The Aggie Brickyard

assembling the blocks of ecology at UC Davis

WINTER 2017 VOL. IV

MOVING FORWARD

Communication and science advocacy on the sea - Jordan Hollarsmith

✦ COVER: *Western Pond Turtle in Suisun Marsh* - ***Mickey Agha***

LETTER FROM THE EDITORS

"Our point is simply that by being honest with one's self about what you are hoping to accomplish, you can focus your energies on strategies best-suited to your objectives and avoid judging yourself and your actions against criteria you never intended to achieve."

The end of the Winter Quarter is a time of transition for many of us. For some, it marks the ramp-up for field season complete with last minute scrambles for gear, anticipation of long days in beautiful places, and never-ending logistical juggling exercises. For others, it marks the end of a winter spent collecting data and the transition to long, hard, coffee-fueled days of analyses, writing, re-analyzing, and re-writing. These cycles (elegantly characterized by John Mola's Emotional Phenology) define the lives of many graduate students and ecologists. These cycles, like any good ecosystem dynamic, are subject to disruption by processes operating at different scales.

The transition to a new presidential administration has been one of these disrupting forces for many of us. The desire for science to inform public decision-making creates an inescapable link between science and politics. The response by the scientific community to the new administration is a powerful reminder of that link—one that is reverberating throughout our personal and professional communities. How are we to respond? What responses are likely to be effective? How do we remain effective as scientists and citizens? These are difficult questions with very personal answers. We suggest, however, that the discussion begins with clarifying what effective means. It could mean ensuring that public decisions are informed by credible research. It could mean changing the hearts and minds of the voting public about what science is and how it works. It could mean protecting the integrity of science as a way of knowing the world. Or it could mean finding a sense of personal empowerment through taking action. Any of these (and many others), may be appropriate objectives—that is up to you. Our point is simply that by being honest with one's self about what you are hoping to accomplish, you can focus your energies on strategies best-suited to your objectives and avoid judging yourself and your actions against criteria you never intended to achieve.

(continued next page)

UCD Quad - UC Davis

Letter from the Editors

The above ideas are at the heart of many (maybe all) strategic development frameworks, but their importance extends beyond political efficacy. We are in a long game and wasted energy risks personal and professional burnout. November's election results, California's drought-busting winter, the struggles of our friends and families—all of these things can magnify or dampen the peaks and troughs that define our lives and work. The question, then, is how to remain personally and professionally resilient to these disruptions?

Thanks to you all we have begun to collect potential solutions to these challenges. In this issue, we have collected a number of faculty and student perspectives on science, advocacy, and science advocacy. We hope that the diverse experiences reflected in these pieces provide guideposts for you as you choose the objectives, strategies, and communities you hope to engage with in the coming months and years. Additionally, a number of you have provided personal insights on how you care for yourselves in the face of adversity. And perhaps most importantly, we have a tremendous diversity of stories from the field. From Antarctica, to Brazil, to the fish physiology lab, your work provides the inspiration that keeps us going through tough times. As always, thank you.

Sincerely,

Your Aggie Brickyard Editors

Erin Flynn, Madeline Gottlieb, John Mola, Ryan Peek, Matt Williamson;

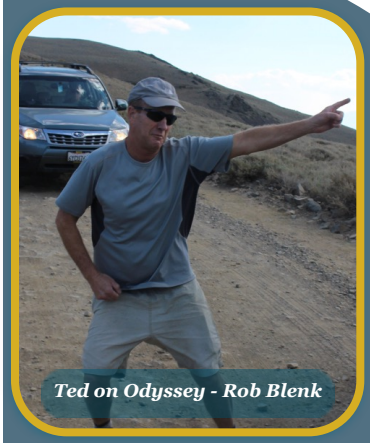
Editors-in-chief

Why The Aggie Brickyard?

*Bernard Forscher invokes the brickyard metaphor in his classic essay "**Chaos in the Brickyard**" (Science, 1963, Vol. 142, No. 3590, p339) to illustrate the dangers of becoming focused simply on producing bricks rather than on building edifices. As graduate students, we are trained to become specialized in whatever narrow area of expertise we have chosen for ourselves. We continue to discover new facts and, in the process, become excellent brickmakers. Yet, to truly understand the complexity of ecological systems, we must do more than produce facts—we must integrate them into a structure. In a graduate group that includes soil chemists, shark biologists, resource economists, social scientists, and everything in between, there is little doubt that we can produce some of the finest bricks. Our challenge remains to create buildings that are both more beautiful and durable than the sum of the bricks on which they rest.*

CHAIR-ISHED REFLECTIONS

A Ted-itorial (*Ted Grosholz*)



Ted on Odyssey - Rob Blenk

"So when you are speaking as a scientist, make sure to do so with humility and a willingness to listen to opinions that you disagree with" - T. Grosholz, GGE Chair

Greetings GGE Brickyard readers,

As the snow begins to melt from the winter onslaught, I have been asked to discuss my views on certain topics motivated in large part by the errant election outcome in November. More specifically, I have been asked to share my thoughts about the role of scientists as policy advocates and as providers of scientific information in the policy arena–both particularly challenging topics in this "post truth" world, as it has been characterized by Dr. Jane Lubchenco (FEE 2017). As always, the views below are my own idiosyncratic views and beliefs and do not represent broader view of the GGE. Instead, they are meant as the basis for further thought and discussion. These views are also colored considerably by my own involvement in science-advocacy, given that I was an advocate long before anyone, myself included, would have considered me a scientist.

