

CSTPR

ANNUAL REPORT

2018

Working to improve how

SCIENCE & TECHNOLOGY

policies address societal
needs, through research,
education and service

CENTER FOR
SCIENCE & TECHNOLOGY
POLICY RESEARCH



University of Colorado
Boulder



CENTER & FOR SCIENCE & TECHNOLOGY POLICY RESEARCH

CENTER FOR SCIENCE AND TECHNOLOGY POLICY RESEARCH
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University of Colorado Boulder

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Annual Report
January 1 - December 31, 2018

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University of Colorado **Boulder**



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January 1 - December 31, 2018

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The U.S. Department of State's Office on International Visitors held a meeting with University of Colorado and Israel delegates under the Department of State's International Visitor Leadership Program in May 2018 to discuss "Science and Making Public Policy". CSTPR Director, Max Boykoff (far right), participated in this meeting along with Hanit Lea, Ben Ari, Eran Brokovich, Orit Raphaeli (Israel Ministry of Energy), Ruth Kiro (Israel Ministry of Environmental Protection), Uri Lerner (Consultant on Environment, Technology & policy), and Sharon Soroker (Head Energy).

INTRODUCTION

The Center for Science and Technology Policy Research (CSTPR) was initiated within the Cooperative Institute for Research in Environmental Sciences (CIRES) at the University of Colorado-Boulder in the summer of 2001 and was recognized as an official University center in the summer of 2002 to conduct research, education, and outreach at the interface of science, technology, and the needs of decision makers in public and private settings. Our long-term vision is to “serve as a resource for science and technology decision makers and those providing the education of future decision makers.” Our mission is to improve how science and technology policies address societal needs, including research, education and service.

The following report includes CSTPR highlights from 2018 as well as a complete list of activities. Also included are selected activities of CSTPR faculty affiliates as an indication (not exhaustive accounting) of what those affiliates engage in.

LETTER FROM THE DIRECTOR

Looking across the past calendar year 2018, I am proud that we here in the Center for Science and Technology Policy Research (CSTPR) have been working mindfully and effectively to help confront these urgent and opportune times at the intersections of science, technology, policy, culture and society. As one of four centers in the Cooperative Institute for Research in Environmental Sciences, through research conducted by members of our CSTPR community, we have continued to productively inform connections between and among these pressing, critical and interdisciplinary spaces.



Among highlights you'll read in our 2018 Annual Report, I point out three particular bright spots:

- in Fall 2018, we welcomed Dr. Matt Burgess to CSTPR: Matt has taken up a role as CSTPR Core Faculty along with his responsibilities as CIRES Fellow and Assistant Professor in Environmental Studies and Economics; Matt brings energy and strengths to investigations of global sustainability and relations with species conservation as well as natural resource management (see pages 7-8 for more)
- in 2018 we graduated six students associated with CSTPR (three PhD students, two Master's students and one undergraduate student): their successful matriculation (and next chapters in the workforce) show our ongoing traditions and commitments of training the next generation of science-policy scholars and practitioners (see pages 21-24 for more)

- integrated research projects continued to grow and thrive in CSTPR in 2018 (see pages 11-18 for more), these projects cut across themes of Drivers of Risk Management Decisions, Innovations in Governance and Sustainability, and Science and Technology Policy that we have prioritized through strategic planning over the past few years

Over the past sixteen years or so as a Center, we have cultivated a dynamic terrain of engagement. Among our activities and accomplishments, we have published over four hundred peer-reviewed articles, nearly another four hundred other reports and publications, and we have generated over \$14 million in funding. We also have been referenced in the media over 1,600 times while we have delivered over 800 talks in the state of Colorado, around the country and throughout the world. Now in 2019, we recognize that the arenas of Science and Technology Policy Research have continued to develop from our initial beginnings as a Center. We – as a community of core faculty, affiliates, students, and staff – continue to nimbly and ambitiously shape and adapt to these changes as we rigorously deploy both ‘the hatchet’ as critique and ‘the seed’ as emancipatory research to trigger innovations and improvements in our confrontations at the human-environment interface.

As we continue to invest in our collective futures, we welcome you to engage with us through a number of touch points described in the pages that follow.

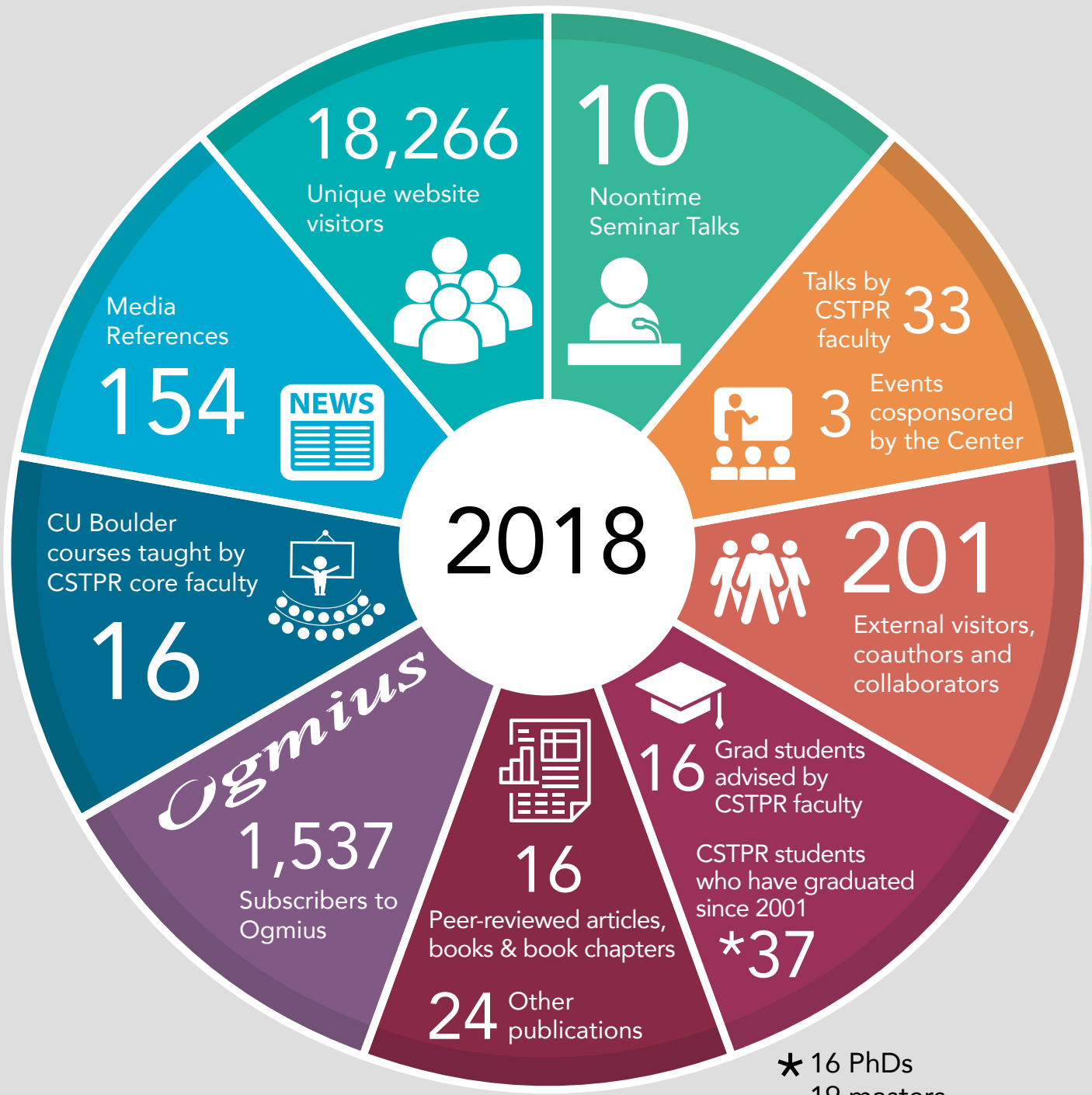
All the best in 2019,

A handwritten signature in blue ink that reads "Max Boykoff". The signature is stylized and cursive.

Max Boykoff, Director
boykoff@colorado.edu

THE CENTER AT A GLANCE

JANUARY 1 - DECEMBER 31, 2018



* 16 PhDs
 19 masters
 1 Masters/MBA
 1 Undergraduate Honors

CSTPR

BY THE NUMBERS 2004-2018

CSTPR has a broad base of funding support that includes: NSF, NOAA, USDA, DOI, USAID, Foundations, State agencies, Private Donors and is very successful at competing for CU internal funds.

\$14,314,450

Total Awards Generating
CIRES Overhead



\$1,556,887

Total Overhead
coming to CIRES
after faculty splits



\$111,206

Total Average
Annual Overhead
Coming to CIRES

CSTPR faculty generated an
additional **\$1,293,411**



non-overhead
generating grants that
supported research,
staff, programs and
students

Grad Student Programs at CSTPR:

- AAAS "CASE" Workshop Competition
- STP Certificate Program
- Red Cross Fellowship Program
- Rad Byerly Award Program
- FOSEP Group



1,263



CSTPR visitors,
coauthors and
collaborators



Seminars at
CSTPR **228**

812

Talks by CSTPR
faculty & students

Peer-reviewed
publications **412**

392

Other
publications



1,609

Media
References





2018 HIGHLIGHTS

- Rad Byerly, Jr. who passed away in 2016, provided inspiration to and guidance in the creation of CSTPR. In recognition of Rad Byerly, Jr.'s contributions, in 2017 CSTPR established the "Radford Byerly, Jr. Award" in Science and Technology Policy. The second winner of the Byerly award was Angela Boag, a Ph.D. candidate in the Environmental Studies Program at CU Boulder (see Education section below for further details).
- The following CSTPR students earned degrees:
 - [John Berggren \(PhD, ENVS\)](#)
 - [Marisa McNatt \(PhD, ENVS\)](#)
 - [Lauren Gifford \(PhD, Geography\)](#)
 - [Emily Ruby \(MS, ENVS\)](#)
 - [Rebecca Page \(MS, ENVS\)](#)
 - [Sofia Corley \(Undergraduate Honors, ENVS\)](#)
- Several CSTPR personnel moved on to pursue new opportunities:
 - [John Berggren \(PhD CU ENVS 2018\)](#) is now a Water Policy Analyst at Western Resource Advocates.
 - [Rebecca Page \(MS CU ENVS 2018\)](#) is now a Project Director at Earth Economics.
 - [Anna Kukkonen \(Fulbright Visiting Scholar\)](#) earned her PhD in 2018 from University of Helsinki in Political Science.
- CSTPR welcomed several new additions to the community:
 - [Matthew Burgess \(CU Boulder\)](#): **CSTPR core faculty member**
 - [Eve-Lyn Hinckley \(CU Boulder\)](#), [Adrienne Kroepsch \(Colorado School of Mines\)](#), and [Shannon Mancus \(Colorado School of Mines\)](#): **CSTPR faculty affiliates**
 - [Fernando Briones \(CU Boulder\)](#), [Lauren Gifford \(CU Boulder\)](#), [Sara Melena \(National Park Services\)](#), [Larry Perez \(National Park Services\)](#), [Kimberly Rogers \(CU Boulder\)](#), and [Melanie Wood \(National Park Services\)](#): **CSTPR Research Affiliates**
 - [Andrew Benham \(CU Boulder\)](#): **CSTPR Undergraduate Student Assistant**
 - [Lydia Messling \(Reading University\)](#) and [Anna Kukkonen \(University of Helsinki\)](#): **CSTPR Visitors**
- Max Boykoff contributed to the Lancet Countdown Report. This report was mentioned by 114 media outlets including The Guardian, CNN, NBC News, New York Times, USA Today, and National Geographic magazine.
- Lisa Dilling and Amanda Carrico presented at the 2018 Fall American Geophysical Union meeting; At this meeting Max Boykoff also co-convended a panel (titles listed in Appendix).
- Max Boykoff and CSTPR Alum Gesa Luedecke contributed a paper "Environment and the Media" to CHOICE Book Award Winner, The International Encyclopedia of Geography: People, the Earth, Environment, and Technology.
- Jennifer Katzung, as a representative of CSTPR, was awarded the Green Office Certification from the CU Boulder Leadership Council. CSTPR received the award at the Campus Sustainability Summit in April 2018.
- CSTPR Graduate Student, Olivia Pearman was awarded the Colorado Governor's Energy & Environment Fellowship to work with the Department of Natural Resources on Greater sage-grouse conservation issues in Colorado.
- CSTPR Graduate Student, Jeremiah Osborne-Gowey was awarded the lead Teach Assistant position with the Graduate Teacher Program (GTP) at University of Colorado Boulder for the 2018-2019 academic year.
- CSTPR graduate student and Red Cross Red Crescent Climate Centre intern, Katie Chambers, and CU Environmental Engineering's Sherri Cook were awarded the 2018 Research & Innovation (RIO) Seed Grant for their project "Resilient and Sustainable Sanitation Systems: Characteristics, Links, and Barriers" (PI Sherri Cook, with these collaborators: CSTPR Director Max Boykoff, CSTPR Affiliate Amanda Carrico, Dr. Trisha Shrum). The seed grant will provide funding to evaluate the social, economic, and technical characteristics of resilient sanitation systems and to integrate this work with existing sustainability research to develop strategies and recommendations to increase access to and long-term performance of sanitation systems.

Left Photo: Climate Scientist, Katharine Hayhoe, visits with CSTPR faculty members and affiliates on September 6, 2018. Photo: Ami Nacu-Schmidt.

2018 HIGHLIGHT

CSTPR WELCOMES ENVIRONMENTAL ECONOMIST MATTHEW BURGESS

Matt Burgess melds ecology, economics, and policy in his work—forming a new connection between CIRES and CU Boulder’s department of Economics.

At CIRES, Burgess will continue his research to explore the relationship between human activity and ecological change. In recent years, for example, he has explored environmental policies such as NOAA’s bycatch rule for marine mammals. Bycatch—the accidental killing of sea life during fishing operations—is a complicated problem that demands an understanding of not only the environment, but of people’s economic motivations.

“Economics is just the ecology of people,” said Burgess. “I’ve blended the two disciplines throughout my education and research career.”

Burgess, originally from Montreal, Canada, received his Ph.D. in Ecology, Evolution, and Behavior from the University of Minnesota in 2014. He completed his postdoctoral research



Dr. Rashid Sumaila introducing Matt Burgess for a talk he gave at University of British Columbia on November 16, 2018. Photo: Juliano Palacios-Abrantes.

at the University of California, Santa Barbara. Today, his research focuses on natural resource management, strategies for ecological conservation, and the economics and ecology of global sustainability.

Burgess is currently working on a new study investigating when environmental regulators can get away with regulating proxies for pollutants instead of the pollutants themselves. For instance, exploring the question: when is a gas tax an acceptable substitute for a carbon tax?

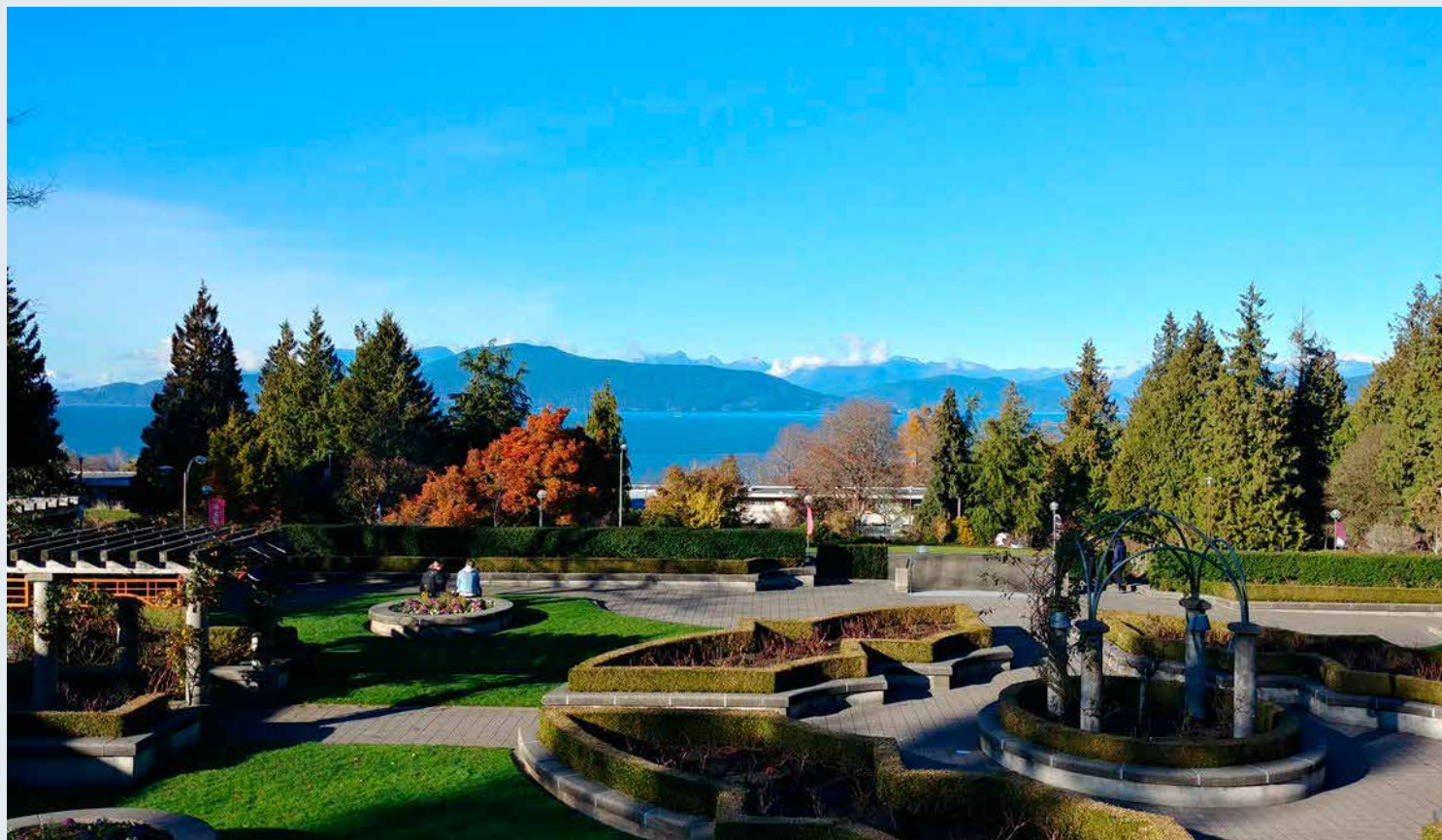
"I am very excited to have Matt join our CIRES faculty," said CIRES Director Waleed Abdalati. "His expertise in environmental economics will add an important new dimension to our research portfolio, complementing our strengths in the natural sciences and science policy. His expertise in the economics of environmental decisions provides a critical interface between the research we do at CIRES, and the implications for people and businesses."

Burgess' home department at CU Boulder will be the Environmental Studies Program, where he is an Assistant Professor, and he has a courtesy appointment in Economics.

In fall 2018, Burgess taught "Natural Resource Economics," an undergraduate course, and will add graduate-level courses in the near future. He will also supervise a postdoctoral researcher in mathematical sustainability science.