Before I delve into the questions I have been asked to address, allow me to explain what I mean by "scientists as policy advocates" versus "scientists as providers of scientific information." When scientists act as policy advocates they insert themselves into the political arena, whether it is at the local, state, or federal level, and they use their scientific expertise to urge the support or defeat of a particular policy. For example, if I were to present testimony before a congressional committee where I presented the results of my research and urged the committee to vote against a pending congressional measure, I would be acting as a policy advocate. In contrast, when scientists act as providers of scientific information, they do not attempt to directly urge the support or defeat of a particular policy. Rather, when acting as providers of scientific information, the scientist presents information that will inform the policy debate but plays a more neutral role, albeit a critically important one that continues to stress the importance of scientific, evidence-based policy making.

Are there particular policies that students (and faculty) should know about as they decide how and whether to get involved in political issues?

First, of all, you should know that as a private citizen you have a protected right, under the First Amendment to the U.S. Constitution and under the California Constitution to freedom of speech. So, as a private citizen, who also happens to be a scientist, you are free to participate in the political process and to express your views, consistent with the Constitution. There are two important points to be aware of, however: if you do become involved in the political process you can identify yourself as a UC Davis employee, but should make it clear that you are not speaking on behalf of the University. Also, there are restrictions on the use of public resources (that is, university resources) for political purposes. So, the time and other resources you use for your political activities should not involve university resources. For example, if you do decide to conduct a letter writing campaign or email campaign for political purposes do not use university resources.

When it comes to your rights as an employee of the University of California, the First Amendment continues to protect your rights and the University has several policies about academic freedom as well as academic codes of conduct that apply to many of these issues. However, if you do decide to participate in the political process, whether it is as an advocate or simply to provide scientific information, you should make it clear that you are not there to represent the views of the University and that the views you are expressing are your own.

CHAIR-ISHED REFLECTIONS

Another very important issue to be mindful of is that you want to avoid the situation where you are compensated for the purpose of influencing legislative action. If you were to find yourself in this situation, you might fall within the definition of a lobbyist, which would subject you to a regulatory scheme that requires certain registration and disclosure requirements. But equally important, if you were to fall within the definition of a lobbyist, your credibility as a scientist might suffer because you would be viewed as someone who is paid to express a particular viewpoint rather than as someone whose testimony is guided solely by scientific evidence.

What are the consequences of science advocacy and the risks for scientific credibility?

If you do become active in science politics, it is important to be make it clear when you are expressing your political views as a policy advocate and when you are presenting scientific information as a practicing scientist. If you do not effectively separate your political views from your scientific opinions, you risk harming your scientific credibility. It is important to understand the risks involved in walking the shifting line between science advocacy and providing scientific information. As one astute author put it "*The paradox lies in the fact that the political power of professionals [e.g. scientists] can be retained only if it is not exercised*" (in Goodwin 2012). So there is both a need to be a science advocate but a risk of expending your credibility as a scientist in doing so. However, as you become more involved in science advocacy, there are some steps you can take to help maintain your scientific credibility. You should be aware of your own personal conflicts of interest, be willing to identify the limitations of your arguments, present data that support as well as refute your opinion, be clear that you are speaking as an individual and not representing an institution (from AAAS Science Advocacy Report). The need for scientists to become involved in the public debate is increasing, and even more so with the new administration in D.C. So it is important that as students and faculty we engage the public and decision makers in a way that defends both the importance and utility of science. But we also need to make it clear that there are strong public opinions including our own about science policy issues.

What is the role of the GGE and UC Davis more broadly in shaping the role of science in public decision making using the right mix of quality science and public engagement?

The GGE and even UC Davis are small entities in the greater scheme of science politics and public decision making. We should continue to increase our engagement with the public broadly and educate and debate the successes of scientific enquiry. We need to be aware that much of the public views science with skepticism and there is a great deal of science illiteracy to overcome. For instance, nearly half of America (46%) believes God created humans in a single day about 10,000 years ago (Gallup Poll) and 25% of Americans are unsure if the earth revolves around the sun or visa versa (NSF poll). For these reasons, it is more important than ever to infuse sound science into the political arena. Whether we act as policy advocates or as more neutral providers of scientific information this will enhance the value of science.

There are risks inherent in speaking up for science and the role of science in the public debate. We have to realize that scientific information, even the 'best available science' that we all strive for and hope will win the day, is just one component of public policy decisions. Economic, social, and political considerations are equally important in the eyes of many, if not most, particularly in a U.S. Congress with only one member with a scientific Ph.D. At the same time, science has greatly improved human health and well-being (Lodge ESA Response 2017) and we need to remind decision makers of the broad-based social benefits of good science. We also need to realize that we can be viewed as self-serving as well, since we can appear to be advocating for scientific views (even overwhelmingly supported ones like climate change) that might result in more funding or support for our own scientific careers. So when you are speaking as a scientist, make sure to do so with humility and a willingness to listen to opinions that you disagree with, examine data that contradict your views and present your views to those who may disagree with you conclusions. There is much that we can all do become better science communicators, which will also help us maintain our scientific credibility as we increase our participation in science advocacy.

FACULTY Q & A

Science Advocacy

November's election results sparked a lot of questions for many of us. Calls for marches, pleas to avoid the politicization of science, and discussions of differing forms of engagement and activism that may seem counter to scientists' professional norms leave students (maybe all of us) with questions about the best way to move forward. We asked several GGE faculty for their thoughts on the risks and rewards of navigating the science-advocacy boundary. Beyond that, we wanted to know what strategies they rely on to "keep on keepin' on" in the face of challenging emotional times (regardless of their source).

Susan Harrison


S. Harrison - UC Davis

On your experience with advocacy (especially science advocacy):

On subjects unrelated to environmental science, like the Iraq War or women's rights, I've been involved as an individual. On issues involving actual scientific facts, like climate change or endangered species, I'm sometimes willing to speak out using my professional title and affiliation. To maintain our own credibility, keep on the right side of our employers, and maintain the societal status of science as more than just another special interest, it's of course necessary to distinguish between our own opinions and actual science. That is getting hard these days, with such intense polarization that being 'pro-science' is considered a political opinion. In these weird times, I tend to look to our scientific societies and other leaders for guidance on where to come down 'professionally' on political issues. We are a small group, and we will be most effective if we speak collectively.

I'm in favor of the March for Science and plan to participate, although I can understand why people are uneasy. Advocacy, even in favor of science, is a very different mindset from science. The key point to me is that these are extraordinary times, and the march is not for science as a profession, but for the survival of science as a way of gaining knowledge and informing decisions - something that's never come under so much attack in the US before.

On the risks for young scientists looking to become more politically involved and strategies for mitigating those risks:

What to say to young ecologists beats me, since we seem to be headed into uncharted territory. You are the best judges of what risks you are willing to take early in your careers. Certainly, in the federal agencies there are risks associated with just doing your job right now. In academia, I think our colleagues and the system will generally stick up for us, so long as we don't overstep in certain ways, such as telling students what to think or presenting our opinions as facts.

In most ways I feel like the current generation of young ecologists is already doing things right — doing societally relevant science, engaging the public, and trying to expand diversity, while not feeling excessively entitled. I think this is a great contribution to society and people who are motivated should keep doing it. If you want to go beyond that in terms of political engagement, that's fine too, but be judicious about when it's legitimate to wear your scientist hat.

On maintaining a quality research program when life hands you lemons:

For me, it's always been important to stay motivated through good and bad times by the beauty of nature, the hunter-gatherer thrill of doing science, and the realization of how lucky it is to have those things in my life every day.

FACULTY Q & A

Science Advocacy

Mike Springborn

On your experience with advocacy (especially science advocacy):

I see "advocacy"—supporting a cause or proposal—as something that could be pursued through two distinct paths. First, there are the regular academic channels (e.g. academic papers, general audience outreach publications, conference presentations, etc.). Alternatively, there are non-academic channels such as open letters, letters to the editor, engaging with politicians, organizing pressure groups, etc. I've engaged in only a limited number of instances of the latter kind—mainly signing on to letters (e.g. from scientists at UC Davis or the Union of Concerned Scientists) in the context of climate change policy. These were low-risk actions—typically such letters are simply arguing for what a majority of scientists already concluded and signed by a large number of well-respected folks. My research is typically policy oriented and normative—I focus on ideal approaches to environmental management problems. Because of this, regular academic channels provide plenty of opportunity for me to express what I think should be done in a certain context.

On the risks for young scientists looking to become more politically involved and strategies for mitigating those risks:

I expect such risks vary widely by topic and type of political activity. It's hard to pontificate on general advice in this context, especially if the activity occurs through the non-academic channel I described above. Alternatively, if the regular academic channel I described above is appealing but you don't have a background in policy science, I suggest reaching out to policy scientists (economists, political scientists, etc.) for possible collaboration. Ecologists (and other environmental scientists) have been instrumental in pointing me towards a number of emerging environmental problems worthy of study. Most of the time they continue to actively collaborate with me. In this way, I ensure that I'm doing justice to the environmental science. In return, my collaborators have a piece of carefully developed policy analysis that addresses one of their pressing concerns.