Burgess has published his research in *Science*, the *Proceedings of the National Academy of Sciences*, *Marine Policy*, and more. He is also an active writer and communicator, with articles and opinion pieces featured in several U.S and Canadian news outlets, and he maintains an active presence on social media (@matthewgburgess).

When he's not doing research, you can find Burgess spending time with his wife and one-year old son, Theo, playing guitar and singing, or playing soccer, hockey and golf. He has also been known to try his hand at snowblading, a winter sport in which riders zip down snowy slopes using shortened skis and no poles.



University of British Columbia campus. Photo: Matt Burgess.



Lisa Dilling presenting at the American Geophysical Union Annual Meeting on December 13, 2018. Photo: Lisa Dilling.

CORE FACULTY

CSTPR core faculty are University of Colorado faculty who conduct research through CSTPR in accordance with agreements with their home departments, and who typically maintain an office and active presence in the Center. They are appointed by the CSTPR Director for renewable 2- year terms.

MAX BOYKOFF

Director

Max Boykoff is the Director of the Center for Science and Technology Policy, which is part of the Cooperative Institute for Research in Environmental Sciences at the University of Colorado Boulder. He also is an Associate Professor in the Environmental Studies program.



He earned a Ph.D. in Environmental Studies from the University of California-Santa Cruz and Bachelor of Sciences in Psychology from The Ohio State University.

Max has ongoing interests in cultural politics and environmental governance, science and environmental communications, science-policy interactions, political economy and the environment, and climate adaptation. He has consequently has produced many peer-reviewed journal articles, book chapters and books in these subjects.

Home page: http://sciencepolicy.colorado.edu/about_us/meet_us/max_boykoff

Twitter: [@boykoff](https://twitter.com/boykoff)

MATTHEW BURGESS

Matthew Burgess is an Assistant Professor in Environmental Studies, with a courtesy appointment in Economics. His

research focuses on natural resource management, endangered species conservation, and issues in global sustainability. Matthew uses a combination of mathematical and computer modeling, data synthesis, and collaboration with stakeholders, in order to make conceptual advances and link them to practice. Matthew received his Ph.D. in Ecology, Evolution, and Behavior from the University of Minnesota in 2014. He completed his postdoctoral research at the University of California, Santa Barbara. Today, his research focuses on natural resource management, strategies for ecological conservation, and the economics and ecology of global sustainability.



Home page: https://sciencepolicy.colorado.edu/about_us/meet_us/matthew_burgess

Twitter: @matthewgburgess

LISA DILLING

Associate Director

Lisa Dilling is Associate Professor of Environmental Studies, a Fellow of the Cooperative Institute for Research in Environmental Sciences (CIRES) and a member of the Center for Science and Technology Policy Research at the University of Colorado, Boulder. She is PI and Director of the Western Water Assessment, a NOAA Regional Integrated Sciences and Assessment project that studies and facilitates the use of climate information in decision making in the Intermountain West. Her scholarship focuses on decision making, the use of information and science policy. Her research topics include drought and urban water management, climate adaptation in cities and on public lands, carbon management, and geoengineering governance. She is the author of over 40 peer-reviewed journal articles and book chapters, co-editor of the book, *Creating a Climate for Change: Communicating Climate Change, Facilitating Social Change* and was Co-leader and co-author of the *State of the Carbon Cycle Synthesis and Assessment Product 2.2* for the U.S. Global Change Research Program. She was the recipient of a 2016 Leverhulme Visiting Professorship hosted by Oxford University, UK. She holds a PhD in biology from the University of California Santa Barbara and a BA in biology from Harvard University.



Home page: http://sciencepolicy.colorado.edu/about_us/meet_us/lisa_dilling

Twitter: @LisaD144

BRUCE GOLDSTEIN

Bruce Goldstein is an Associate Professor in the Program in Environmental Design and the Program in Environmental Studies at the University of Colorado Boulder, and a faculty research associate in the Institute for Behavioral Science. He examines how communities can combine forces to adapt to social and ecological challenges and foster transformational change. Bruce pursues this question through research partnerships with learning networks, which enable place-based learning and system-wide adaptation to innovate solutions that are site-specific and applicable network-wide. He partners with netweavers who are attempting to promote positive change across critical social and ecological thresholds. His research is qualitative and interpretive and applies the principles of participatory action research. His past work includes a 6-year study of the U.S. Fire Learning Network, a novel multi-scalar collaborative approach to restoring disrupted fire regimes across multi-jurisdictional landscapes, and the edited book *Collaborative Resilience: Moving Through Crisis to Opportunity* (MIT Press 2011), which focuses on how crises can be opportunities for collaboration, consensus building, and transformative resilience.



Home page: http://sciencepolicy.colorado.edu/about_us/meet_us/bruce_goldstein

STEVE VANDERHEIDEN

Steve Vanderheiden (Ph.D., University of Wisconsin-Madison) is Associate Professor of Political Science and Environmental Studies at the University of Colorado at Boulder, as well as Professorial Fellow at the Centre for Applied Philosophy and Public Ethics (CAPPE) in Australia. He joined the CU-Boulder faculty in 2007, and specializes in normative political theory and environmental politics, with a particular focus on global governance and climate change. In addition to numerous published articles and book chapters on topics ranging from Rousseau's environmental thought to the politics of SUVs, and edited books on political theory approaches to climate change, energy politics, and environmental rights, his *Atmospheric Justice: A Political Theory of Climate Change* (Oxford, 2008) won the 2009 Harold and Margaret Sprout award from the International Studies Association for the best book on international environmental politics.



Home page: http://sciencepolicy.colorado.edu/about_us/meet_us/steven_vanderheiden



RESEARCH

CSTPR conducts research at the interface of science and decision making on a broad range of topics, organized under the following themes:

- Science and Technology Policy
- Innovations in Governance and Sustainability
- Drivers of Risk Management Decisions
- Communication and Societal Change

CSTPR researchers also engage in many related cross-cutting projects. Examples of CSTPR's 2018 research projects are described below.

SCIENCE AND TECHNOLOGY POLICY

Under this theme we analyze decisions at the science-policy interface, including making public and private investments in science and technology, governing the usability of scientific information, and critically engaging the scientific and technical construction of emerging issues. Projects include:

Balancing Severe Decision Conflicts Under Climate Extremes in Water Resource Management

Lisa Dilling; PI; project team includes Joseph Kasprzyk and Rebecca Smith, University of Colorado Department of Civil, Environmental and Architectural Engineering; Imtiaz Rangwala, Kristen Averyt, and Eric Gordon, CIRES/WWA; Laurna Kaatz, Denver Water; and Leon Basdekas, Colorado Springs Utility

The project team represented an interdisciplinary collaboration (policy, social science, engineering, operations research, climatology) between academics and water utility practitioners from 6 water providers in Colorado's Front Range. Water managers and

researchers worked together to define the problem formulation (policy levers, objectives and constraints) that informed multiobjective evolutionary algorithms (MOEAs) and combined with a representative water resources simulation model for a range of extreme climate scenarios. This Testbed approach resulted in a visualization of the decision space that may in fact expand the alternatives that still meet managers' decision criteria and allowed managers to be able to visualize these more clearly than traditional tools. In our final step we queried managers about the tool, its results, and the process involved in incorporating such a tool into practice for helping to make decisions in anticipation of future extreme events. We analyzed these results and made some inferences about the viability of MOEAs and the larger issue of incorporating new tools into practice for urban water utilities.

The project produced the following article:

Smith, R., J. Kasprzyk, and L. Dilling, 2019. Testing the potential of Multiobjective Evolutionary Algorithms (MOEAs) with Colorado water managers. *Environmental Modelling & Software*, Vol. 117, pp. 149-163, <http://doi.org/10.1016/j.envsoft.2019.03.011>.

Left Photo: CU Boulder graduate student Molly McDermott fits a Barn Swallow with a geolocator tag at a colony in Hygiene, CO as part of an Inside the Greenhouse project. These tags will store data on an individual bird's movements during migration and the non-breeding season. Photo: Nancy Tankersley.

Knowledge, Power and the Coproduction of Climate Information for Adaptation to Climate Change in Tanzania

Lisa Dilling, Meaghan Daly, Mara Goldman and Eric Lovell

This project aimed to improve understanding of processes to effectively link climate information and adaptation at national and local scales in Tanzania. The approach was to explicitly recognize and examine the ways in which the varying epistemological traditions and relations of power among vulnerable communities, disaster management professionals, and climate experts influence the perceived value of climate information for improved early warning and climate adaptation. The primary research question was “what processes or institutions can support improved application of technical climate information to facilitate successful adaptation to climate related disasters?” This research drew upon theoretical contributions from the fields of science policy, disaster research, science and technology studies (STS), and political ecology to support a mixed-methods research approach to explore practices and modes of engagement that may best facilitate the production of usable science that can be successfully integrated within adaptation decision-making and policy development processes. This project was supported by the NSF, CU Seed Grant Fund and the USAID.

The project produced the following article:

Daly, M. E. and L. Dilling. The politics of ‘usable’ knowledge: Examining the development of climate services in Tanzania. In revision with *Climatic Change*.

Building a Network of VAR (Vulnerability, Adaptation, Resilience) Researchers in the Intermountain West

Lisa Dilling, Lead

The intermountain west is home to many researchers who study aspects of climate vulnerability, adaptation and resilience. Most of us attend national conferences such as AAG, AGU, AMS and the like, and many of us work within specialized networks such as fire, water, forest ecosystems, and so on. However, building resilience to climate change is a goal that requires bringing together different perspectives and sectors in order to ensure that system linkages are considered at the regional scale. Also, there is great synergy in linking together researchers at the regional scale, who might not otherwise be connected both to share research with each other, and to promote interactions with stakeholders who might help shape research agendas to produce usable science for decision making. Finally, there is the opportunity to share ideas and resources across different research organizations throughout the intermountain west, from very large public universities such as CU Boulder, to smaller universities

like Western State, to the various federally-funded centers and independent research organizations. To our knowledge, there is not currently any network regionally that cuts across all the sectors and focuses on the region as a whole for VAR research.

The work entailed some initial web research to develop a preliminary list of researchers to include in an initial proposed network. We then developed a short web-based survey to collect information on ongoing projects, region-based work, sector involvement, engagement with stakeholders, network connections, and interest in future activities. This survey will help to inform a website that will serve as an introduction to the VAR community capacity in the region, complete with illustrations of projects and listings of researchers.

This project would be the starting point for building a sustained network for resilience that links researchers and practitioners engaged in knowledge-action research across the region. Our goal is to make visible and develop the researcher network that we would then build on in future years to create a more complete practitioner/researcher network for engaged research.

Session at National Adaptation Forum 2019: Developing an Intermountain Region Resilience, Adaptation, and Vulnerability (RAV) Community of Practice, Dr. Corrie Knapp and Lisa Dilling.

INNOVATIONS IN GOVERNANCE AND SUSTAINABILITY

Under this theme we study innovations in governance and the complexity of sustainability challenges, including the development of (1) new institutions that transcend conventional political boundaries or bring actors together in new ways, (2) new tools and experimental interventions for inducing behavioral change or enabling participation in decision making, and (3) new forms of association in the creation and protection of collective goods. Projects include:

Ocean Halos: Marine Zoning in Small-Island Countries

Matthew Burgess

This project examines the accidental subsidies small-island countries provide to foreign fishing fleets, and strategies they may use to recover some of the value, as well as limit the damage to their fish stocks. The territorial waters of small-island countries tend to have less fishing pressure and healthier fish populations than nearby high seas. As a result, fish flow across the territorial boundaries, and foreign fishing effort concentrates near these boundaries, to benefit from the fish spillover. This spillover is effectively a subsidy, which comes at a cost to

the domestic fish stocks. We are designing new marine zoning policies that could allow small-island countries to recover some of the value of these accidental subsidies, and limit their ecological damage. These policies would involve small-island countries leasing small amounts of fishing rights within their waters to foreign vessels, and using the proceeds for domestic projects such as conservation or community development. The Sustainable Fisheries Group at University of California Santa Barbara, and The Nature Conservancy, are partners in this project.

Locally Managed Marine Areas

Bruce Goldstein, PI; Sarah Schweizer, graduate student; Vicki Goldstein, associate

Natural resource and conservation practitioners are increasingly realizing the importance of having networks of locally managed marine areas (LMMAs). These are areas of ocean managed by local, coastal communities for the protection of fisheries, culture, and biodiversity and have proven effective in reducing local conflicts over fisheries, conserving marine biodiversity and improving catches. Globally, there are number of marine area networks each encompassing a diversity of approaches to coastal management and governance. What is common to LMMAs, however, is the shared involvement of coastal communities in marine and fisheries management.

The LMMA Network is a group of practitioners involved

in various community-based marine conservation projects around the globe who have joined together to learn how to improve their management efforts and spans the people and cultures of Southeast Asia, Melanesia, Micronesia, Polynesia and the Americas. One of the primary goals of the LMMA Network is to learn under what conditions using an LMMA strategy works, doesn't work, and why. We are working with the LMMA Network to better understand how learning networks evolve and adapt to changing knowledge and attitudes via adaptive policy-making.

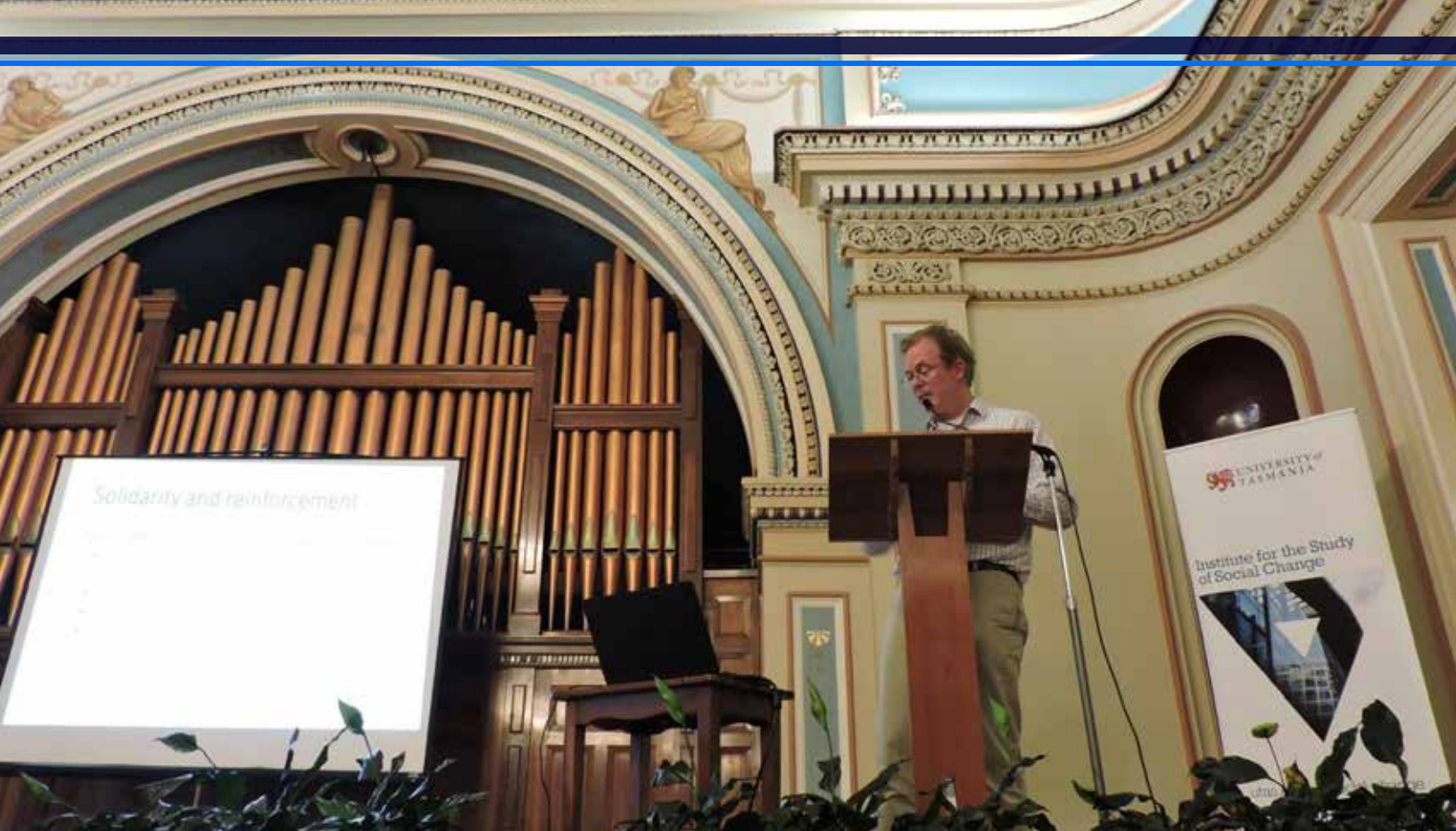
“Social-Impact Network” for Wildfire Adaptation

Bruce Goldstein

In the face of natural hazards, resource scarcity, climate change, and other social-ecological challenges, how does a community adapt, and how can communities combine forces to contribute to transformational change? Dr. Bruce Goldstein sees communities as the engine for institutional transformation. By organizing themselves into “learning networks,” communities can apply local knowledge to address issues that are very specific to their place and time, and team together to transform unstable practices into sustainable ones. Learning networks enable people to create new ideas by serving as a laboratory for best practices, and a forum for addressing basic questions like, “What is the system in which I live and how do I

Katie Clifford presenting at a Vulnerability, Consequences and Adaptation Planning Scenarios meeting in Carbondale, Colorado on September 26, 2018. Photo: Lisa Dilling.





Steve Vanderheiden speaking at the Hobart Town Hall Meeting on Climate Justice at the University of Tasmania on February 8, 2018. Photo: Matthew Rimmer.

want to change it?" Goldstein has been studying the Fire Adapted Communities Learning Network (FACNET), which is aimed at connecting communities from across the United States in order to solve complex issues associated with wildfire adaptation. The project's aim is to enhance our insight into the network through constant interaction and exchange with the netweavers, applying a participatory action research approach, and learning together in ways that enhance the ability to adapt their network design.

STEM Learning Network

Bruce Goldstein

STEM Education Centers serve as incubators for transformational changes of higher education practices and culture. By creating and studying a national network of university-based centers of STEM education, we will incubate, support, and leverage key institutional resources – both individual centers and a national network of centers. Research on a network of these centers can delineate the potential impacts of the network itself, the nature of such a network, and foundational studies on how such a network is created. These studies will serve to inform the development of the network itself, providing a dynamic, more robust, and more likely-to-be-sustained network. This project will engage in three intertwined components:

1. seeding the development of a network through programmatic work,
2. studying the capacities and mechanisms of individual centers (how they operate within institutional contexts), and
3. researching the development of a network of such centers, identifying how such a network forms, and what this network may accomplish.

Environmental Rights and Adaptation to Climate Change

Steve Vanderheiden

This project is a collaboration with philosophers, lawyers, and scientists to investigate the governance and allocation of surface waters under increasing scarcity. By looking at policies in California, Australia, and the Netherlands, Vanderheiden and his colleagues hope to inform funding bodies and government agencies how water use can be fairly prioritized. In the western U.S., senior water rights are currently over-allocated because they are based on historical amounts of water; however, these assumptions on available water no longer hold as water has become scarcer. There are constraints on what we can feasibly do with water since for any reasonable water reform to occur, the water rights holders must first see the benefit of the

reform. Fortunately, many recognize that our existing system of dealing with surface water is not sustainable given expected changes in rain, water flow, and population growth. Possible solutions range from community-driven efforts such as xeriscaping to federal-level efforts such as buying up water rights (as is happening in Australia). Vanderheiden will look at the case of the Colorado River, linking it to a very similar, overdrawn river in Australia and parsing out the similarities and differences in governance and what kind of reform opportunities are available.