On maintaining a quality research program when life hands you lemons:

Take time for eating well, exercise, and socializing with friends/family just as you would any other essential item in your work calendar. It can be tempting to skip these "appointments" when time is tight or times are tough. But research is a long game and these activities are important inputs to a centered mind and therefore good research.

FACULTY Q & A

Science Advocacy

Erica Fleishman


Erica Fleishman - UC Davis

On your experience with advocacy (especially science advocacy):

I often have felt that some sectors of the scientific community expect their members to ascribe to rhetoric, or to overlook weak inference, if they feel that the political or environmental ends are laudable. Question whether the scientific evidence supports listing a given species under the US Endangered Species Act, or whether climate change categorically is the greatest contemporary threat to native species, and risk being excluded from some professional circles. But capitulate to groupthink, and one's scientific integrity erodes rapidly.

I believe that it is my professional obligation to defend scientific integrity and intellectual freedom. The Oxford English Dictionary defines advocacy as "public support for or recommendation of a particular cause or policy." If public is interpreted as the general public, then I have not engaged in science-related advocacy. However, I have wrestled with how to ensure that the scientific process is equitable and that all parties, regardless of their political views, can trust scientific products. For example, as editor in chief of the journal Conservation Biology, a publication of the Society for Conservation Biology, I requested that authors either remove advocacy statements from their manuscripts or identify such statements as opinion. I also resisted the insistence of some members of the society's governing board that they be allowed to dictate whether and how the journal reviewed and presented policy statements. The journal traditionally had published editorials, which, unlike regular articles, are neither peer reviewed nor indexed. In this case, some individuals wished to publish unreviewed opinion pieces within the indexed section of the journal. Doing so would have rendered the pieces, to all but the most discerning reader, indistinguishable from peer-reviewed articles. As a result, the editorial board effectively would have condoned future presentation of the statements as having the imprimatur of a highly respected scientific journal.

These decisions were based on my personal values and consultation with previous editors in chief, other members of the editorial board, and editorial staff. The advantage of making these decisions was that I was true to the ideal of editorial independence and to my ethics. The disadvantages included being discharged from the journal (more and accurate dirt is here: www.sciencemag.org/news/2012/06/society-conservation-biology-turmoil-over-editors-ouster), losing a number of dear colleagues and friends, and extraordinary emotional pain.

A major source of my trauma in this and other situations was the extent to which I struggled not with individuals or entities with political perspectives that might diverge considerably from my own, but with my professional community. For instance, in 2010, a not-for-profit coalition of agricultural water users in the Sacramento–San Joaquin Delta asked whether I would be willing to provide testimony as an independent expert to California's State Water Resources Control Board. As a scientist with relevant knowledge and a private citizen with a stake in management of California's water, I readily agreed. I was not asked to serve as a representative of the coalition; they had no role in preparing my testimony, and they did not compensate me. However, one of my research sponsors at the time, a partnership of federal and state agencies, objected strongly to my provision of testimony on the basis of the source of the invitation, and essentially contended that I was in breach of contract. It baffled and disillusioned me that instead of being pleased that the regulated community considered me to be a credible scientist, they were

FACULTY Q & A

Erica Fleishman (cont.)

upset by the notion that I would communicate with the regulated community. Unwilling to back down, I consulted with my dean, and then with university counsel, both of whom fully supported my academic freedom and were willing, if necessary, to defend me against any attempts to withhold research funds. I suspect that few other organizations so strongly would have defended the right to inform decisions.

On the risks for young scientists looking to become more politically involved and strategies for mitigating those risks:

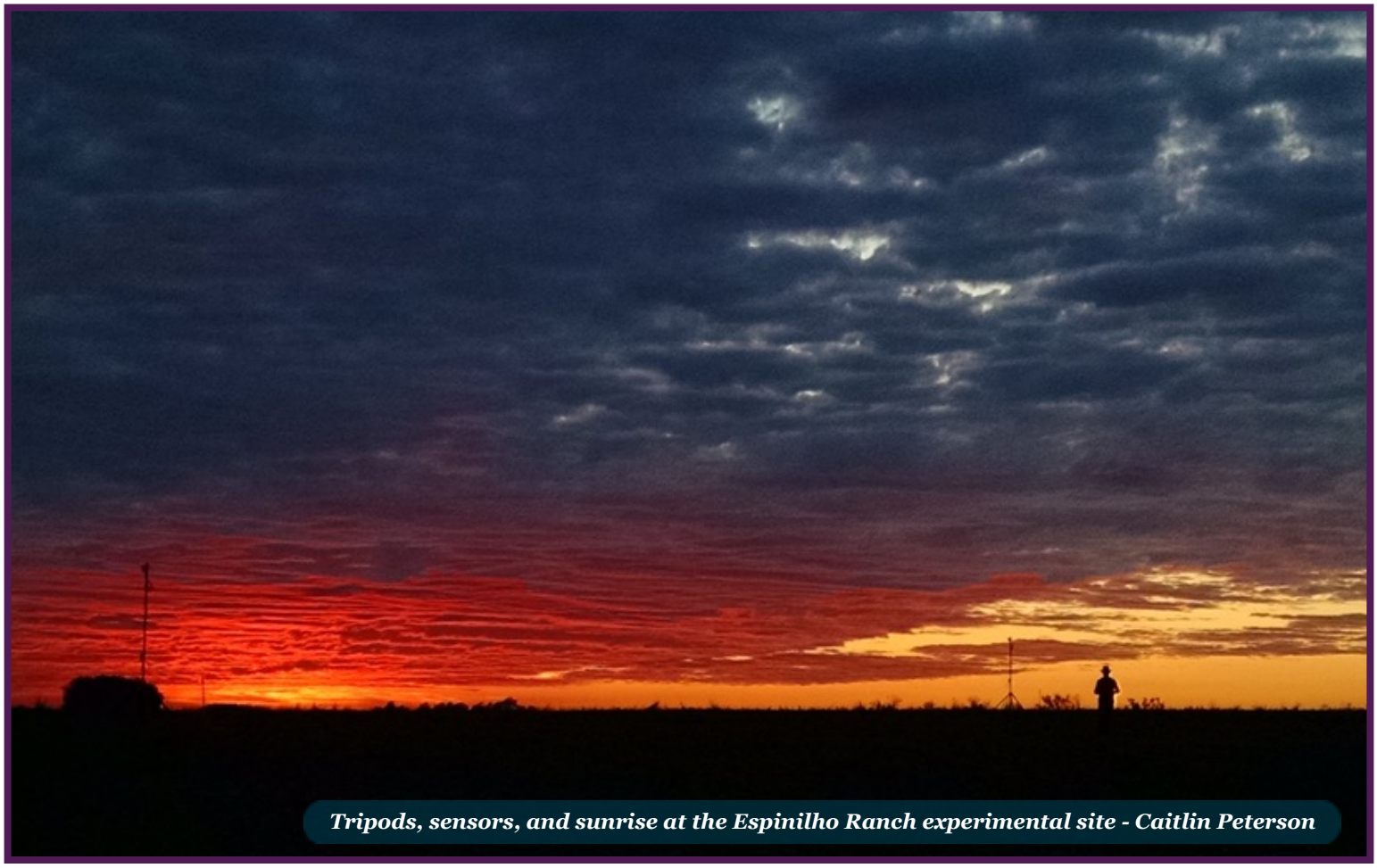
I suggest that one first needs to think carefully about what they wish to accomplish by engaging in the political process (beyond voting or contacting one's representatives, which I believe are a civic responsibility and a civic right, respectively). There can be trade-offs between satisfying an impulse or social pressure to advocate for one's convictions in the short term and using one's professional expertise to inform decisions by elected officials, the private sector, or resource agencies over the long term. The perceptions of those who one seeks to inform can matter as much as the reality, and political activity can compromise the perception of neutrality even if one's science is above reproach. In my opinion, the greatest risk of political activity may be engaging in what Wilhere (2012, Conservation Biology 26:39–46) defined as inadvertent policy advocacy: "unintentionally expressing ethical judgments or personal policy preferences in a way that is nearly indistinguishable from scientific judgments." Being perceived as objective and credible increases the likelihood that one will be consulted and trusted by the business community, which typically has far more political influence than the scientific community, or by government agencies and employees. Remaining at a remove from politics, and therefore being regarded as an honest broker by the greatest possible number of actors, ultimately can maximize one's ability to play a role in the decision-making process.

On maintaining a quality research program when life hands you lemons:

Two strategies have helped me to maintain the quality of my research, and a modicum of rationality, during periods of despair. The first is physical activity. An early morning exercise habit forces me to focus. It is a strong disincentive to overindulging in intoxicants, and ensures that even if the rest of the day is awful, I did one worthwhile thing. The second is spending time at our field sites in rugged and sparsely populated areas of the Great Basin, where I often travel or collect data unaccompanied. The loneliness is offset by nature's tough love: the mountains and aspen and bighorn sheep are wholly unaffected by my dramas. I also find it helpful to remember something written by a friend who experienced personal grief far more profound than that induced by my own professional challenges: "you live through things, and you do that by living, not sitting around."

A tree - Jordan Hollarsmith

"You live through things, and you do that by living, not sitting around."
E. Fleishman



Tripods, sensors, and sunrise at the Espinilho Ranch experimental site - Caitlin Peterson

Juvenile Bald Eagle - Shannon Skalos

Does ecological research follow Betteridge's "Law of Headlines?"

John Mola

No.

Well, maybe. Probably not. Sometimes. Sort of?

For a period in which we might be glued to the news (or actively avoiding it), it may be a good time to remember how to interact with the news in a skeptical manner. As such, I've been thinking about Betteridge's Law of Headlines. The law states (according to Wikipedia) that "Any headline that ends with a question mark can be answered by the word ***no***." While the rule isn't actually a law, and it certainly isn't always true, it's important to consider why the law exists and what critique it is attempting to provide.