Water Equity Project Workshop

Steve Vanderheiden

Water governance is perhaps the least explored contemporary environmental policy domain to which the equity lens has thus far been minimally applied, with the result that equity criteria are not well understood in and have yet to be systematically applied to this institutional context. Unlike the oceans or climate system, which involve resources in the global commons, require cooperation in their sustainable management, and have undergone significant recent international regime building, territorial water systems have avoided these features of resource management regimes that generate equity norms, and transboundary water systems have largely confined equity norms to interstate allocation issues, rather than mapping them across levels of analysis. But equity remains an important and under-researched objective within the governance of water systems across scales, and poses an increasingly urgent challenge in domestic and transboundary contexts. Increasing demand for water resources combined with decreasing flows places growing stress on antiquated systems of riparian law, raising issues of prioritization among water right holders under drought conditions that call for equity analyses. Adaptation planning likewise may involve long-term water rationing criteria as well as necessitating the development of conservation programs and flood and drought resilience programs. Controversies around the transfer of water rights among users and uses involve equity concerns, and can best be resolved by considering them as such. Finally, as equity principles suitable for informing water allocation decisions are most legitimately derived through stakeholder participation in water governance, equitable procedures as well as outcomes will drive and be driven by innovative processes in the governance of water resources, as democratic institutions must also be equitable ones.

This project will seed a research program to be based at CSTPR around equity norms in water governance at multiple scales. The project's empirical components include the development of new case studies on equity conflicts in water allocation or the transfer of water rights within the Colorado river basin, from archival materials as well as field data collection (interviews, survey research,

etc.), and the development of an innovative game-based participatory allocation tool that will allow for collection of data on stakeholder equity preferences. Theories of institutional effectiveness from environmental governance literature anchor the framework, which also relies upon a normative framework for assessing water equity. Expected outputs include publications in interdisciplinary environmental policy and governance journals, a research report designed to inform policymakers and stakeholders, and the public presentation of findings in various fora.

DRIVERS OF RISK MANAGEMENT DECISIONS

Under this theme we interrogate how individuals and institutions – at local, regional, national, and international scales – make decisions to respond and adapt to perceived risks, and what factors promote or inhibit effective decision making. Projects include:

Advancing the Use of Drought Early Warning Systems in the Upper Colorado River Basin

Lisa Dilling, Co-PI: Ben Livneh, Lead PI, CEAE CU Boulder; Bill Travis, Co-PI, GEOG CU Boulder; Jeff Lukas, Co-PI, WWA CU Boulder; Nolan Doesken, Co-PI, CO State Climatologist and Colorado State University; Eric Kuhn, Co-PI, Colorado River District; Rebecca Smith, ENVS Graduate Student Researcher)

The largely rural Western Slope of Colorado encompasses much of the headwaters of the Colorado River, a critical regional water resource used to meet multiple demands across a landscape that is frequently subject to drought. Water managers and users in this region rely on snowpack as a form of seasonal water storage as well as an indicator of drought. Climate change projections indicate that the regional warming trend will continue, causing the snowpack to melt earlier and produce less runoff for the same precipitation input, and potentially reducing its utility as a drought indicator. This project will identify opportunities to improve drought risk management by characterizing decision processes related to drought risk and describing the current use of information among water providers in the Western Slope. Then, we will assess whether snowpack indicators will remain good predictors of seasonal water supplies under a warming climate. The first element of the project will consist of in-depth interviews, participant observation, document analysis and focus groups of five Western Slope water entities. The second element will evaluate the robustness of current snow-based drought indicators, estimate the change in robustness under projected future climate warming using modeled data, and explore the implications of changing robustness for climate adaptation resilience through focus groups with water managers.

The project produced the following article:

Page, R. and L. Dilling. Finding new ground for advancing hydro-climatic information use among small mountain water systems. In revision with *Weather, Climate and Society*.

Vulnerability, Consequences and Adaptation Planning Scenarios (VCAPS)

Lisa Dilling

In the summer and fall of 2018, Dilling along with many members of the Western Water Assessment (WWA) Team led a series of five workshops in small towns on the Western Slope of Colorado and southern Utah following a method called VCAPS pioneered by a sister RISA in coastal communities in North and South Carolina. VCAPS had not been used before in the intermountain west, and we wanted to understand how it might work to help communities understand their climate context and plan for resilient actions going forward. The intensive process began with selecting towns who are interested in participating. The team then conducted interviews with key participants involved in the hazard of interest (in our cases mostly drought and/or flooding), created a science presentation tailored to the content and interests of the town, conducted a two-day workshop with participants to diagram in real time the cascade of consequences from climate stressors to aspects that matter to residents, and wrote an extensive report that was provided back to the town. We have already received follow-up requests from the towns involved, and all communities said they valued the process and are taking steps to make their communities more resilient. We also plan to write a peer-reviewed paper on the process and outcome.

Interactions of Drought and Climate Adaptation (IDCA) for Urban Water

Lisa Dilling

Municipalities have responded in various ways to past droughts, enacting a variety of policies to cope with temporary shortages in water supply. These measures have been largely successful at reducing short-term demand during drought events, as well as constraining the long-term per capita consumption of water even as population grows. Now, though, water systems also face the likelihood of long-term climate change, raising a fundamental question: have previous responses to short-term drought events led to more resilient urban water systems across climate time scales? This line of inquiry requires addressing the dynamic nature of vulnerability, which may vary across scales, sectors, and over time. With this in mind, we propose to examine how drought policies interact with both short-term drought and long-term climate change through detailed quantitative and

qualitative analysis of selected municipal water systems. We are pursuing a three-step approach that includes a comparative literature review of the drought management and climate adaptation literatures, preliminary interviews focused on drought response of 20 municipalities across the U.S. and in-depth case studies of three metropolitan water systems.

The project produced the following articles:

Dilling, L., M. Daly, R. Klein, D. Kenney, K. Miller, A. Ray, W. Travis, and O. Wilhelmi, 2018. Drought in urban water systems: Learning lessons for climate adaptive capacity. *Climate Risk Management*. <https://doi.org/10.1016/j.crm.2018.11.001>.

Dilling, L., J. Berggren, J. Henderson, and D. Kenney, 2019. Savior of rural landscapes or Solomon's Choice? Colorado's experiment with Alternative Transfer Methods for water (ATMs). *Water Security*, Vol. 6. <http://doi.org/10.1016/j.wasec.2019.100027>.

Red Cross/Red Crescent Climate Centre Fellowship Program

Max Boykoff

CU-Boulder has partnered with the Red Cross Red Crescent Climate Centre (RCRCCC) to place graduate students in locations in eastern and southern Africa each summer. This collaborative program targets improvements in environmental communication and adaptation decision-making as well as disaster prevention and preparedness in the humanitarian sector. It connects humanitarian practitioners from the Red Cross/Red Crescent Climate Centre – an affiliate of the International Federation of Red Cross and Red Crescent Societies – with graduate student researchers at the University of Colorado who are interested in science-policy issues. Through this program we strive to accomplish three key objectives:

1. to improve the capacity of humanitarian practitioners within International Federation of Red Cross and Red Crescent Societies network at the interface of science, policy and practice
2. to help meet needs and gaps as well as work as a research clearinghouse in environmental communication and adaptation decision-making in response to climate variability and change, as identified through Red Cross/Red Crescent Climate Centre priorities and projects
3. to benefit graduate students by complementing the classes and research that they undertake in their graduate program with real-world experience in climate applications and development work

Emerging Responses to Genetically Modified Crops in Boulder County

Amanda Carrico

Significant increases in global food production will be necessary in the coming decades to meet rising demand. Compared to conventional and organic agriculture, genetically modified (GM) crops have demonstrated higher yields, reduced chemical pesticide use, and increased farmer profits. These benefits have been observed without significant negative impacts to the environment or human health. Yet all new technologies come with risks, and despite the potential environmental and social benefits of GM crops, communities around the world have been reluctant to accept this emerging technology. The cultivation or import of GM foods have been banned in many countries and the regulatory process in the United States is burdensome. Fewer than 40% of Americans agree that GM foods are safe for human consumption. In fact, the difference between scientists and the general public in their beliefs about GM crops is larger than corresponding gaps on human evolution, anthropogenic climate change, and mandatory vaccinations. While some researchers have begun to investigate the association between public knowledge and support for policies regulating GM foods, further research is needed.

This project was launched to examine the co-evolution of policy making and public perceptions surrounding GM crops in Boulder County. Boulder County is an ideal place

to examine the emergence of laws and norms regarding GM technology. In 2016, Boulder County passed a resolution to phase out the use of genetically modified herbicide-resistant crops on county-owned land. This measure effectively banned the use of GM sugar-beets and corn, which were grown on county-owned land at the time that the measure was passed. The Boulder County Cropland Policy allows for the use of new GM crops to be reviewed on a case-by-case basis, and two newly approved crops (potatoes and apples) will likely receive consideration in the coming years. As one expert panelist at a Boulder County hearing expressed, "What happens in Boulder will be regarded as a bellwether, given that Boulder is really the epicenter of the organic food industry in the U.S."

The research team is assessing the public discourse surrounding Boulder's GM policy through a qualitative analysis of public comments submitted in advance of the recent amendment to Boulder County's cropland policy. A manuscript describing these findings is currently in development. The research team has also extended this project to examine the emerging technology of cultured meat. The research team submitted a grant proposal to the National Science Foundation's Decision Risk and Management Sciences program in January entitled *Making sense of meat without animals: Evolving media representations and consumer perceptions of cellular agriculture*. Amanda Carrico (PI), Pete Newton (Co-PI), Max Boykoff (Co-PI), Alastair Norcross (Co-PI). Submitted to the National Science Foundation in January 2019. Amount requested: \$485,000.

2018 Red Cross/Red Crescent Climate Centre Fellow, Juhri Selamet (left) and Edson Rodriguez (right) at the Mozambique Red Cross. Photo: Juhri Selamet.





The 2018 Annual Meeting of The Lancet Countdown: Tracking Progress on Health and Climate Change. Photo: Olivia Pearman.

COMMUNICATION AND SOCIETAL CHANGE

Under this theme we experiment and conduct critical analysis as we study communication strategies and engagement in varying cultural, political and societal contexts. Projects include:

Inside the Greenhouse

Max Boykoff, Beth Osnes, Rebecca Safran, Phaedra Pezzullo, co-founders

Inside the Greenhouse works to deepen our understanding of how issues associated with climate change are/can be communicated, by creating artifacts through interactive theatre, film, fine art, performance art, television programming, and appraising as well as extracting effective methods for multimodal climate communication.

The project produced the following articles:

Boykoff, M. and B. Osnes, 2019. A Laughing Matter? Confronting Climate Change through Humor, *Political*

Geography, 68(1), 154-163. <http://doi.org/10.1016/j.polgeo.2018.09.006>.

Boykoff, M. and D. Oonk, 2018. Evaluating the perils and promises of academic climate advocacy, *Climatic Change*. <http://doi.org/10.1007/s10584-018-2339-3>.

Boykoff, M., B. Osnes, and R. Safran, 2018. Contando historias de la ciencia del cambio de clima 'Dentro del Invernadero', in *Comunicación Audiovisual de la Ciencia* [co-editors G.O. Gómez, B. León, and M. Francés i Domènec] Special Issue, TV Morfosis CNTD.

Media and Climate Change Observatory (MeCCO)

Max Boykoff

MeCCO monitors 89 sources (across newspapers, radio and TV) in 41 countries in seven different regions around the world. We assemble the data by accessing archives through the Lexis Nexis, Proquest and Factiva databases via the University of Colorado libraries. These sources are selected through decision processes involving weighting of three main factors:

1. geographical diversity (favoring a greater geographical range)
2. circulation (favoring higher circulating publications)
3. reliable access to archives over time (favoring those accessible consistently for longer periods of time)

This project produced the following papers:

Ghosh, A. and M. Boykoff, 2019. Framing hegemonies of sustainability and climate change: Deconstructing discourses in the vernacular and English language media on Sundarbans, India, *Geoforum*. <http://doi.org/10.1016/j.geoforum.2018.11.014>.

Watts, N., M. Amann, N. Arnell, S. Ayeb-Karlsson, K. Belesova, H. Berry, T. Bouley, M. Boykoff, P. Byass, W. Cai, D. Campbell-Lendrum, J. Chambers, M. Daly, N. Dasandi, M. Davies, A. Depoux, P. Dominguez-Salas, P. Drummond, K.L. Ebi, P. Ekins, L. Fernandez Montoya, H. Fischer, L. Georgeson, D. Grace, H. Graham, I. Hamilton, S. Hartinger, J. Hess, I. Kelman, G. Kiesewetter, T. Kjellstrom, D. Kniveton, B. Lemke, L. Liang, M. Lott, R. Lowe, O.S. Maquins, J. Martinez-Urtaza, M. Maslin, L. McAllister, S.J. Mikhaylov, J. Milner, M. Moradi-Lakeh, K. Morrissey, K. Murray, M. Nilsson, T. Neville, T. Oreszczyn, F. Owfi, O. Pearman, D. Pencheon, S. Pye, M. Rabhaniha, E. Robinson, J. Rocklöv, O. Saxer, S. Schütte, J.C. Semenza, J. Shumake-Guillemot, R. Steinbach, M. Tabatabaei, J. Tomei, J. Trinanes, N. Wheeler, P. Wilkinson, P. Gong, H. Montgomery, and A. Costello, 2018. The 2018 Report of The Lancet Countdown on Health and Climate Change, *The Lancet*, 391(10120), 581-630.

Boykoff, M., J. Katzung, and A. Nacu-Schmidt, 2018. Media and Climate Change Observatory Monthly Summary of News, Center for Science and Technology Policy Research, Cooperative Institute for Research in Environmental Sciences, University of Colorado, http://sciencepolicy.colorado.edu/icecaps/research/media_coverage/summaries.

Boykoff, M., J. Katzung, and A. Nacu-Schmidt, 2018. A Year-end Review of Media Coverage of Climate Change and Global Warming in 2018, Media and Climate Change Observatory, Center for Science and Technology Policy Research, Cooperative Institute for Research in Environmental Sciences, University of Colorado, https://scholar.colorado.edu/mecco_summaries.

Environmental and Science Communication Workshops and Curriculum (MeCCO)

Phaedra C. Pezzullo, lead; Co-PIs, Cassandra Brooks and **Max Boykoff**

In Summer 2018, four graduate students in ENV5 and COMM were funded for part-time research. From this, they

created a resource guide of science and environmental communication centers, identifying key documents for public circulation. More rigorously, they identified classes across the university curriculum that might be considered as part of a science and environmental communication undergraduate certificate. From that research, Prof. Pezzullo developed a proposal that has been vetted by administrators, who advised proposing a Minor (or more) in the new College of Media, Communication, and Information. Prof. Pezzullo garnered support from colleagues in the college. Then, she and Prof. Boykoff met with their colleagues Prof. Osnes and Prof. Safran to verify the most helpful narrative about the curriculum and to deliberate how many degrees are relevant to develop at this time. We are excited that no significant barriers have been identified yet, and we hope the outcome will support undergraduate education on campus in interdisciplinary, timely, and innovative ways.

An example of a CSTPR cross-cutting project that falls within more than one of the other themes.

ICECaPs: International Collective on Environment, Culture & Politics

Max Boykoff

The International Collective on Environment, Culture and Politics is a research group that examines some of today's most pressing environmental issues. ICECaPs members and affiliates cross disciplines to apply a wide range of theories and perspectives to study issues at the human-environment interface. We work across scales from the individual to the global. ICECaPs explores the complex and dynamic cultural and political dimensions of environmental problems at the intersection of science and society. Individual members confront a broad range of issues such as adaptation to environmental hazards, energy conflicts, polarization of climate politics, disposal of hazardous materials, alternative environmental policies, and public engagement with and understanding of complex environmental problems. Through both empirical and theoretical work, we seek to improve understanding and broaden the discussion about the nature of evolving environmental challenges.



“The nature and scale of the response to climate change will be the determining factor in shaping the health of nations for centuries to come.”

The 2018 report of the *Lancet* Countdown on health and climate change

THE LANCET

The best science for better lives

RESEARCH HIGHLIGHT

2018 LANCET COUNTDOWN ON HEALTH AND CLIMATE CHANGE RELEASED

Research from 27 global institutions including CU Boulder show extreme heat damages health and livelihood and may overwhelm hospitals

New research published in The Lancet medical journal last night shows that rising temperatures as a result of climate change are already exposing us to an unacceptably high health risk and warns, for the first time, that older people in Europe and the East Mediterranean are particularly vulnerable to extremes of heat, markedly higher than in Africa and SE Asia.

Leading doctors, academics and policy professionals from 27 organizations, including CIRES fellow and Center for Science and Technology Policy Research (CSTPR) director Max Boykoff and Olivia Pearman, Lucy McAllister, Meaghan Daly from CU's Media and Climate Change Observatory, have contributed analysis and jointly authored the report: <https://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2818%2932594-7/fulltext>. As members of The Lancet Countdown: Tracking Progress on Health and Climate Change, partners behind the research include the World Bank, World Health Organization (WHO), University College London and Tsinghua University, among others.

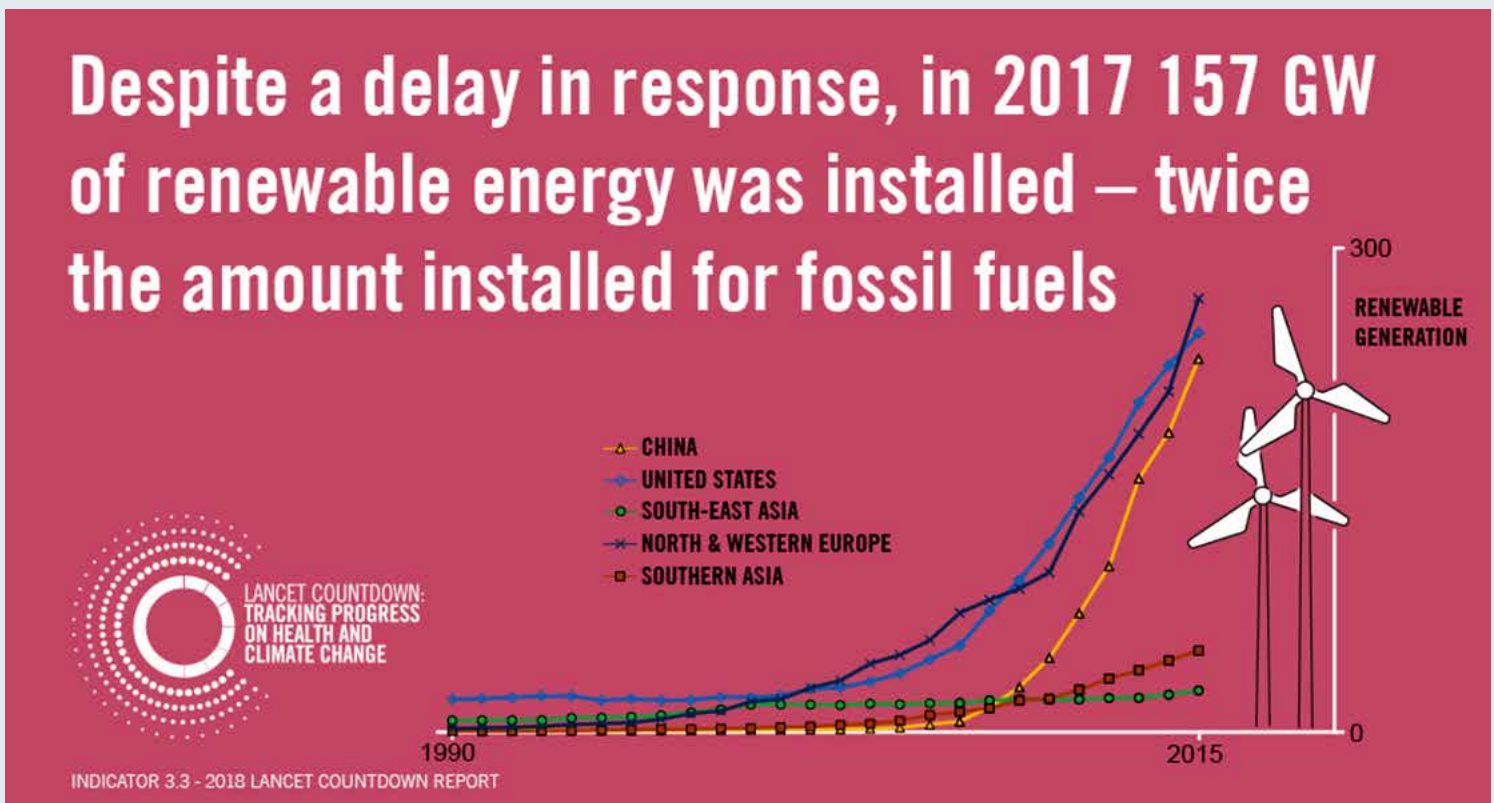
“Climate change is not just an environmental issue, rather it is one involving science, policy, culture, psychology, environment and society,” said Boykoff. “As part of the larger collaboration, I, with members from our Media and Climate Change Observatory at the University of Colorado, examined media representations to help understand public discourse on climate change and health over the past eleven years.”

Boykoff's team determined global coverage of climate and public health has increased by 42 percent between 2007 and 2017, indicating a gradual but promising trend toward more sustained attention to climate change and public health in the public arena, said Boykoff.

Some of the new health impacts of heat documented in The 2018 Report of The Lancet Countdown on health and climate change include:

- 157 million more vulnerable people were subjected to a heatwave last year than in 2000, and 18 million more than in 2016.
- 153 billion hours of work were lost in 2017 due to extreme heat as a result of climate change. China alone lost 21 billion hours, the equivalent of a year's work for 1.4% of their working population. India lost 75 billion hours, equivalent to 7% of their total working population. New methodologies have captured this data for the first time.
- Rising ambient temperatures are placing vulnerable populations at increased risks across all regions of the world. Europe and the East Mediterranean are particularly at risk, most likely due to ageing populations living in cities, with 42% and 43% of over 65s vulnerable to heat exposure. Markedly higher than Africa (38%) and southeast Asia (34%).
- Heat greatly exacerbates urban air pollution, with 97% of cities in low- and middle- income countries not meeting WHO air quality guidelines.
- Heat stress, an early and severe effect of climate change, is commonplace and we, and the health systems we rely on, are ill equipped to cope.
- Rising temperatures and unseasonable warmth is responsible for cholera and dengue fever spreading, with vectorial capacity for their transmission increasing across many endemic areas.
- The mean global temperature change to which humans are exposed is more than double the global average change, with temperatures rising 0.8°C versus 0.3°C.

This CIRES News story was modified from Lancet's press release. To view the complete Lancet press release, see: <http://www.lancetcountdown.org/the-report>.



Infographic from the Lancet Countdown 2018 report. Credit: Lancet Countdown: Tracking Progress on Health and Climate Change.



RESEARCH HIGHLIGHT

IS IT POSSIBLE?

A FUTURE WHERE PEOPLE AND NATURE THRIVE

CIRES News Story, October 2018

<https://cires.colorado.edu/news/it-possible-future-where-people-and-nature-thrive>

Can humans drive economic growth, meet rising demand for food, energy and water, and make significant environmental progress? The short answer is “yes,” but it comes with several big “ifs.” New research shows that we can put the world on a path to sustainability if we make significant changes within the next 10 years.

The Nature Conservancy, together with 12 other institutions including CIRES, analyzed the feasibility of advancing major conservation goals while meeting the demands of population and economic growth in 2050. The research paper, “An Attainable Global Vision for Conservation and Human Well-Being,” published in *Frontiers in Ecology and the Environment* (<https://esajournals.onlinelibrary.wiley.com/doi/10.1002/fee.1965>), presents a scientific test of a vision for the future where thriving human communities and abundant, healthy ecosystems coexist.

“We found the world already has the capability to meet the economic and environmental needs of 2050. But to realize this potential, we need to very quickly shift towards the most environmentally efficient food, energy, and water production practices,” said Matt Burgess, CIRES Fellow and coauthor on the new study. “This means moving energy production away from fossil fuels; intensifying agriculture in developing countries to get better crop yields; increasing capacity in environmentally efficient forms of aquaculture; and moving water-intensive forms of agriculture to less water-stressed regions.”

By 2050, as the world population grows toward 10 billion, demand for natural resources will reach unprecedented levels—intensifying the harsh impacts of climate change. Leading global development organizations are already highlighting air pollution and water scarcity as the biggest dangers to human health and prosperity.

The study modeled what the world would look like in 2050 if human development progressed on its current “business-as-usual” path compared to a “sustainability” path, which would require major changes in production patterns to overcome substantial economic, social and political challenges. The “sustainability” path requires a number of paradigm shifts but demonstrates the feasibility of meeting human demands while simultaneously advancing several major conservation goals.

RESEARCH HIGHLIGHT

PARIS PEACE FORUM

Prometheus Story, December 2018

<http://ciresblogs.colorado.edu/prometheus/2018/12/10/paris-peace-forum>

In November 2018, French President Emmanuel Macron convened the first edition of the Paris Peace Forum, an event targeted at improving global governance writ large. This bold initiative involved 65 Heads of State and participants from all over the world. The occasion, which took place between November 11-13, 2018, marked the 100th anniversary of the end of World War I and provided a new platform as a “global meet-up” to share innovative ideas in overcoming the challenges of our era: peace and security, environment, development, new technologies and more-inclusive economy. For me and my colleagues with the Antarctica2020 project, it was an appropriate moment to highlight the opportunity and risk of Antarctica – a place of amazing historic diplomacy, but also of current dramatic threat from a changing climate.

Among the presentations of ambitious solutions, ending counterterrorism, promoting digital peace, protecting global wild cats, initiating governance for the moon – among many others, we were presenting a vision of continued diplomacy and protection for Antarctica.

At the height of the Cold War, states had Antarctica divided up like a pie. The United States and USSR were both interested in using this southern uninhabited continent for military purposes. The world watched on in fear as rumors circulated that nuclear war would be waged from the Antarctic. Incredibly, instead of using Antarctica to wage war, a peace treaty was signed – The Antarctic Treaty – which came into force in 1961. It banned all nuclear and military activity and latter amendments banned mining and set aside the entire continent as “a natural reserve, devoted to peace and science.” For more than 50 years, the Antarctic has been a beacon of hope, and example of functioning multilateralism serving as a model for a vast global commons dedicated to peace and science.

However, the Antarctic is undergoing rapid environmental changes and management has failed to keep pace. The Southern Ocean around Antarctica, in particular, did not receive the same protection as the continent, so in addition to suffering the effects of climate change. Fishing pressure is increasing with vessels encroaching upon penguin and whale foraging grounds. Amongst glacier collapse and sea ice changes that cause reverberations throughout the food web, Antarctic species are struggling to adapt. However, Antarctica2020 is one project supporting the designation of marine protected areas in the Southern Ocean to protect biodiversity and build the resilience of the marine environment to the effects climate change.

I went to Paris with a team from the project to make the case for Antarctica to continue being a place of diplomacy, peace, science and environmental protection. I talked about the incredible role that protected areas can play in enhancing resilience and for how marine protected areas themselves can be a tool for diplomacy. I saw in 2016 when, despite incredible geopolitical tension, Russia and the USA – along with the other states involved in the governance of the Southern Ocean – agreed to designate the world’s largest marine protected area in the Ross Sea. This southern continent has always been a place where, despite diplomatic tensions on other parts of the world, we could find common ground.

As a testament to the importance of protecting the Antarctic marine global commons, Antarctica2020 was one of 10 projects selected from the 120 (from 850 applicants) for further support. I was immensely proud to participate in this inspiring inaugural event that will no doubt reverberate for years to come with its impacts on global governance.

Cassandra Brooks

CSTPR Faculty Affiliate, Assistant Professor of Environmental Studies at University of Colorado at Boulder



Cassandra Brooks (far left) presenting at the Paris Peace Forum. Photo: Mike Walker.



EDUCATION

An important part of CSTPR's mission involves educating the next generation of science and technology policy scholars to work at the interface of science and decision making. In furtherance of this mission, CSTPR, in collaboration with the Environmental Studies Program, sponsors a certificate in Science and Technology Policy for graduate students. CSTPR faculty also teach classes and advise individual graduate students. The Red Cross/Red Crescent internship for graduate students is now in its 6th year. For the 5th year CSTPR organized an annual competition to send two highly qualified CU students to the AAAS "Catalyzing Advocacy in Science and Engineering" workshop. In 2017 CSTPR launched the Rad Byerly, Jr., Award in Science and Technology Policy.

RAD BYERLY, JR., AWARD IN SCIENCE AND TECHNOLOGY POLICY

Rad Byerly, Jr. who provided inspiration and guidance for the founding of CSTPR, passed away in January 2016 after an impressive career that included more than twenty years as staff on and ultimately Director of the Science Committee of the U.S. House of Representatives. He also was Director of the Center for Space and Geosciences Policy at CU Boulder. Rad spent the last years of his career with CSTPR, where he was known as a mentor, adviser and friend with a wicked sense of humor.

In recognition of Rad's contributions to and impact on the CSTPR community, in 2017 CSTPR established the Radford Byerly, Jr. Award in Science and Technology Policy. Through this program CSTPR will periodically present a monetary award to a CU Boulder graduate student with a demonstrated commitment to making a significant contribution to science and technology policy in his or her work.

The 2018 winner of the Byerly award was Angela Boag, a Ph.D. candidate in Environmental Studies at CU Boulder. Angela is investigating the relationships between climate change, forest management and land ownership. She has a Master's in Forestry from the University of British Columbia and serves as Co-Chair of the Ecosystem-based Adaptation and Mitigation Thematic Group of the International Union for Conservation of Nature (IUCN). As a member of the Communities and Forests in Oregon research project led by Dr. Joel Hartter, Angela studies how changing climate and wildfire regimes impact forest resilience, as well as how private forest owners adapt to changing conditions.

Angela Boag, recipient of the 2018 Rad Byerly, Jr. Award in Science and Technology Policy. Photo: Angela Boag.



Left Photo: Earth Guardians Youth Director, Xiuhtezcatl Martinez, visits Max Boykoff's Environmental Studies class at CU Boulder in December 2018. Photo: Katie Weeman.

GRADUATE CERTIFICATE IN SCIENCE AND TECHNOLOGY POLICY

The Graduate Certificate in Science and Technology Policy program, now in its 15th year, is a rigorous educational program to prepare students pursuing graduate degrees for careers at the interface of science, technology, and decision making. Upon completion students will have attained a measure of understanding of the broad societal context of science and technology as well as an introduction to methodologies of policy analysis that are used in decision settings related to science and technology. The program currently includes 15 students from a variety of CU departments and institutes. Thirty-five students have received certificates from the program and have found careers in government, academia and non-profits.

COURSES TAUGHT BY CENTER CORE FACULTY IN 2018

- ENVS 1000: Introduction to Environmental Studies (Boykoff)
- ENVS 3022: Climate Politics and Policy (Boykoff)
- ENVS 5100: Colorado Science Technology and Policymaking processes (Boykoff)
- ECON 3535 Natural Resource Economics (Burgess)
- ENVS 4800 Capstone "Risk and Resilience" (Dilling)
- ENVS 5100 Science and Technology Policy (Dilling)
- ENVS 5100 Creating Usable Science (Dilling)

- MENV 4361: Inclusive Community Design (Goldstein)
- MENV 5001: Collaborative Transformation (Goldstein)
- MENV 5002-001: Socio-Ecological Systems (Goldstein)
- MENV 5002-002: Socio-Ecological Systems (Goldstein)
- PSCI 2004: Introduction to Western Political Thought (Vanderheiden)
- ENVM 5003: Ethics and Values in Environmental Leadership (Vanderheiden)
- PSCI 7024: Environment and Political Theory (Vanderheiden)
- PSCI/ENVS 3064: Environmental Political Theory (Vanderheiden)
- PSCI 3206: Environment and Public Policy (Vanderheiden)

COURSES TAUGHT BY CENTER VISITORS & AFFILIATES IN 2018

- ENVS 3030-001: Environmental Governance (Brooks)
- ENVS 3030-002: Environmental Governance (Brooks)
- ENVS 5000: Policy, Science, and the Environment (Brooks)
- ENVS 5100: Behavioral Insights for Sustainability (Carrico)
- ENVS 3031: Environmental Psychology (Carrico)

Jeremiah Osborne-Gowey (bottom right) was awarded an SICSS grant to pay for training in a workshop for computational social science methodologies in August 2018. Photo: Jeremiah Osborne-Gowey.





A group discussion at the National Meeting of Experts on Disaster Risk Reduction in Maputo City, Mozambique, on July 12, 2018. Photo: Juhri Selamet.

2018 CENTER GRADUATES

The following CSTPR graduate students earned degrees in 2018:

- John Berggren (PhD, ENVS)
- Marisa McNatt (PhD, ENVS)
- Lauren Gifford (PhD, Geography)
- Emily Ruby (MS, ENVS)
- Rebecca Page (MS, ENVS)

Sofia Corley earned an Undergraduate Honors degree in ENVS in 2018.

RED CROSS/RED CRESCENT CLIMATE CENTRE FELLOWSHIP PROGRAM

Now in its 6th year, the Red Cross/Red Crescent Climate Centre Internship Program has placed graduate student interns in Zambia, South Africa, Uganda, Kenya, Ethiopia, and Mozambique. The 2018 fellow, Juhri Selamet, spent his summer in Maputo, Mozambique, working on Mozambique Red Cross's communication strategy and supporting the development of communication

protocols for a Forecast-based Financing (FbF) project. His work focused on identifying communication channels that work best for the local community in rural areas such as Gaza, Nampula, Sofala, and Zambezia provinces in Mozambique, as well as training Red Cross local staff to set up digital media and design as part of the FbF project campaign and Mozambique Red Cross publication. His extensive field notes and full report are posted at <https://sciencepolicy.colorado.edu/students/redcross/selamet>.

AAAS CASE WORKSHOP COMPETITION

For the 5th year CSTPR organized a competition to select two highly qualified University of Colorado students to attend the 2018 American Association for the Advancement of Science "Catalyzing Advocacy in Science and Engineering" Workshop in Washington, D.C. Those students--Kaitlin McCreery (Mechanical Engineering) and Julia Bakker-Arkema (Chemistry & Biochemistry)—participated in a CSTPR panel discussion about the workshop and also provided reports about their experiences. Financial support for the competition is provided by the University of Colorado Graduate School and Center for STEM Learning.



Amanda Koch (CSU), Julia Bakker-Arkema (CU Boulder), and Kaitlin McCreery (CU Boulder) meet with then Congressman Jared Polis. Photo: Heather Bené.

EDUCATION HIGHLIGHT

AAAS CASE COMPETITION

Each year CSTPR hosts a competition to send two CU Boulder students to Washington, DC to attend the AAAS “Catalyzing Advocacy in Science and Engineering” workshop. During the workshop portion, the winners learned about the structure and organization of Congress, the federal budget and appropriations processes, and tools for effective science communication and civic engagement. In addition, the winners participated in interactive seminars about policy-making and communication. Below are comments by Julia Bakker-Arkema and Kaitlin McCreery about the 2018 workshop.

I left my snow boots by the door as I departed for Denver International Airport at 4:30 a.m. on a Sunday morning, thinking the forecasted snow was a Southern bluff. From March 18 to 21, I navigated the streets and government buildings of our nation’s capitol with a fellow CU-Boulder graduate student, Julia Bakker-Arkema and a graduate student representative from Colorado State, Amanda Koch. We were three of a contingent of 193 graduate students from around the country that participated in the American Association for the Advancement of Science (AAAS) policy workshop called “Making Our CASE” (Catalyzing Advocacy in Science and Engineering). The goal of this annual workshop is to inform scientists how funding for science is determined by Congress, how science serves the interests of the public, and how scientists can integrate these two aspects.

Why do we need young scientists in Washington to advocate for funding? It is important to remember who is running our country, and their education background. For instance, 18 members of the House have no post-secondary education. Fifty-five percent of the Senate holds law degrees. 22 Representatives and 2 Senators have doctoral degrees. In all of Congress, there is one physicist, one chemist, and eight engineers. But there is no significant advantage of having a science background in Congress, as it serves two purposes: passing laws and writing checks for nearly every social and economic issue that our nation faces. If scientists want more funding, we need to show them who we are, and ask for it.

Graduate students from every state in the continental United States packed the auditorium in the AAAS Headquarters on a Monday morning. Matthew Hourihan, Director of the AAAS Research and Development (R&D) Budget and Policy Program, gave us a detailed look at the federal budget process. We heard from Rush Holt, CEO of AAAS and former

U.S. Representative for New Jersey, as he discussed why scientists have untapped potential for political influence. Graduate students are some of the best science advocates because we do the grunt work in academic research while being paid with federal dollars. We have passion behind our commitment to research, and our representatives want to go to bat for us.

Some of what I learned about the federal budget surprised me. In general, Defense spending accounts for just under half of R&D expenditures. The National Science Foundation—which pays my salary, through a graduate training grant—makes up a relatively small portion of the budget. For the life sciences, the largest source of funding is the National Institutes of Health. The buzz term of the week in Washington was “appropriation season,” as the federal government was scheduled to shut down in three days if a spending bill was not signed into law. Congressmen and their staffers—many of whom were in their twenties—were charged with the task of writing and refining the spending bill that influences every aspect of the American economy.

As we prepared for our meetings, I wondered: as a scientist, what impact can I make? There are so many issues that I feel passionate about, from climate change to increasing research on gun control measures. I desired to tackle all of them with this unique opportunity. During lunch, the day before our meetings with Colorado congressmen, I approached Rush Holt (CEO of AAAS) to gain insight, and he boiled down his decades of experience while we hunched over our boxed lunches. He asked me three key questions: “First, who do you want them to think you are? Second, what do you want them to do? Third, what can you thank them for?” These questions made an excellent point. These brief meetings would be most impactful if we represent a concise group of people with clear messages: increase funding for scientists like us. Give them a face representing the people funded by the NSF.