It has been suggested that yes/no type questions pop up in headlines when the author is intending to sensationalize the information, or otherwise to sell a non-story. Essentially, Betteridge-type headlines are the original "click bait". By using a question mark at the end of a title, unsupported claims can gain footing and misleading statements can gain legitimacy. After all, the author is not staking out a claim, just simply asking questions.

Betteridge-type questions often look like the following, and their answers are often no: "Are potato chips the key to weight loss?" No. "Is the government plotting to make us a Muslim nation?" No. "Is it normal for someone your age to be unemployed?" MOM! I'M NOT UNEMPLOYED I'M IN GRAD SCHOOL!

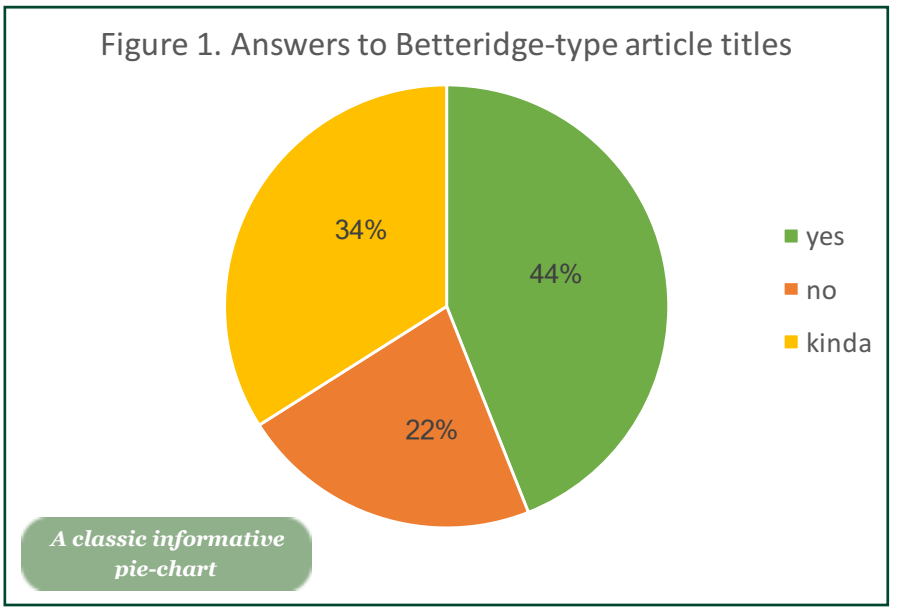
I digress.

Thinking about Betteridge's Law caused me to wonder if it applied in ecological research. So, I did what any sane person would do: I combed through 130+ issues of Ecology, Ecological Letters, Journal of Ecology, and Ecosphere to look for articles with question marks in them. I looked (with some help from Joanna Solins and Ryan Peek, thanks y'all) at tables of contents and tallied each article as either "No question" "other question" or "Betteridge-type question". I either looked at three years or 500 articles worth of issues per journal. After downloading any article that had a "Betteridge-type question" in it, I established the answer and marked it as "yes" "no" or "kinda".

In total, I categorized 2,585 articles with the vast majority of titles containing no question (96.03%). Betteridge-type questions, which can be answered with a simple yes or no, were 2.15% of all articles. "Other questions", which asked things like, "how many" or "which" or "when does", were also uncommon at 1.82%. There were no differences in the commonality of questions between the different journals (P = a lot).

I found 55 journal articles with a yes-no type question, including one that was later redacted (from a GGE faculty member no less! Gasp! Don't worry, it was redacted due to good ol' fashioned human error and excluded from my comparisons). Of these, "yes" or "maybe" were by far the most common answer to the paper's central question (78%, Figure 1).

Figure 1. Answers to Betteridge-type article titles

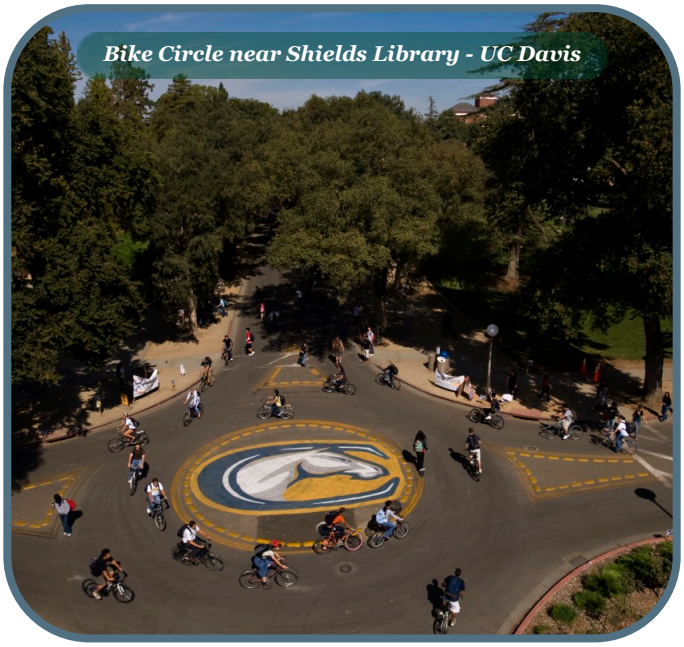


From this data, we can easily conclude that no... ecologists do not follow Betteridge's law. When you see a question, in fact, you can assume the opposite, that the answer is probably yes or yes with some nuance. But then, why make your title a question?

It's worth noting that in my investigation, I had originally begun looking at Conservation Biology, only to find out, 300 articles in, that they explicitly ban the use of yes/no questions in their titles. Stating in their Style Guide for Authors that, "Interrogatives make poor titles because the entire manuscript can often be summarized with a single word: yes or no". They further encourage authors to avoid sensationalizing their titles or making "dogmatic" statements.

So, it seems ecologists avoid the sensationalism and the easy eye-catching format of Betteridge-type titles. However, looking into this ended up leaving me with many questions of my own. Why use a question in a title at all? Even though it was rare, questions in titles were not absent even in some of our most premier journals. Why not just state results plainly? Why ask leading questions? I believe part of it has to do with the messy nature of ecological research. Maybe sometimes a question is an easy way out of writing a concise title when the results are anything but simple. Who knows?

If you find good Betteridge-type questions in ecology, send them to me. I'm curious!



Bike Circle near Shields Library - UC Davis

White-tailed Kite - Shannon Skalos

RESEARCH SPOTLIGHT

At sea aboard the R/V Akademik Tryoshnikov - Jordan Hollarsmith

Musing from a month at sea

Jordan Hollarsmith

By train, plane, ferry, and car, we came from around the world to gather in front of our home for the next four weeks: the ***R/V Akademik Tryoshnikov***. This 500 foot Russian ice breaker would take us from Germany to South Africa on Leg Zero of the Antarctic Circumnavigation Expedition (ACE). This was only the first section of an historic journey to circumnavigate Antarctica and visit all fringing islands to investigate, sample, and increase our understanding of the Southern Ocean. Thanks to the generosity of the Swiss Polar Institute, we 50 students representing 19 countries and territories that spanned five continents were invited aboard to learn about oceanographic and atmospheric research methods and to foster international collaborations in marine and atmospheric science. Our backgrounds and research interests were as diverse as our nationalities and mother tongues—from aerosols, to isotopes, trace gases, microbes, glaciers, coral reefs, kelp forests, and on. After a traditional send-off with rowdy sea chanties sung by old German men, we battened the hatches and set off into a North Atlantic cyclone.

Traveling by ship leaves one with a much greater appreciation of distance (and a month of pickled Russian food leaves one with a greater appreciation for anything other than pickled Russian food!). We saw the oceanographic and atmospheric concepts of our lectures play out in the sea around us. We pitched and rolled through the storms of the westerlies, the same winds that made connection between the New and Old Worlds possible in a time before steam engines. We felt the lethargy of the eerily still and windless horse latitudes, thankful we had a huge diesel engine and were not stuck adrift on the flat ocean as often befell ships of days past. We were drenched in the squalls and towering cumulonimbus clouds of the equatorial trade winds. We atoned for our sins to gain permission from King Neptune to cross into the Southern Hemisphere. We felt the shift from boreal winter to austral summer in the temperature and in the stars above us.

Observing these changes, both incremental and dramatic as we steamed across latitudes, granted us a greater understanding of the interconnectedness of global oceanic and atmospheric processes. Being stuck on a 500 foot boat with so many nationalities represented made us recognize the interconnectedness of human politics and cultures. A few days into the southern hemisphere, we all gathered for a discussion of the state of science and climate change communication in our respective countries. To our chagrin, it quickly became clear that climate change misinformation and science skepticism is a global phenomenon. We collectively committed to continuing to collaborate across borders, especially as many countries shift towards nationalist and isolationist agendas. We reaffirmed the importance of reaching out beyond the walls of our respective institutions and communicating with broad audiences. In these tumultuous times of budget cuts, capitalism over conservation, and the denial of science, it gave me hope to see such an inspiring and intelligent group of global early career scientists. It was also alarming to hear my concerns regarding my own country mirrored in countries across Europe, Africa, Australia, and Asia.

I came off that ship in Cape Town, thirsty for a beer and hungry for non-Russian food, but mainly deeply impressed with the GGE. Our program encourages us to collaborate widely and to carry our scientific messages outside of the university, whether that is to local schools, government agencies, or NGOs. I appreciate now more than ever how unique these qualities are and I applaud all of my colleagues for the amazing work they all do in addition to their cutting edge research.