On our final morning in Washington, I wished that I was wearing snow-appropriate shoes as we dashed out of our cab, through the snowy slush, and up the stairs of the Longworth House Office Building which houses all of the offices of the House of Representatives. We first met with congressional staffers in Jared Polis’ office, who were incredibly friendly and receptive. As we left for our next meeting, Representative Polis himself stepped into the hallway and called to us, “Hello, scientists!” We quickly thanked him for his commitment to funding research and snapped a photo before he disappeared to attend a hearing.

We followed a Congressional staffer down to the basement and hurriedly walked through the tunnel beneath the Capitol to get to our meetings with the staffers of Senators Gardner and Bennett. Each of their offices were decadently decorated with local Colorado art and memorabilia, including a Broncos poster and oil paintings of Aspen trees. Since the Senators were in hearings, we discussed federal R&D funding with young, educated, very busy staffers in decadent offices. Meeting with these staffers was inspiring in its own rite, and our discussions reminded me that we are all trying to find the optimal way we can serve our society. Spending time in these offices reinforced the idea that Congressmen work for their constituents, as our 15-minute meeting was on a long list of issues they were to address that day from constituents that traveled to Washington offices. They listened to our stories, asked about our research, and asked about how federal dollars impact our work. The staffers assured us that our representatives were opposed to cuts to scientific research, and we just needed to remain optimistic.

Just a few days after I returned to Colorado, my endless scrolling on Twitter abruptly froze when I saw an omnibus bill was sitting on the President’s desk waiting to be signed. The bill contained a 12.8 percent increase in funding for research and development, and is now law. We were fortunate to have nearly 200 student scientists strolling through the halls on the Hill advocating for research funding during a critical time in the bill’s passage. I envision a lot more students in Washington in upcoming years to continue our momentum.

Kaitlin McCreery - Mechanical Engineering, University of Colorado Boulder



Amanda Koch, Julia Bakker-Arkema, and Kaitlin McCreery in Washington, DC. Photo: Heather Bené.



David Oonç, Nico Hernandez Charpak, and Fernando Briones at the CSTPR Open House on October 5, 2018. Photo: Jennifer Katzung.

OUTREACH

CSTPR outreach engages the science and technology policy community and others in discussion of and reflection on critical issues at the intersection of science, technology and decision making. Outreach efforts over the past year have included the following below.

NOONTIME SEMINAR SERIES

CSTPR held 10 talks in its noontime seminar series including one talk that was a Conference on World Affairs Event (Our Lives in the 21st Century: The Best of Times or the Worst of Times? By Alexander Verbeek). See the Appendix for a complete list of titles and speakers. CSTPR provides live webcasts of noontime talks to allow remote viewing. The webcasts are also available on the CSTPR website after the event: <http://sciencepolicy.colorado.edu/news/webinars>.

PROMETHEUS: CSTPR'S SCIENCE POLICY BLOG

CSTPR revived its blog, Prometheus, to regularly feature content from CSTPR core faculty, research associates, postdocs, visitors, students and affiliates and serve as a resource for science and technology decision makers. Examples of 2018 Prometheus blog posts include:

- Elon Musk Deserves the Nobel Peace Prize by Matthew Burgess and Ian Burgess
- Open Access: The Way Forward for Academic Publishing by Alison Gilchrist
- On the Ground Learning Over Spring Break: Law Students Travel the Colorado Plateau by Alice Madden
- The Complexity of Consensus: Protecting the World's Most Remote Ocean by Cassandra Brooks
- Toward an Equitable Coal Transition by Suzanne Tegen and Alison Anson

- Learning from Colorado's 2013 Floods: Decisions, Processes, and Outcomes Four Years Later by Deseraï Crow and Elizabeth Albright
- A More Efficient Way to Conserve Forests and Support Livelihoods? by Peter Newton
- How to Find Out About Boulder Creek Streamflow: Data for Your Outdoor Adventures by Abigail Ahlert

Carol Byerly introducing Angela Boag, the 2018 winner of the Byerly award, at a noontime seminar on September 19, 2018. Photo: Jennifer Katzung.



ICE CAPS SPRING 2018 MEETINGS

The International Collective on Environment, Culture & Politics held the following talks for fellow affiliates and students:

- Open Access and the CU Repository with Melissa Cantrell, Andrew Johnson, and Ryan Caillet
- Altmetric Explorer at CU Boulder with Matt Ramey
- Research and the Media: What Makes News? with Trent Knoss

FACULTY AND STUDENT PRESENTATIONS

In addition to noontime seminar talks, CSTPR faculty and students gave numerous presentations over the past year on a wide variety of topics. A complete list can be found in the Appendix.

MEDIA

CSTPR core faculty or their work were quoted, cited, interviewed or referred to 154 times in numerous media including the Associated Press, USA Today, CNN, The

Guardian, Nature, New York Times, Reuters, Los Angeles Times, and Washington Post. Also, Max Boykoff's MeCCO contribution to the Lancet Countdown Report was highlighted in 114 different news outlets. A complete list with links to articles is located at <https://sciencepolicy.colorado.edu/news/in-the-news2018.html>.

OTHER ONGOING OUTREACH EFFORTS

- Articles in peer reviewed journals and non-peer reviewed publications (see Appendix)
- Content rich website (<http://sciencepolicy.colorado.edu>)
- Regular newsletter, Ogmios (<http://sciencepolicy.colorado.edu/ogmios>)
- CSTPR Project Pamphlets (https://sciencepolicy.colorado.edu/about_us/cstpr_pamphlets.html)
- Media and Climate Change Observatory (MeCCO) Monthly Summaries (https://sciencepolicy.colorado.edu/icecaps/research/media_coverage/summaries)
- Twitter (https://twitter.com/cu_cstpr) and Facebook (<https://www.facebook.com/pages/Center-for-Science-and-Technology-Policy-Research/279714958827043>) presence

Trent Knoss from University of Colorado Boulder's Strategic Relations giving a talk for the International Collective on Environment, Culture & Politics on April 27, 2018. Photo: Jennifer Katzung.





OUTREACH HIGHLIGHT

MAKING RESEARCH RELEVANT FOR DECISION MAKERS

CIRES News Story, May 2018

<https://cires.colorado.edu/news/making-research-relevant-decision-makers>

Experts in NOAA/CIRES' Western Water Assessment have released a new usable science guide to break down common barriers: research questions may not be targeted to resolve issues of most relevance to stakeholders, and research products such as publications or datasets are often inaccessible or impractical for use by non-experts. The handbook provides tested, tangible methods for researchers to produce useful science for those who write legislation, implement policy, manage natural resources or public resources, or manage their own business—bridging the gap between critical scientific research and constructive societal impact.

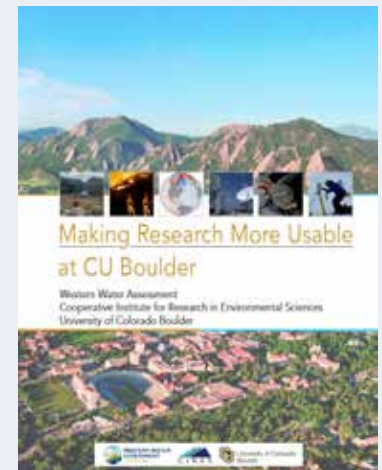
"To create usable research, we must deliberately make connections with decision makers throughout the path of our projects," said Lisa Dilling, director of Western Water Assessment, associate director of CIRES' Center for Science and Technology Policy Research, and CU Boulder associate professor in Environmental Studies. "This ensures the questions we are asking and the research we are producing are useful and relevant to the decisions at hand—whether in land management, health care, disaster prevention, or transportation planning."

The guide features easy-to-follow steps, tools, and resources to improve usability. It also spotlights several CU Boulder researchers who have made their research usable and accessible to various sectors in society:

There's Lise St. Denis in CIRES/CU's Earth Lab who works on wildfire issues. She built trust and established early, meaningful connections with hazard-management decision makers to work toward a flexible, web-based fire risk-management interface that can be used by experts and non-experts alike.

And there's Florence Fetterer, a National Snow and Ice Data Center researcher, who sought to improve sea-ice forecasts in the Arctic. She identified the specific operational needs of several external stakeholders, including the Naval Research Laboratory and U.S. National Ice Center, to drive her research forward.

How will YOU make your science usable to decision makers? Access the usable science guide online here: http://wwa.colorado.edu/publications/reports/usable_research_guide.pdf.





CSTPR Faculty, Staff, Students and Affiliates gather to volunteer at the Community Food Share in Louisville, CO. Photo: Max Boykoff.

CENTER PERSONNEL

ADMINISTRATIVE AND RESEARCH STAFF

Jennifer Katzung

Jennifer Katzung assumed the position of CSTPR Office Manager in June 2017. She moved to Colorado to enjoy her favorite activities, hiking and skiing. Previously, she lived in Switzerland and worked at the Swiss Federal Institute of Technology in Lausanne. She has experience in program coordination, event planning, advising and general administrative support. She is originally from Oklahoma and attended the University of Oklahoma.



Ami Nacu-Schmidt

Ami Nacu-Schmidt is the Center's Outreach and Engagement Director. She manages CSTPR's website, email communications, and social media channels, and works to implement various programs. She is a member of the Media and Climate Change Observatory (MeCCO) project, which tracks newspaper coverage of climate change or global warming on a monthly basis in seven different regions around the world. Ami also serves as the Co-editor for the Center's



newsletter, Ogmius, academic advisor for the Graduate Certificate in Science and Technology Policy, and program coordinator for the AAAS "CASE" Workshop Student Competition and the CSTPR Noontime Seminar Series.

STUDENTS

Abigail Ahlert

Abigail Ahlert is a graduate student in the Department of Atmospheric and Oceanic Sciences and the Institute of Arctic and Alpine Research. Her Ph.D. work involves modeling of the Arctic climate system and the improvement of sea ice models. She is a writing intern with CSTPR.



Andrew Benham

Andrew is currently a Sophomore studying Aerospace Engineering at University of Colorado Boulder. He hopes to one day work on space policy or as a project manager for spacecraft. Andrew is the founder of a student club called Colorado Undergraduates in Science and Policy which seeks to expose undergraduates to the intersection of science and policy. Andrew is a Colorado native and loves the outdoors. Andrew is an office assistant with CSTPR.



John Berggren

John received his PhD in Environmental Studies in 2018 at the University of Colorado, with a secondary focus on water policy. His academic research is in western water policy and governance, with a focus on the Colorado River. John worked with Lisa Dilling on the Framework for Assessing Stakeholder Needs for Climate Information project. He also worked with her on the Drivers of Adaptation project and is a key contributor to the Western Water Assessment project. John holds a B.A. in Public Health Studies from the Johns Hopkins University, and an M.H.S. in Environmental Health from the Johns Hopkins Bloomberg School of Public Health.



Katie Chambers

Katie Chambers is a third-year PhD Student in Environmental Engineering and Engineering for Developing Communities. Her research examines resilience and sanitation infrastructure in resource-limited communities. She was the 2017 Red Cross Red Crescent Centre intern and worked on a flood modelling and assessment project in Ethiopia from May to August 2017.



Patrick Chandler

Patrick Chandler has ten years' experience working in and developing environmental education, stewardship and science programs. His current focus is learning how the arts and emotional engagement can be used to raise awareness of environmental issues and promote responsible consumerism. Before beginning graduate work at CU, he worked as the Education Director for the Washed Ashore Project, and retains his role with them as a consultant. Washed Ashore raises awareness about marine debris by creating sculptures from items found on the beach and using those sculptures to spark changes in consumer habits. Prior to joining the Washed Ashore team, Patrick spent five years in Alaska where he taught biology for Kenai Peninsula College, served as the International Coastal Cleanup Coordinator for Alaska, and worked as the Special programs coordinator for the Center for Alaskan Coastal Studies.



Sofia Corley

Sofia Corley was a Senior Honors student pursuing an Environmental Studies degree with an Ecology and Evolutionary Biology minor at University of Colorado Boulder. She wants to work for a conservation organization after college, which inspired the research question for her thesis. Sofia is writing her honors thesis on the methods that lead to success of endangered/threatened species conservation programs. Sofia received her BA in the Environmental Studies program in 2018.



Roger Emmelhainz

Roger is a PhD candidate in Political Science, studying under Steve Vanderheiden. He works in the fields of political theory and public policy, with a focus on environmental issues. Before beginning graduate school at CU, he earned an interdisciplinary M.A. in the social sciences at the University of Chicago. He also spent a number of years as an operations manager in the energy industry, working with communities and local governments to coordinate development projects. Roger's dissertation research explores the role (both normative and empirical) of scientific expertise in democracy, with an emphasis on the need to reconceptualize our idea of democratic legitimacy.



Lee Frankel-Goldwater

Lee is a PhD student with the Environmental Studies and Design programs at the University of Colorado, Boulder. His research and professional efforts focus on supporting collaborative storytelling for grassroots community empowerment and developing new models for transformative environmental education. Recent projects and positions include an analysis of the 100 Resilient Cities learning network as part of a multi-case research study, teaching Environmental Studies courses at Pace University, co-leading community-based projects in Costa Rica and Israel with The Sustainability Laboratory, and developing



models for collaborative learning with the Earth Child Institute alongside rural communities in Brazil. Lee holds an MA in Environmental Conservation Education from NYU, and a BS in Computer Science from the University of Rochester. His dreams include climbing mountains for a living, being a rock star, and helping to bridge worldwide gaps in intercultural understanding towards a more unified human society.

Alison Gilchrist

Alison Gilchrist is a graduate student in the department of Molecular, Cellular, and Development Biology. She is currently studying how flaviviruses, including Dengue virus and Zika virus, hijack elements of our own immune systems. She also writes for the CU STEM blog Buffs: <http://www.sciencebuffs.org>.

She is a writing intern with CSTPR.



Celeste Maldonado

Celeste is an undergraduate student in Integrative Physiology at the University of Colorado who plans to attend medical school upon graduation. Her future goals include graduating from Medical School and becoming an Emergency Room Physician. She is interested in seeing how both environmental policies can have an effect on medical policies and how that can affect patients as a whole. Outside of school, she loves to volunteer, go on runs, and explore the community around her. Celeste is an office assistant with CSTPR.



Marisa McNatt

Marisa McNatt received her PhD in the Environmental Studies Program in 2018 with a policy focus and a member of the research group the International Collective on Environment, Culture & Politics (ICECaPs). Marisa is generally interested in the factors that influence and shape the public and policy-makers' opinions on climate and energy policy in the U.S., ranging from geographical, to socioeconomic, to cultural



values. Marisa was chosen as a 2013 Climate Media Fellow for the Heinrich Boll Foundation with the goal of familiarizing U.S. energy experts with the European and German experiences transitioning toward a low carbon economy. Marisa received her B.A. in English Literature from Davidson College in 2007 and earned her Master in Journalism and Broadcast and a Graduate Certificate on Environment, Policy and Society from the University of Colorado Boulder in 2011.

David Oonk

David Oonk is a PhD student in the ATLAS Institute at University of Colorado Boulder. His research focuses on oil and gas development and policy in Colorado. He researches the dynamics and practices of horizontal drilling and 'fracking' technologies, the governance problems they create, and the role of science in assessing their risk and influence policy-making. He has experience designing programs and conducting research in environmental science communication and education using visual media and art. He is advised by Max Boykoff faculty in Department of Environmental Studies and Director of the Center for Science and Technology Policy Research (CSTPR).



Jeremiah Osborne-Gowey

Jeremiah is a PhD student in the Environmental Studies program and works at the nexus of science, policy and natural resource management. He is particularly interested in collaborative approaches to managing interactions between humans and the rest of the natural world. His dissertation research focuses



on understanding the role and evolution of network approaches to collaborative governance, adaptation and resilience. In particular, his graduate research examines whether and how social networks build and foster adaptive capacity and resilience during transitions in complex social-environmental systems. He is currently working with agricultural communities facing drought in Sri Lanka and Bangladesh and communities of people in the United States learning to live with wildfire. At the CSTPR, Jeremiah works with Drs. Amanda Carrico and Maxwell Boykoff. Jeremiah is also affiliated with CU's Institute of Behavioral Science in the Natural Hazards Center and the Environment and Society Program and is a lead teacher in the Graduate Teacher Program at CU Boulder.

Before coming to CU Boulder to pursue a PhD, Jeremiah worked for >15 years as an aquatic/landscape ecologist with Federal and State agencies, universities and private and non-profit consulting firms throughout the Western United States. He holds an Honors Bachelor of Science degree in Fisheries and Wildlife and a Master of Science degree in Quantitative Fish Ecology from Oregon State University. Jeremiah also holds a Masters of Public Policy degree from Oregon State University. Jeremiah enjoys spending time in the great outdoors with his partner and kids, friends and animals. His favorite activities include camping, backpacking, fishing, hunting, forest foraging, SCUBA diving, fly tying, traveling, photography, reading, gardening, geocaching, and homebrewing/distilling.

Rebecca Page

Rebecca received her Masters degree in Environmental Studies at University of Colorado Boulder in 2018. Her research interests lie in understanding how natural resource managers and other stakeholders make decisions around natural hazard mitigation and climate adaptation, and specifically the usability of climate science in adaptation planning. She also has a strong interest in public participation in environmental governance and decision making. She is a graduate research assistant within the Western Water Assessment, where she focuses on understanding how water managers in Western Colorado utilize information about snow pack to manage and prepare for drought.



Prior to moving to Boulder, Rebecca worked in international development, focusing primarily on sustainable development capacity building initiatives in China, India and Bangladesh. From 2010-2011 she was a Fulbright Research Fellow in China, where she researched public participation in water quality monitoring. Rebecca received her B.A. in Environmental Studies and East Asian Studies from Oberlin College.

Olivia Pearman

Olivia Pearman is a PhD student in the Environmental Studies Program and is interested in improving approaches to complex environmental problems through policy. She is particularly focused on how institutions and organizations make decisions about the environment and especially how individuals' beliefs, values,



and world views influence the making of those decisions. Olivia holds a BS in Environment and Natural Resources from Clemson University and a Master of Environmental Management (MEM) from the Yale School of Forestry and Environmental Studies. Her Master's project focused on policy approaches to address conflicts between oil and gas development and greater sage-grouse conservation on lands owned by the Bureau of Land Management.

Emily Ruby

Emily received her Masters in Environmental Studies at the University of Colorado in 2018, specializing in energy science and policy. She is interested in researching the development and application of energy storage (batteries, compressed air, etc.) as a means to allow further penetration of renewables onto the grid. An avid environmental activist since 1998, she has most recently been working with non-profits in the San Francisco Bay Area, researching energy policy and encouraging the adoption of local clean energy. She holds a B.A. in Environmental Science and Toxicology from University of California, Santa Cruz.



Sarah Schweizer

Sarah is a PhD student in the College of Architecture and Planning at the University of Colorado and the Director of Programs at START, where her work is focused on understanding and enhancing human and institutional capacities to effectively respond to critical global environmental change challenges. Sarah has a keen interest in collaborative governance, learning processes, social-ecological resilience, and participatory research methods. She holds a M.S. in Human Dimensions of Natural Resources and a B.S. in Environmental Communication from Colorado State University.



2018 VISITORS

Leslie Dodson

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. 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.



Matthew Druckenmiller

Matthew Druckenmiller is a Research Scientist at the University of Colorado Boulder's National Snow and Ice Data Center (NSIDC) and Research Faculty with Rutgers University's Department of Marine and Coastal Sciences. Matthew's work primarily focuses on understanding and communicating the societal implications of Arctic sea-ice loss. Currently, he serves as the coordinator of the Sea Ice Action Network within the Study of Environmental Arctic Change (SEARCH) – a collaborative program of Arctic researchers, funding agencies, and stakeholders. Matthew earned his doctorate in 2011 from the University of Alaska Fairbanks where he combined geophysical monitoring with local and indigenous knowledge to study how Inupiat communities use and rely on a changing sea-ice environment for their traditional travel and hunting. During his time as a PACE (Postdocs Applying Climate Expertise) Fellow, he collaborated with Alaska's North Slope Borough to investigate the impacts of changing Arctic marine habitat on the health and feeding success of bowhead whales. With long-held interests in science policy, he has served as a Science Policy Fellow at the National Academies' Polar Research Board (2005), a project manager at the Arctic Research Consortium of the U.S. (2006), a AAAS Science Policy Fellow at the U.S. Agency for International Development (2013-2015), and currently as the second U.S. delegate to the International Arctic Science Committee (IASC).



Anna Kukkonen

Anna Kukkonen is a Fulbright visiting scholar at the Center for Science and Technology Policy Research. Anna's PhD research deals with comparative climate change politics, comparing media debates on climate change in five different countries: the US, Canada, Brazil, India and Finland. More specifically, she is interested in examining the formation of advocacy coalitions, the centrality of international organizations and the role of different moral justifications in the climate change debates in these diverse political-economic contexts. Anna was awarded a Fulbright Graduate Grant to continue her PhD research at the University of Colorado Boulder where she aims to develop her knowledge on environmental governance, science-policy interactions and media's role in the politics of climate change. Anna holds a Master's degree in Sociology from University of Helsinki where she also begun her graduate studies in 2014. She has specialized in comparative and political sociology but has recently become increasingly interested in combining comparative sociology with the study of public policy. Anna is part of the international research project Comparing Climate Change Policy Networks (COMPON) which analyzes cross-country differences in climate change responses and currently includes 20 countries. She has been involved in the COMPON project for almost 4 years, collaborating with research teams around the world by sharing data, developing common research protocols and publishing articles in peer-reviewed journals.



Suzanne Tegen

Suzanne Tegen is the Assistant Director at the Center for the New Energy Economy where she works for Colorado's 41st governor, Bill Ritter, Jr. and helps host the Clean Energy Legislative Academy for state legislators.



Prior to joining the Center, Tegen managed the Technology, Engineering and Deployment Group for wind and water power at the National Renewable Energy Laboratory, where she spent 14 years. She has authored technical reports on economic impacts from renewable energy projects and researches domestic clean energy workforce and the equitable transition from fossil energy to clean power. She has provided testimony for the State of Colorado and Colorado Energy Office, has participated in National Academy of Sciences research, and served as

a reviewer for the Intergovernmental Panel on Climate Change. She was awarded the Clean Energy Ministerial's Clean Energy Education & Empowerment Mid-career Award. Her interests include local, domestic and global energy policy, climate change, environmental justice, and communicating science to decision-makers.

Suzanne earned her PhD in Energy Policy and an M.S. in Environmental Science at the University of Colorado - Boulder. She holds a B.A. in German Literature from the University of Wisconsin-Madison.

GRADUATE STUDENT ALUMNI

Kevin Adams earned his MS in Environmental Studies in 2017.

Adam P.H. Amir earned his PhD in Environmental Studies in 2016. He is a filmmaker for At Films: <http://www.folkfilmmaking.org>.

Jackie Albert earned her MS in Environmental Studies in 2017. She is a Natural Resource Planner at U.S. Fish and Wildlife Service.

Kevin Andrews earned his MS in Environmental Studies in 2015. He is a Senior Research Analyst at E Source.

Kelli Archie earned her PhD in Environmental Studies in 2012. She is now an Assistant Professor at the NZ Climate Change Research Institute, Victoria University of Wellington.

Marilyn Averill is a Senior Fellow at Getches-Wilkinson Center for Natural Resources, Energy, and the Environment at the University of Colorado Law School.

Adam Briggie earned his PhD in Environmental Studies in 2006. He is Associate Professor and Director of Graduate Studies in the Philosophy and Religion Department at the University of North Texas. He served for three years as a postdoctoral fellow working on the philosophy of technology at the University of Twente in The Netherlands.

David Cherney earned his PhD in Environmental Studies in 2011. He is now an Energy Industry Advisor with PA Consulting Group's Energy Capital Markets Practice, with expertise in public policy analysis, electricity market dynamics, and program evaluation.

Kelsey Cody earned his PhD in Environmental Studies in 2018. He is currently working for the California Department of Public Health as a regulator of commercial shellfish aquaculture.

Meaghan Daly earned her PhD in Environmental Studies in 2016. She is currently an Assistant Professor at the University of New England.

Brian Devine earned his MS in Environmental Studies in 2015. He is now a Water Quality and Water Resources Professional with the San Juan Basin Health Department.

Betsy (Failey) Wagner earned her MS and MBA in Environmental Studies in 2011. She is currently a Certified General Real Estate Appraiser at Nash Johnson Associates, Inc.

Erik Fisher earned his PhD in Environmental Studies in 2006. He is an Associate Professor at Arizona State University.

Kristin Gangwer earned her MA in Geography in 2011. She is the Project Development and Communications Manager at Produce Perks Midwest.

Joel Gratz earned his MS in Meteorology and Policy and an M.B.A. in 2006. He is the Founder and Meteorologist for Opensnow.com and Opensummit.com.

Jimmy Hague earned his MS Environmental Studies in 2007. Jimmy is currently a Senior Water Policy Advisor at The Nature Conservancy. He previously worked with the Theodore Roosevelt Conservation Partnership as the Director of the Center for Water Resources, and for U.S. Senator Mark Udall of Colorado as his advisor for various conservation and natural resources issues, including water resources management and environmental regulation. He also worked for the U.S. House of Representatives Committee on Science.

Rachel Hauser earned her MS in Environmental Studies in 2012. She is a Senior Business Development Manager at Atmospheric and Space Technology Research Associates, LLC.

Michael Henry earned his MS in Environmental Studies in 2012. He is currently a Senior Policy Analyst at the National Aeronautics and Space Administration.

Mary Huisenga earned her MA in Geography in 2012. She is Assistant Project Manager at SWCA Environmental Consultants.

Yeonsang Hwang earned his PhD in Civil Engineering in 2005. He is the Interim Associate Dean of Engineering and Computer Science at Arkansas State University.

Rebecca Johnson earned her PhD in Energy Policy in 2010. She is currently a Transmission and Power Markets Advisor at Western Area Power Administration.

Elizabeth Koebele earned her PhD in Environmental Studies in 2017. She is Assistant Professor at the University of Nevada, Reno.

Kimberly Kosmenko earned her MS in 2004 and MBA in 2014. She is Managing Director at Kosmenko & Co.

Abby Kuranz earned her MS in Environmental Studies in 2014. She is currently a Digital Marketing Manager at Western Resource Advocates.

Cara Lauria earned her MS in Environmental Studies in 2017 and is now a Water Quality Intern at the Ohio EPA.

Lydia Lawhon earned her PhD in Environmental Studies in 2016. She is now an Instructor in the Masters of Environment Program at the University of Colorado Boulder.

Alexander Lee earned his PhD in Environmental Studies in 2016. He is now an Assistant Professor of Philosophy at the Alaska Pacific University Institute for Culture and Environment.

Nat Logar earned his PhD in Environmental Studies in 2007, followed by a law degree from the University of Colorado Boulder. Currently he is an Emmett/ Frankel Fellow in Environmental Law & Policy at University of California, Los Angeles School of Law. Previously he was a research fellow at Harvard's Kennedy School of Government.

Jessica Lowery earned her MS in Environmental Studies in 2004 and a JD in Law in 2012. From 2004 - 2009, Jessica worked for the NOAA/CU Western Water Assessment analyzing the annual and long-term policies, and the potential use of climate information forecasts of municipal water providers in the Intermountain West. She is now an Assistant Attorney General with the Colorado Attorney General's Office.

Genevieve Maricle earned her PhD in Environmental Studies in 2008. She currently is the Global Knowledge and Innovation Lead, Climate and Energy Practice, for the World Wildlife Fund. Previously she served as a Policy Adviser to the US Ambassador (ECOSOC) US Mission to the UN. She also served as USAID's Environment and Climate Change Policy Advisor.

Lucy McAllister earned her PhD in Environmental Studies in 2017. She currently a Visiting Assistant Professor and Lewis Institute Fellow at Babson College.

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Michael Weiss earned his MS in Environmental Studies in 2016 and currently works as a freelance writer.

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VISITOR HIGHLIGHT

CSTPR'S FULBRIGHT VISITING SCHOLAR: ANNA KUKKONEN

by Abigail Ahlert, CSTPR Science Writing Intern

In Fall 2018, Anna Kukkonen had a quintessential “Boulder” experience. A friendly man waiting next to her at a bus stop asked what she worked on. When she explained her research on climate change debates in the media, the man mentioned that he was a part of the Shanahan Ridge Neighbors for Climate Action—a South Boulder group that discusses local sustainability issues—and invited her to join. She was delighted by the coincidence. Boulder is a hub for those interested in the environment, and as a Fulbright visiting scholar at University of Colorado’s Center for Science and Technology Policy (CSTPR), Kukkonen is truly finding opportunities around every corner.



Kukkonen is a PhD student in Sociology at the University of Helsinki, and applied for a Fulbright grant with CU’s high ranking environmental policy program in mind. She anticipated that visiting CU would provide many opportunities for collaboration, particularly since her research is well-aligned with that of Dr. Max Boykoff, Director of CSTPR. In 2017, Kukkonen and her co-authors published a paper applying the Advocacy Coalition Framework (ACF) theory to U.S. media coverage of climate change from 2007-2008. According to Kukkonen, “The general beliefs concerning the reality of anthropogenic climate change, the importance of ecology over economy and desirability of governmental regulation divide organizations into three advocacy coalitions: the economy, ecology and science coalitions”. Specific beliefs concerning policy instruments such as cap and trade and alternative energy do not. She found that the ACF theory could be clarified to better account for how beliefs contribute to coalition formation in specific points in time and policy domains.

During her time in Boulder, Kukkonen is working on multiple projects involving climate change politics. First, she is comparing media discussions of climate change in the United States, Canada, Brazil, India and Finland. Kukkonen works with researchers from these countries and others in the Comparing Climate Change Policy Networks (COMPN) project. She finds writing with international colleagues to be very rewarding and acknowledges that the writing process is the most challenging part of her work. “You really grow as a person when you do this kind of stuff, and you learn to take critique,” she says. Additionally, Kukkonen is studying the roles of different types of policy actors (such as non-profit organizations, universities and businesses) and the moral justifications they use in the Finnish and Canadian media debates on Arctic climate change.

When she isn’t working on her PhD research, Kukkonen attends classes offered by CU’s Environmental Studies Program, where she has learned more about the interactions between science and policy. To her surprise, many of her classmates are natural scientists. “It has been very enlightening how differently we think,” she says. “They have their own conception of what social science is and that has been very interesting.” Discussions with her classmates have challenged her to describe her work and its use to researchers outside of her field, and this has given her greater confidence in her role as a social scientist.

Kukkonen also appreciates how many scientists at the University of Colorado prioritize communicating their results with the public. “This is another reason why I came to CSTPR, because here I think they focus a lot on how researchers can communicate their research to the general audience. I notice that people in the US like to talk about their research in a way that people who are not experts in that field can understand it,” she says. In May, Kukkonen will return to Finland to complete her PhD. She is excited about the direction her research has taken at CSTPR and hopes to continue studying climate change after graduate school. “Now I find purpose in my research better than before I came here,” she says. “I feel more motivated after this experience because I’ve had to think about my research in a more practical way.”

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AAAS “Catalyzing Advocacy in Science and Engineering” Workshop Student Competition Panel Discussion including (left to right) Nicholas Valcourt, Heather Bené, Julia Bakker-Arkema, and Kaitlin McCreery on November 28, 2018. Photo: Jennifer Katzung.





In remote villages like Jayuya, Puerto Rico, many house still needs to be repaired. The blue plastics roof where provided by FEMA in most cases, but also by NGOs. Photo: Fernando Briones.

FACULTY AFFILIATE HIGHLIGHT

FERNANDO BRIONES ON VULNERABILITY IN PUERTO RICO AND DOMINICA

by **Alison Gilchrist, Science Writing Intern**

When is the eruption of a volcano a natural disaster? You may be thinking what I was when Fernando Briones asked me a similar question: always. But Briones has a different answer: sometimes.

Briones, a recent research affiliate with the Center for Science and Technology Policy Research (CSTPR), argues that a natural hazard only becomes a natural disaster when affected people are around.

“A volcanic eruption in the middle of a tiny isolated island is not a disaster,” said Briones. “It’s just a volcanic eruption. But that same eruption in Quito, or Ecuador, or Mexico City, or wherever there are people around—that becomes a disaster.”

Briones has a PhD in Social Anthropology from The School for Advanced Studies in Social Sciences, in Paris, France. He is primarily interested in how people are managed or manage themselves before and after natural disasters affect their communities. He argues that being vulnerable to a natural disaster is the result of social vulnerability as much as geographic vulnerability.

“Disasters are the result of human management, the way that we interact with nature, that way that we become vulnerable to those hazards,” said Briones. “Disasters are the combination of a natural hazard and social conditions of vulnerability and risk.”

Currently, Briones is studying the aftereffects of Hurricane Maria, the hurricane that struck Puerto Rico in 2017, devastating the region and leaving people without adequate power and shelter for months. It was an ongoing, aggravating news story in the United States—but most of us were unaware of the true extent of the hurricane’s devastation.



“Hurricane Maria, as everyone knows, devastated Puerto Rico,” said Briones. “But it also devastated Dominica. And nobody thinks about that.”

The Commonwealth of Dominica is an island country in the West Indies. It was also hit by Hurricane Maria, and has not recovered as well since. Smaller and poorer than Puerto Rico, it also does not have the economic advantage of being a territory of the United States. Federal resources were fewer and farther between, and the long-term effects of that lack of resources are still being felt. Many people displaced from housing in Dominica are still living in shelters—arrangements that were really meant to be temporary.

“I found in Dominica that people stay in the shelters for one and a half years,” said Briones. “It sounds horrible, but those people are going to die sooner than the life expectancy.” Living in a shelter is demoralizing, depressing, and economically punishing. “Being in shelters is a waste of a generation,” Briones concluded.

Briones is researching these circumstances, particularly in comparison to Puerto Rico, which had a larger influx of foreign aid. He’s especially interested in how people first respond to a disaster, before there is a response from government institutions.

“I found that the disaster triggered a lot of community organizations,” said Briones, about people responding to Hurricane Maria in Puerto Rico. “Creativity is so important; people became so organized.”

With a “boots on the ground” approach—talking to citizens directly affected by the crises—Briones is compiling an incredible wealth of knowledge about these early responses. He’s currently collecting this qualitative data in Puerto Rico and Dominica such that he can compare the two disaster responses, “in order to prepare better preparedness systems and resilience, and to understand vulnerability,” said Briones.

Previously at CCB/INSTAAR (sponsored by Alumni TIES program in Puerto Rico) and now at CSTPR, Briones is working with Max Boykoff to develop a proposal for this work. He’s also collaborating with CIRES, making the project extensively interdisciplinary. Moreover, his collaborations in Dominica, for example with the Minister of the Environment, ensure that his research will directly help people in vulnerable areas of society. In particular, he wants to draw attention to the fact that a vulnerable population made Hurricane Maria much more devastating.

“The hurricanes were important, but the real risk was to be settled in vulnerable places. If people settled in a landslide area, it’s not because they wanted to be in danger, it’s because they had no choice,” said Briones. “Perhaps the housing there was cheap. Or they were installed without the proper advisement. So human management or management of the territory is a very important key in reducing the vulnerability of communities.”

Briones is also a photographer, so apart from this research, Briones spent some of his time in Dominica taking pictures. The results, stark photographs of people and places in Dominica ruined by the hurricane, are particularly devastating. Briones hopes that it is a combination of research, storytelling, and pictures like these that will get the story of Dominica as much attention as the story of Puerto Rico—that might not be much, but it will help.

A hurricane in the middle of the Atlantic Ocean isn’t a disaster—it’s just some clouds and wind in a funnel. But when that funnel touches down on land, displacing thousands of vulnerable people, and disrupting communities on a long-term scale—that’s a disaster. The distinction is important because it changes the equation: humans can’t stop the hurricane, but with the right information and the right actions pre- and post- landfall, they can mitigate the disastrous consequences.



Father and son installing a water collection system, using their own knowledge and materials. Jayuya, Puerto Rico. Photo: Fernando Briones.

Trump tells King
and rise

EPA's Scott Pruitt Just Took Climate
Change Denial To A Whole New Level

Energy Secretary Rick Perry
says CO2 is not the main driver
of climate change

EPA's Scott Pruitt Just
Took Climate Change Denial To A

Energy Secretary
says CO2 is not
the main driver
of climate change

Room
AB

EXIT



APPENDIX

PUBLICATIONS

(Center personnel in bold)

Journal Articles

- Averyt, K., J.D. Derner, **L. Dilling**, R. Guerrero, L. Joyce, S. McNeeley, E. McNie, J. Morissette, D. Ojima, R. OMalley, D. Peck, A.J. Ray, M. Reeves, and W. Travis, 2018. Regional climate response collaboratives multi-institutional support for climate resilience. *Bulletin of the American Meteorological Society*, 99 (5), 891-898, doi: [10.1175/BAMS-D-17-0183.1](https://doi.org/10.1175/BAMS-D-17-0183.1).
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Left Photo: Katharine Hayhoe visits Max Boykoff's Environmental Studies class at CU Boulder in September 2018. Photo: Ami Nacu-Schmidt.

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Series

- **Boykoff, M., J. Katzung**, and **A. Nacu-Schmidt**, 2018. Ogmios. Newsletter of the Center for Science and Technology Policy Research 49, issn: 1936-9921, https://sciencepolicy.colorado.edu/ogmios/archives/issue_49.
- **Boykoff, M., J. Katzung**, and **A. Nacu-Schmidt**, 2018. Ogmios. Newsletter of the Center for Science and Technology Policy Research 50, issn: 1936-9921, https://sciencepolicy.colorado.edu/ogmios/archives/issue_50.
- **Boykoff, M., J. Katzung**, and **A. Nacu-Schmidt**, 2018. Ogmios. Newsletter of the Center for Science and Technology Policy Research 51, issn: 1936-9921, https://sciencepolicy.colorado.edu/ogmios/archives/issue_51.

Letter/Report/Note/Memo/

- **Boykoff, M., J. Katzung**, and **A. Nacu-Schmidt**, 2018. A Year-end Review of Media Coverage of Climate Change and Global Warming in 2018, Media and Climate Change Observatory, Center for Science and Technology Policy Research, Cooperative Institute for Research in Environmental Sciences, University of Colorado, https://scholar.colorado.edu/mecco_summaries
- **Boykoff, M., J. Katzung**, and **A. Nacu-Schmidt**, 2018. Duly 'noted', but not duly 'welcomed'. A review of the month's media coverage of climate change and global

warming. Media and Climate Change Observatory, Center for Science and Technology Policy Research, Cooperative Institute for Research in Environmental Sciences, University of Colorado, December, Issue 24, doi: [10.25810/qv9p-yt19](https://doi.org/10.25810/qv9p-yt19).

- **Boykoff, M., J. Katzung**, and **A. Nacu-Schmidt**, A., 2018. I've seen it. I've read some of it. And it's fine. A review of the month's media coverage of climate change and global warming. Media and Climate Change Observatory, Center for Science and Technology Policy Research, Cooperative Institute for Research in Environmental Sciences, University of Colorado, November, Issue 23, doi: [10.25810/te5x-ye24](https://doi.org/10.25810/te5x-ye24).
- **Boykoff, M., J. Katzung**, and **A. Nacu-Schmidt**, 2018. 1.5 to Stay Alive. A review of the month's media coverage of climate change and global warming. Media and Climate Change Observatory, Center for Science and Technology Policy Research, Cooperative Institute for Research in Environmental Sciences, University of Colorado, October, Issue 22, doi: [10.25810/jne4-af95](https://doi.org/10.25810/jne4-af95).
- **Boykoff, M., J. Katzung**, and **A. Nacu-Schmidt**, 2018. A Tale of Three Storms: Mangkhut, Florence & Trump's Tweets. A review of the month's media coverage of climate change and global warming. Media and Climate Change Observatory, Center for Science and Technology Policy Research, Cooperative Institute for Research in Environmental Sciences, University of Colorado, September, Issue 21, doi: [10.25810/Q8YF-0640](https://doi.org/10.25810/Q8YF-0640).
- **Boykoff, M., J. Katzung**, and **A. Nacu-Schmidt**, 2018. Morrison installed, Clean Power Plan uninstalled. A review of the month's media coverage of climate change and global warming. Media and Climate Change Observatory, Center for Science and Technology Policy Research, Cooperative Institute for Research in Environmental Sciences, University of Colorado, August, Issue 20, doi: [10.25810/70zy-9358](https://doi.org/10.25810/70zy-9358).
- **Boykoff, M., J. Katzung**, and **A. Nacu-Schmidt**, 2018.

Rebecca Page presenting at a Vulnerability, Consequences and Adaptation Planning Scenarios meeting in Durango, Colorado on July 16, 2018. Photo: Lisa Dilling.





Lori Peek, Haorui Wu and Mason Mathews giving a talk February 7, 2019 talk on "Extreme Events Reconnaissance: Social Science and Interdisciplinary Research in the Disaster Aftermath". Photo: Jennifer Katzung.

Connecting the dots. A review of the month's media coverage of climate change and global warming. Media and Climate Change Observatory, Center for Science and Technology Policy Research, Cooperative Institute for Research in Environmental Sciences, University of Colorado, July, Issue 19, [doi: 10.25810/KAC7-ZE20](https://doi.org/10.25810/KAC7-ZE20).

- **Boykoff, M., J. Katzung, and A. Nacu-Schmidt, 2018.** MeCCO Monthly Summary. A review of the month's media coverage of climate change and global warming. Media and Climate Change Observatory, Center for Science and Technology Policy Research, Cooperative Institute for Research in Environmental Sciences, University of Colorado, June, Issue 18, [doi: 10.25810/PETQ-D773](https://doi.org/10.25810/PETQ-D773).
- **Boykoff, M., J. Katzung, and A. Nacu-Schmidt, 2018.** MeCCO Monthly Summary. A review of the month's media coverage of climate change and global warming. Media and Climate Change Observatory, Center for Science and Technology Policy Research, Cooperative Institute for Research in Environmental Sciences, University of Colorado, May, Issue 17, [doi: 10.25810/eafb-9s31](https://doi.org/10.25810/eafb-9s31).
- **Boykoff, M., J. Katzung, and A. Nacu-Schmidt, 2018.** MeCCO Monthly Summary. A review of the month's media coverage of climate change and global warming. Media and Climate Change Observatory, Center for Science and Technology Policy Research, Cooperative Institute for Research in Environmental Sciences, University of Colorado, April, Issue 16, [doi: 10.25810/KSFA-KH84](https://doi.org/10.25810/KSFA-KH84).
- **Boykoff, M., J. Katzung, and A. Nacu-Schmidt, 2018.** MeCCO Monthly Summary. A review of the month's media coverage of climate change and global warming. Media and Climate Change Observatory, Center for Science and Technology Policy Research, Cooperative Institute for Research in Environmental Sciences, University of Colorado, March, Issue 15, [doi: 10.25810/WFEM-SQ87](https://doi.org/10.25810/WFEM-SQ87).

- **Boykoff, M., J. Katzung, and A. Nacu-Schmidt, 2018.** MeCCO Monthly Summary. A review of the month's media coverage of climate change and global warming. Media and Climate Change Observatory, Center for Science and Technology Policy Research, Cooperative Institute for Research in Environmental Sciences, University of Colorado, February, Issue 14, [doi: 10.25810/CT5R-9A40](https://doi.org/10.25810/CT5R-9A40).
- **Boykoff, M., J. Katzung, and A. Nacu-Schmidt, 2018.** MeCCO Monthly Summary. A review of the month's media coverage of climate change and global warming. Media and Climate Change Observatory, Center for Science and Technology Policy Research, Cooperative Institute for Research in Environmental Sciences, University of Colorado, January, Issue 13, [doi: 10.25810/VQ0G-HW97](https://doi.org/10.25810/VQ0G-HW97).
- **Burgess, M.G., K. Millage, D. Ovando, L. Thomas, L.L. Rubino, and C. Costello, 2018.** Transferable effort vs. transferable catch in age-structured fisheries. Report to The Nature Conservancy.
- **Dilling, L., K. Clifford, E. McNie, J. Lukas, and U. Rick, 2018.** Making Research More Usable at CU Boulder. Western Water Assessment Report, 26 pp.
- **Goldstein, B., et al., 2018.** Transformative Learning Networks: Guidelines and Insights for Netweavers. CSTPR White Paper 2018-01.

Reviews

- **Boykoff, M., 2018.** Burden sharing at the water's edge, Book review of *Rising: Dispatches from the new American Shore* by E. Rush. *Nature Climate Change*, 8 (10), 853, [doi: 10.1038/s41558-018-0288-5](https://doi.org/10.1038/s41558-018-0288-5).
- **Vanderheiden, S., 2018.** Book review of *Climate Justice in a Non-Ideal World* by C. Heyward and D. Roser.



Inside the Greenhouse's Green Suits BVSD, a participatory photography project, at University of Colorado Boulder Campus. Photo: Lianna Nixon.

Perspectives on Politics, 16 (1), 215-217, doi: [10.1017/S1537592717003590](https://doi.org/10.1017/S1537592717003590).

- **Vanderheiden, S.**, 2018. Book review of *Environmental Success Stories: Solving Major Ecological Problems & Confronting Climate Change* by F.M. Dunnivant. *Ethics & International Affairs*, 32.

Prometheus Commentaries

- **Ahlert, A.**, 2018. CSTPR's Fulbright Visiting Scholar: Anna Kukkonen, Prometheus Blog Post, April 6, <http://ciresblogs.colorado.edu/prometheus/2018/04/06/cstprs-fulbright-visiting-scholar-anna-kukkonen>.
- **Ahlert, A.**, 2018. How to Find Out About Boulder Creek Streamflow: Data for Tube to Work Day and Your Other Summer Adventures, Prometheus Blog Post, July 5, <http://ciresblogs.colorado.edu/prometheus/2018/07/05/how-to-find-out-about-boulder-creek-streamflow-data-for-tube-to-work-day-and-your-other-summer-adventures>.
- Averill, M., 2018. Technology Under the United Nations Framework Convention on Climate Change, Prometheus Blog Post, October 22, <http://ciresblogs.colorado.edu/prometheus/2018/10/22/technology-under-the-united-nations-framework-convention-on-climate-change>.
- Boag, A., 2018. Forests of the Future: Why Private Landowners Are a Key Piece of the Climate Challenge, Prometheus Blog Post, September 14, <http://ciresblogs.colorado.edu/prometheus/2018/09/14/forests-of-the-future-why-private-landowners-are-a-key-piece-of-the-climate-challenge>.
- Brooks, C., 2018. The Complexity of Consensus: Protecting the World's Most Remote Ocean, Prometheus Blog Post, May 31, <http://ciresblogs.colorado.edu/prometheus/2018/05/31/the-complexity-of-consensus-protecting-the-worlds-most-remote-ocean>.
- Brooks, C., 2018. Paris Peace Forum, Prometheus Blog Post, December 10, <http://ciresblogs.colorado.edu/prometheus/2018/12/10/paris-peace-forum>.
- **Burgess, M.**, 2018. Elon Musk Deserves the Nobel Peace Prize, Prometheus Blog Post, October 4, 2018, <http://ciresblogs.colorado.edu/prometheus/2018/10/04/elon-musk-deserves-the-nobel-peace-prize>.
- Crow, D., 2018. Building Resilience in Colorado Communities: Lessons From the Colorado Communities Symposium, Prometheus Blog Post, February 15, <http://ciresblogs.colorado.edu/prometheus/2018/02/15/building-resilience-in-colorado-communities-lessons-from-the-colorado-communities-symposium>.
- Druckenmiller, M., 2018. Fostering Scientific Integrity in Policymaking: Opportunities at the State Level, Prometheus Blog Post, February 7, <http://ciresblogs.colorado.edu/prometheus/2018/02/07/fostering-scientific-integrity-in-policymaking-opportunities-at-the-state-level>.
- **Gilchrist, A.**, 2018. Matthew Druckenmiller: A Career-Long Collaborator, Prometheus Blog Post, March 23, <http://ciresblogs.colorado.edu/prometheus/2018/03/23/matthew-druckenmiller-a-career-long-collaborator>.
- **Gilchrist, A.**, 2018. Open Access: The Way Forward for Academic Publishing, Prometheus Blog Post, October 15, <http://ciresblogs.colorado.edu/prometheus/2018/10/15/open-access-the-way-forward-for-academic-publishing>.
- Hinckley, E., 2018. Into the Wild – For Rain, Part 1. British Columbia, Prometheus Blog Post, September 24, <http://ciresblogs.colorado.edu/prometheus/2018/09/24/into-the-wild-for-rain-part-i-british-columbia>.
- Huda, J., 2018. The Role of Stories in the Policy Process: A Glimpse Into the Narrative Policy Framework, Prometheus Blog Post, May 21, <http://ciresblogs.colorado.edu/prometheus/2018/05/21/the-role-of-stories-in-the-policy>.

process-a-glimpse-into-the-narrative-policy-framework.

- Koebele, E. and D. Crow, 2018. Learning From Colorado's 2013 Floods: Decisions, Processes, and Outcomes Four Years Later, Prometheus Blog Post, May 10, <http://ciresblogs.colorado.edu/prometheus/2018/05/10/learning-from-colorados-2013-floods-decisions-processes-and-outcomes-four-years-later>.
- Madden, A., 2018. On the Ground Learning Over Spring Break: Law Students Travel the Colorado Plateau, Prometheus Blog Post, April 12, <http://ciresblogs.colorado.edu/prometheus/2018/04/12/on-the-ground-learning-over-spring-break-law-students-travel-the-colorado-plateau>.
- Newton, P., 2018. New Research is Studying Innovative Sub-National Governance in Acre, Brazil, Prometheus Blog Post, April 19, <http://ciresblogs.colorado.edu/prometheus/2018/04/19/new-research-is-studying-innovative-sub-national-governance-in-acre-brazil>.
- Osnes, B., 2018. Game On! Promoting Commitment Into Positive Action, Prometheus Blog Post, October 23, <http://ciresblogs.colorado.edu/prometheus/2018/10/23/game-on-promoting-commitment-into-positive-action>.
- **Pearman, O.**, 2018. Adventures in London and How the World is Doing on Climate and Health, October 11, <http://ciresblogs.colorado.edu/prometheus/2018/10/11/adventures-in-london-how-the-world-is-doing-on-climate-and-health>.
- Pielke, Jr., R.A., 2018. Reconciling the Supply of and Demand for Research, Prometheus Blog post, October 10, <http://ciresblogs.colorado.edu/prometheus/2018/10/10/reconciling-the-supply-of-and-demand-for-research>.
- Tegen, S. and A. Anson, 2018. Toward an Equitable Coal Transition, Prometheus Blog post, December 18, <http://ciresblogs.colorado.edu/prometheus/2018/12/18/toward-an-equitable-coal-transition>.
- **Vanderheiden, S.**, 2018. Is Transparency the Best Disinfectant? Prometheus Blog post, April 26, <http://ciresblogs.colorado.edu/prometheus/2018/04/26/is-transparency-the-best-disinfectant>.

Examples of publications of faculty affiliates and visitors

Journal Articles

- **Brooks C.M.**, J.A. Caccavo, J. Ashford, R. Dunbar, K. Goetz, M. La Mesa, and L. Zane, 2018. Early life history connectivity of Antarctic silverfish (*Pleuragramma antarctica*) in the Ross Sea. *Fisheries Oceanography*, 27 (3), 274-287, doi: 10.1111/fog.12251.
- Benson A., **C. Brooks**, G. Canonico, E. Duffy, F. Muller-Karger, H. Sosik, P. Miloslavich, and E. Klein, 2018. Integrated observations and informatics improve understanding of changing marine ecosystems. *Frontiers in Marine Science*, 5 (428), doi: 10.3389/fmars.2018.00428.
- Liu N. and **C.M. Brooks**, 2018. China's changing position towards marine protected areas in the Southern Ocean:

Implications for future Antarctic governance. *Marine Policy*, 94, 189-195, doi: 10.1016/j.marpol.2018.05.011.

- Davies T.E., G. Epstein, S.E. Aguilera, **C.M. Brooks**, M. Cox, L.S. Evans, S.M. Maxwell, M. Nenadovic, and N.C. Ban, 2018. Assessing trade-offs in large marine protected areas. *PLOS ONE*, 13 (4), doi: 10.1371/journal.pone.0195760.
- **Brooks C.M.**, D.G. Ainley, P.A. Abrams, P.K. Dayton, R.J. Hofman, J. Jacquet, and D.B. Siniff, 2018. Antarctic fisheries: Factor climate change into their management. *Nature*, 558 (7709), 177-180, doi: 10.1038/d41586-018-05372-x.
- Burchfeld E., N.E. Williams, and **A.R. Carrico**, 2018. Rescaling drought mitigation in rural Sri Lanka. *Regional Environmental Change*, 18 (8), 2495-2503, doi: 10.1007/s10113-018-1374-y.
- **Carrico A.R.**, U.S. Raja, J. Fraser, and M.P. Vandenberg, 2018. Household and block level influences on residential fertilizer use. *Landscape and Urban Planning*, 178, 60-68, doi: 10.1016/j.landurbplan.2018.05.008.
- **de la Poterie A.**, E.K. Burchfeld, and **A.R. Carrico**, 2018. The implications of group norms for adaptation in collectively managed agricultural systems: evidence from Sri Lankan paddy farmers. *Ecology and Society*, 23 (3), 21, doi: 10.5751/ES-10175-230321.
- Williams N.E., **A.R. Carrico**, I. Edirisinghe, and P. Champika, 2018. Assessing the impacts of agrobiodiversity maintenance on food security among farming households in Sri Lanka's dry zone. *Economic Botany*, 72 (2), 196-206, doi: 10.1007/s12231-018-9418-2.

Reports

- **Brooks, C.**, S. Chown, L. Douglass, and B. Raymond, 2018. Progress towards a representative network of Southern Ocean protected areas. CCAMLR WS-SM-18/12.
- **Carrico, A.R.**, 2018. National Academies of Sciences, Engineering, and Medicine. Environmental Engineering for the 21st Century: Addressing Grand Challenges, National Academies Press. doi: 10.17226/25121.
- Oteri, F., R. Baranowski, I. Baring-Gould, and **S. Tegen**, 2018. NREL Technical Report, State of Wind Development in the United States By Region NREL/TP-5000-70738, <https://www.nrel.gov/docs/fy18osti/70738.pdf>.

Other Publications

- Dodds, K. and **C. Brooks**, 2018. Antarctic Geopolitics and the Ross Sea Marine Protected Area. *E-International Relations*, February 20, <https://www.e-ir.info/2018/02/20/antarctic-geopolitics-and-the-ross-sea-marine-protected-area>.
- **Brooks, C.**, 2018. Cracks in the Future of the Antarctic. *National Geographic*, November 5, <https://blog.nationalgeographic.org/2018/11/05/cracks-in-the-future-of-the-antarctic>.

CSTPR TALKS AND EVENTS

CSTPR Noontime Seminar Series

Spring 2018

January 24, 2018

Flood Modelling and Early Warning Assessments for Downstream Communities of Koka Dam, Ethiopia
Katie Chambers, University of Colorado at Boulder

February 7, 2018

Extreme Events Reconnaissance: Social Science and Interdisciplinary Research in the Disaster Aftermath
Lori Peek, University of Colorado Boulder

March 14, 2018

Discourse Networks and Climate Change: Comparing Media Debates on Climate Change Policy in Canada, the US, Finland, Brazil, and India
Anna Kukkonen, University of Helsinki, Finland

April 10, 2018

Conference on World Affairs Event
If Sustainability Isn't Possible, Does Collapse Become Inevitable?
Max Boykoff, Guy D. Middleton, David Orr, Gregory Tanaka,
Moderator: Suzanne Jones

April 11, 2018

Conference on World Affairs Event
Our Lives in the 21st Century: Best of Times or the Worst of Times?
Alexander Verbeek, Yale Greenberg World Fellows, Stockholm Environment Institute

April 25, 2018

Finding New Ground for Advancing Hydro-Climatic Information Use Among Small Mountain Water Systems
Rebecca Page, University of Colorado Boulder

Fall 2018

September 19, 2018

Private Forest Owners and Climate Change Adaptation: How Science and Society Will Shape Future Forests
Angela Boag, University of Colorado Boulder

October 17, 2018

Local Responses to Disasters in Peru and Puerto Rico: An Approach from Zero-Order Responders
Fernando Briones, Institute of Arctic and Alpine Research

October 24, 2018

Climate Change Scientists as Policy Advocates? Navigating the Tensions Between Scientific Independence, Poor Policy, and Avoiding a Dangerous World
Lydia Messling, University of Reading

October 31, 2018

Fracking and Technological Momentum: Risks, Hazards and Features of the Oil and Gas Extraction System in Colorado
David Oonk, University of Colorado

November 28, 2018 at 12:00 PM

AAAS "Catalyzing Advocacy in Science and Engineering" Workshop Student Competition Panel Discussion
Julia Bakker-Arkema, Kaitlin McCreery, Adalyn Fyhrie, Nicholas Valcourt, and Heather Bené

Other Talks and Presentations by Center Personnel

Max Boykoff

- Scientific Integrity Roundtable, US Senate offices, Washington DC, December 11.
- American Geophysical Union, Washington, DC, December 12.
- Narratives, New Media and Mass Communication workshop, Chatham House and Leo DiCaprio Foundation, New York, NY, September 27.
- Unnatural Disasters conference, University of Illinois, September 13.
- Forum on Science, Ethics and Policy (FOSEP), University of Colorado, September 5.
- UC3 (University Climate Change Cooperative), University of Colorado, July 26.
- Global Town Hall, Climate, Sustainable Development and Global Economic Security panel, July 23.
- National Park Service, Climate Change Response Program 10th Anniversary, July 12.
- Scientific Integrity Roundtable, AAAS, Washington DC, May 21-22.
- University of Chicago, Neubauer Collegium for Culture and Society 'Climate Science and Democracy' April 26.
- Conference on World Affairs, University of Colorado Boulder, April 10.
- Colorado School of Mines, Hennebach Lecture Series in the Humanities, Arts and Social Sciences Division, April 4.
- Guest judge for 'Denver's Next Improv Star', Bovine Metropolis, April 21.
- Universitat Pompeu Fabra, Departament de Comunicació, Barcelona, Spain, March 7.
- Climate change think tanks, Barcelona, March 4-8.
- Invited participant, Scientific Integrity Roundtable, US Senate offices, Washington DC, February 8.

Matthew Burgess

- Surprising global tradeoffs and synergies between fisheries and conservation, Institute for Oceans and Fisheries Seminar (invited), University of British Columbia, Vancouver, Canada, November 16.
- Approximating losses from second-best externality pricing units, CU Environmental and Resource Economics Workshop, Vail, CO, September 14-15.

Lisa Dilling

- Scaling knowledge innovation to smaller water providers: A focus on communities of practice, American Geophysical Union, December.
- Advancing the use of drought early warning systems in the Upper Colorado River Basin: Project Overview, SARP Project Workshop, August 1.
- Beyond Communication: Understanding the decision context for use of drought information in practice, Natural Hazards Workshop, Broomfield CO, July 11.

- Watershed Summit Panelist, Denver Botanic Gardens, June 30.
- Characterizing the robustness of snowpack-based drought indicators in the Upper Colorado River Basin, GEWEX Meeting, May.
- Beyond communication: Understanding the decision context for the use of climate information in practice, American Associate of Geographers Annual Meeting, April 10.
- Dynamics of vulnerability in drought contexts, American Meteorological Society Annual Meeting, Austin TX, January.
- The role of place-based, sustained networks for resilient drought management, American Meteorological Society Annual Meeting, Austin TX, January 7.

Bruce Goldstein

- The Netweaver Network: How Can the CCRN Benefit From Joining a Network Community of Practice? "Communities, Conservation and Livelihoods", Community Conservation Research Network Conference, Halifax, Nova Scotia, May 28-30.
- Accommodating Community and Economic Interests in Public Lands and Natural Resources Decisions, Session Putting 'the Public' in Public Lands Summit, CU Boulder, May 1.
- Netweaving For Systems Transformation: Resilience in Four Learning Networks. Emergent Land-scapes: Reconceptualising Social-ecological Practice, Research symposium, Melbourne, Australia, February 8.

Steve Vanderheiden

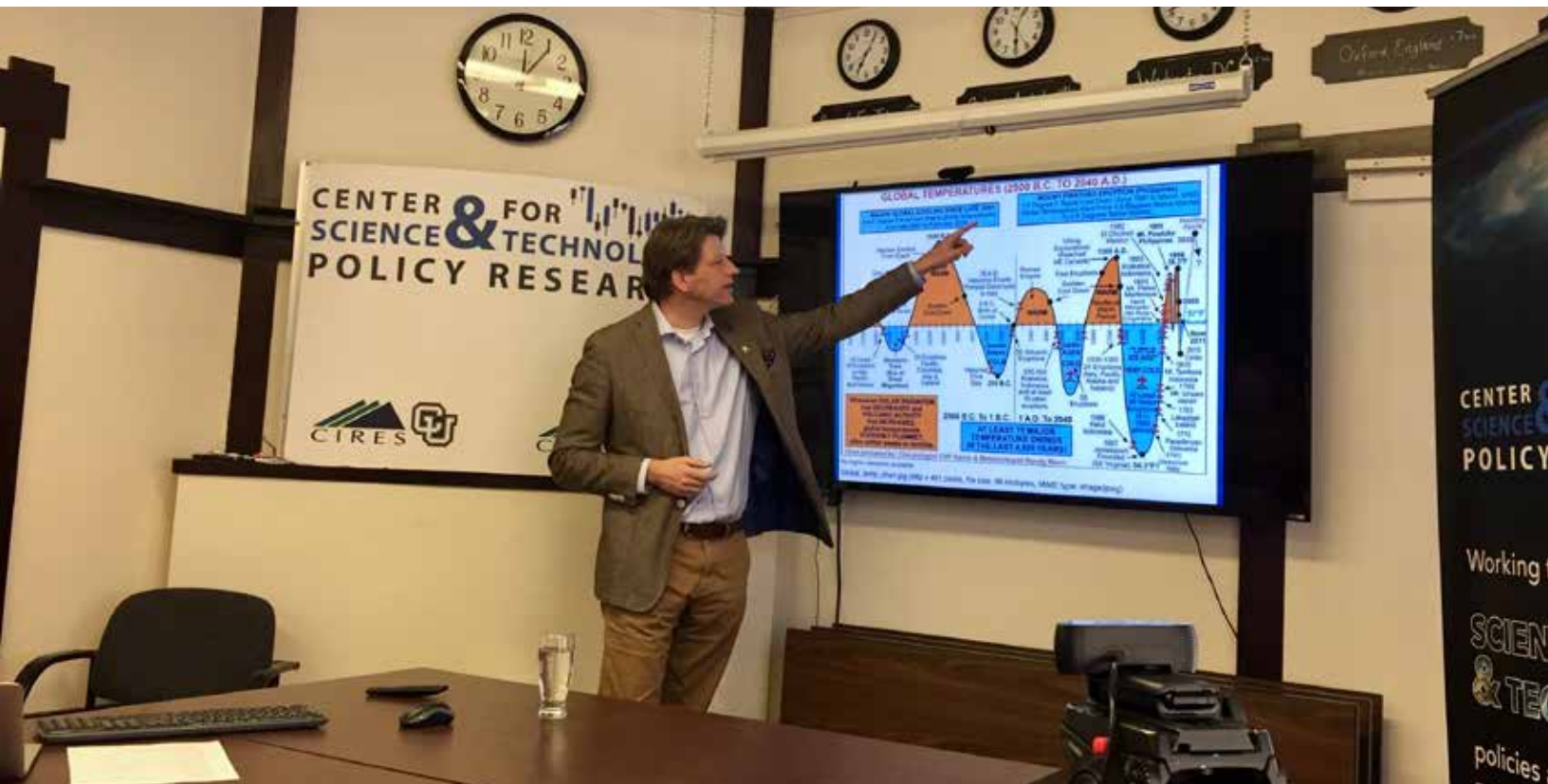
- Consumption Critiques and the Low-Carbon Imaginary, Vienna Institute for Social Change and Sustainability workshop "Transition Impossible? Ambiguous Transformations and the Resilience of Unsustainability", Vienna, Austria, September 19.
- Reconceiving Progress: The Environmental Politics of a Sustainable Future," WPSA annual meeting, San Francisco, CA, March 29.
- Climate Justice Beyond Burden Sharing, keynote for Imagining a Different Future conference, University of Tasmania, February 8.
- Climate Ethics Amidst Climate Injustice, Hobart, Tasmania, Australia, February.

Selected Faculty Affiliate Presentations

Cassandra Brooks

- Paris Peace Forum, in Paris, France, November.
- ENVS/ENVD lunch event focused on publishing, October 9.
- TEDx Salon, The Melting Arctic, University of Colorado, Boulder, October.
- Colorado State University's Antarctic Lecture Series, September 8.
- Chilean Law Student Visit to Colorado Law school, Environmental Law with students from Universidad del Desarrollo, Santiago, Chile, September 5.
- Research and Innovation Office, Faculty Fellows Science Communication Work-shop, May.

Alexander Verbeek giving a CSTPR Noontime Seminar and Conference on World Affairs talk April 11, 2018 on "Our Lives in the 21st Century: The Best of Times or the Worst of Times?". Photo: Ami Nacu-Schmidt.



- International Arctic Workshop, Changing climate patterns threaten West Antarctic Peninsula penguin populations, Boulder, CO, April.
- Conference on World Affairs, The Earth in Human Hands, University of Colorado Boulder, April.
- Towards a representative network of protected areas in the Southern Ocean, Scientific Committee on Antarctic Research Meeting, in Davos, Switzerland, June.
- Leadership in conserving the global commons: Protecting the Ross Sea, Antarctica, Scientific Committee on Antarctic Research Meeting, in Davos, Switzerland, June.

Amanda Carrico

- Psychological Dimensions of Climate Change Adaptation, American Psychological Association Annual Convention, Division 34 Early Career Achievement Address, San Francisco, CA.
- Energy and the Environment (Keynote, Behavioral Science and Policy Association Annual Meeting, Washington, DC.
- Environmental Stress and Migration in Bangladesh: Results from the Bangladesh Environment and Migration Survey, International Centre for Climate Change and Development, Independent University of Bangladesh, Dhaka, Bangladesh.
- Engaging Employees in Energy Efficiency and Conservation, Environmental Protection Agency, Energy Star Industrial Brownbag Series, Nationally-advertised Webinar.

Students, Postdocs, Visitors

- Boykoff, M. and D. Oonk, 2018. Evaluating the Perils and Promises of Academic Climate Advocacy. Poster at the American Geophysical Union (AGU) Annual Meeting. Washington DC, December.

- Lichtin, S., E. Cohen, E. Golden, M.L. Druckenmiller, and D. Powers, 2018. Establishing science as civic leadership in Colorado: How nurturing solidarity and social capital across institutions gets you a seat at the table. Poster PA11F-0830, American Geophysical Union Fall Meeting, Washington, DC, December 10-14.
- Tegen, S. and D. Keyser, 2018. American Wind Energy Association Conference Poster, Wind Energy Workforce Gap in the United States NREL/PO-5000-71457, May 7-10, <https://www.nrel.gov/docs/fy18osti/71457.pdf>
- Oonk, D., 2018. Fracking and Technological Momentum: Unconventional oil and gas development in Colorado. Cooperative Institute for Research in Environmental Sciences (CIRES) Rendezvous, University of Colorado Boulder, May.
- Oonk, D., 2018. Fracking and Technological Momentum: Unconventional oil and gas development in Colorado. Dimensions of Political Ecology (DOPE) Conference, University of Kentucky. Lexington, Kentucky, February.
- Plant, T., S. Tegen, and P. Cummins, 2018. Presentation to State Legislators, Clean Energy Legislative Academy: Energy Policy Overview, <http://cnee.colostate.edu/wp-content/uploads/2018/09/Energy-Overview-Combined.pdf>.

SERVICE ACTIVITIES 2018 - CORE FACULTY

Max Boykoff

- Deputy Editor (history/social science): Climatic Change
- Associate Editor: Ethics, Policy & Environment
- Editorial Board: Environmental Communication: A Journal of Nature & Culture

Fernando Briones giving a talk October 17, 2018 on "Local Responses to Disasters in Peru and Puerto Rico: An Approach from Zero-Order Responders". Photo: Ami Nacu-Schmidt.



- Editorial Board: Global Environmental Change
- 2016-present: Environmental Studies program Graduate Committee
- 2016-present: Environmental Studies program Executive Committee
- 2015-present: Boulder Faculty Assembly (BFA) Environmental Studies program representative
- 2017-2018: Environmental Studies program Introductory Series 1000/1001 Committee
- 2016-present: Director, Center for Science and Technology Policy Research
- 2017-present: Co-editor (with Ami Nacu-Schmidt and Jennifer Katzung) of Ogmios Newsletter for CSTPR
- 2017-present: Search committee for Rad Byerly memorial CSTPR award
- 2016-present: CSTPR Rad Byerly application review committee
- 2016-present: CSTPR AAAS Catalyzing Advocacy in Science and Engineering application review committee
- 2013-present: CU-Boulder Red Cross/Red Crescent Climate Centre Internship program Director
- 2009-present: CIRES Center for Science and Technology Policy Research Executive Committee
- 2018-present: Internal ARPAC reviewer, Environmental Design, University of Colorado Boulder
- 2017-present: Research and Innovation Office (RIO) steering/advisory group, University of Colorado Boulder
- 2010-present: University of Colorado co-organizer of UN observer credentialing (with J. White and M. Averill)
- 2017-present: Advisory Board, Albert Bartlett Center for Science Communication, University of Colorado
- 2018-present: Boulder Faculty Assembly (BFA) Budget and Planning committee
- 2017-present: Boulder Faculty Climate Science & Education Committee (BFCSEC)
- 2016-2018: Advisory role, Center for Sports Governance, University of Colorado
- 2017-2018: Faculty Leadership Institute, cohort 5, University of Colorado Boulder
- 2015-2018: Boulder Faculty Assembly (BFA) Intercollegiate Athletics committee
- 2016-2018: Advisory Board member: Colorado Ocean Coalition/Inland Ocean Coalition
- 2016-present: E-town Editorial Advisory Board

- 2018-present: Years of Living Dangerously Science Advisor
- 2016-present: Advisory role, Climate Change Comedy Project (Emily Coren [PI])

Matthew Burgess

- 2018-present: Undergraduate Curriculum Committee, Environmental Studies Program (member)
- 2018-present: Core Faculty, Center for Science and Technology Policy Research
- 2018-present: Referee for Science Advances, Proceedings of the National Academy of Sciences, Proceedings of the Royal Society B, BioScience, Global Change Biology, Climatic Change, Canadian Journal of Fisheries and Aquatic Sciences, Marine Policy, ICES Journal of Marine Science, Ecology and Society, Ecological Economics, Journal of Policy Analysis and Management, Environmental Modeling and Assessment, Marine Environmental Research, PLoS One, Natural Resource Modeling, Methods in Ecology and Evolution, Ecological Applications, Conservation Letters, Endangered Species Research, Regional Studies in Marine Science
- 2018-present: Volunteer consultant on the design of an aquarium exhibit on fishery bycatch, Aquarium of the Pacific and Art Center College of Design

Lisa Dilling

- 2018: CU Boulder Faculty Leadership Institute
- 2017-2018: CU Boulder ASSETT Teaching Fellow
- 2018-present: NASA Applied Sciences Advisory Board
- 2017-present: ENVIS Teaching Evaluation Committee Chair
- 2017-present: ENVIS Faculty Learning Community Member
- 2017-present: Advisory Board, Research Applications Lab., National Center for Atmospheric Research
- 2017-present: Domain Editor, Vulnerability and Adaptation, WIRES Climate Change
- 2017-2018: CIRES Visiting Fellow Committee Chair
- 2017-2018: CIRES Environmental Economist Search Committee member
- 2016-present: Subject Editor, Bulletin of the American Meteorological Society (BAMS)
- 2016-present: Aspen Global Change Institute Advisory Board, Aspen CO USA
- 2014-present: Director, Western Water Assessment
- 2011-present: Advisory Board, Decision Center for a Desert City, Arizona State University, Tempe AZ
- 2008-present: CIRES Fellow

Bruce Goldstein

- 2017-2018: Program in Environmental Design, Mentoring Committee (Chair)
- 2017-2018: Program in Environmental Studies, Curriculum Committee, MENV
- 2018: Program in Environmental Studies, Curriculum Revision Committee

Steve Vanderheiden

- 2010-present: Environmental Politics book series Editor, Routledge, Peer reviewer, Working Group III, Intergovernmental Panel on Climate Change, (IPCC) fifth assessment report
- 2010-present: Senior Research Fellow, Earth Systems Governance Project
- 2009-present: Associate Editor, Ethics, Policy and Environment
- 2012-present: Editorial Board member, Environmental Politics

Selected Faculty Affiliate Service Activities 2018

Cassandra Brooks

- 2018-present: Standing Committee on the Antarctic Treaty System, (SCATS) Scientific Committee on Antarctic Research (SCAR), Deputy Chief Officer.
- 2012-present: Journal Reviewer for Science, Conservation Letters, PLOS ONE, Frontiers in Marine Science, Marine Policy, Antarctic Science, CCAMLR Science, Global Environmental Change, Nature Climate Change.
- 2018-present: University of Colorado Boulder, Undergraduate curriculum committee.
- 2018-present: University of Colorado Boulder, Arctic Certificate Committee
- 2018: University of Colorado Boulder, Peer classroom evaluation committee.

Amanda Carrico

- 2018-present: Awards Committee, APA Society for Environmental, Population, and Conservation Psychology
- 2017-present: Invited Member, Committee on Grand Challenges and Opportunities in Environmental Engineering and Science for the 21st Century, National Academies of Science, Engineering, and Medicine
- 2015-2018: Associate Deputy Editor, Climatic Change

GRANT ACTIVITY

Project Title	Source	Amount	Period of Grant
Connecting Science to the General Public More Effectively through the Arts (Boykoff, collaborator/advisor)	National Science Foundation	--	2017-2018
Leadership Education for Advancement and Promotion (LEAP) Growth Grant (Boykoff, PI)	University of Colorado	\$6,000	2017-2018
Think tanks, denialism and climate change in Europe (THINKCLIMA) (Boykoff, collaborator)	Spanish National Government	Travel Funds	2016-2019
Equipment for Inside the Greenhouse (Boykoff, PI with Beth Osnes and Rebecca Saffran)	Environmental Studies Program student course fees, University of Colorado	\$4,487	2017-2018
Science and Technology Policy Fellowship Program for Colorado State Policymaking (Boykoff, Co-PI with Matthew Druckenmiller)	California Council on Science and Technology, in partnership with the Gordon and Betty Moore Foundation and the Simons Foundation	\$30,000	2016-2018
Advancing the Use of Drought Early Warning Systems in the Upper Colorado River Basin (Dilling, Co-PI)	National Oceanic and Atmospheric Administration	\$286,000	2016-2018
Western Water Assessment: Building Climate Resilience by Design (Dilling, PI)	National Oceanic and Atmospheric Administration	\$4.5 million	2015-2020
CU Boulder NC CASC: Driving innovation in co-producing science to help resource managers in the North Central region adapt to a changing world (Dilling, Co-PI)	US Department of Interior	\$4.5 million	2018-2023
Creating and Studying a National Network of Centers of STEM Education: Developing Foundational Infrastructure for Educational Transformation (Goldstein, Co-PI)	National Science Foundation	\$224,956 (Goldstein portion)	2015-2020

2018 GRANTS AND AWARDS - SELECTED FACULTY AFFILIATES

Cassandra Brooks

2018-2020 Pew Charitable Trusts, Conservation Policies Towards Developing, Adopting, and Implementing Marine Protected Areas in Antarctica's Southern Ocean (PI; \$250,000).

Amanda Carrico

2017 – 2022 National Science Foundation, Co-PI, \$1.5 M

Socioecological System Dynamics Related to Livelihood, Human Migration, and Landscape Evolution

2018 – 2019 CU Innovative Seed Grant, Co-I, \$50,000, Resilient and Sustainable Sanitation Systems: Characteristics, Links, and Barriers

2017 – 2018 Center for Science and Technology Policy Research Seed Grant, PI, \$6,000, Emerging Responses to Genetically Modified Crops in Boulder County

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