An immigrant's quest to do research in the heart of California

Linda Estelí Méndez Barrientos

One of the world's largest-scale experiments with common-pool resource institutions is taking place in California. The Sustainable Groundwater Management Act (SGMA) of 2014, labeled as "the most significant piece of California water law since the Porter-Cologne Water Quality Control Act of 1969," requires local stakeholders in 103 groundwater basins to collectively develop new institutions for groundwater management and plans for reducing groundwater overdraft in 127 groundwater basins across the state. A couple years ago I decided to quit my job as an advocate with the Environmental Defense Fund to do my PhD on SGMA at UC Davis.

SGMA implementation is key for California. This is especially true for the sustainability of our ecosystems, for farmers and for the hundreds of disadvantaged communities in the Central Valley that lack access to safe drinking water, which is aggravated by drought and by depleted common groundwater resources. That SGMA is key does not mean that its processes are easy. With water rights at stake, and the introduction of management rules aimed at changing the status-quo, implementation has been a politically contested process.

One of my dissertation goals is to develop case studies across the State to better understand decision-making processes around the development of new groundwater management institutions. I am specifically trying to determine why have some stakeholders chosen certain governance structures, included or excluded disadvantaged groups and/or made other governance decisions?

In short, I am trying to explain the differences between these basins and to answer these questions, I have been traveling around the state going to SGMA meetings. From Glenn County to Tulare County, from Sonoma Valley to the Salinas Valley, I've been a fly on the wall observing stakeholder interactions and documenting each process.

In that capacity, as a young Latin American woman with a thick Latino accent, and a UC researcher, I've encountered a series of interesting identity experiences that are part of doing social science. Up until now, I've had to invest in some basic wardrobe uniform to "try to fit in", which basically consists on plaid shirts, jeans and boots. Even though I am not a U.S. citizen, I've had to memorize the Pledge of Allegiance to not be the only one in the room who does not know it by heart. I've also learned that being associated with UC Davis can close some doors, depending on the geographic location. Because some of our scientists have done research that has highlighted important issues around water quality and more recently, around the imminent salinization of the South Central Valley, farmers are now facing more regulations from the State. How does that translate into my research?

Well, let's just say I've had a hard time trying to get interviews in some geographies.

Maybe as a social scientist I am too aware of the different hats I wear with my identity (e.g. young, female, minority, scientist) and wonder and worry about how this affects my own research. Whether it is the product of my own cognitive perception with the world I interact with, or due to the evolutionary societal state in which we live, I now pay more attention to these details in order to unrealistically diffuse the 'outsider' image I embody.

Juvenile Western Pond Turtle, SF Eel River - Ryan Peek

Doing a field season in the lab

Ken Zillig

I will begin with an assumption - most ecologists found themselves drawn to this discipline with the promise of wandering hillsides to collect seeds, diving reefs to measure fish or spending hours observing wild creatures through binoculars. Even if eight months of the year we sit wrestling with R code, or probing the recesses of memory for the meaning of cryptic sample labels, it was all to earn the privilege of donning some moisture-wicking shorts or wearing a scuba tank and getting into the field. Incorporating the adventure of field work into our careers (and furthering science) is the motivation for becoming an ecologist.

Perhaps I misunderstood, or was deceived by naivety, but I have managed to become a laboratory ecologist. My field season runs from spring into summer and for its entirety I will bike a few miles off of UC Davis campus and post up with a laptop surrounded by tanks, pipes and pumps. I study the metabolism of fish, salmonids to be precise. A group which are characterized not only by their impressive physiological capabilities but by their ability to traverse the wild boundary between mountain and sea. I however, sit sedentary aside a mix of concrete and plexiglass discovering new ways to be captivated.

The containment has allowed me to observe the surrounding ecology with new focus. Over the course of the field season, dozens of barn swallows will industriously build mud nests along the walls and under the eaves. As one enters or leaves the doorways they are enveloped in a whimsical swarm of blue blurs. My field season corresponds nicely with the swallow life cycle; beginning when the swallows arrive and ending when young fly as deftly as their parents. Alongside the swallows, all forms of flora and fauna are moving with spring, the Swainson's hawks have returned and a new batch of gangly turkey chicks will quickly grow into lithe runners. But the real attraction to the lab are the fish themselves.

A reason for being a laboratory ecologist is the sheer amount of time you can spend with your study species. The fish, unlike in the field, aren't occluded by

Sturgeon in the [lab] field - Sarah Baird

turbid waters or sunken flotsam. They swim in full view, separated by a quarter inch of glass. It may seem odd, but such contrived circumstances allow for a unique appreciation for the nuanced influence of natural selection. They are beautiful little living machines and the lab is the performance garage where I can test their capabilities. Each fish has been sculpted as wind and rain shape rock. The salmon use their fusiform bodies to sprint through water with the greatest ease. The juvenile sturgeon, with their triangular profile, use their small bodies like the spoiler on an Indy car to hold position despite swift currents. This is the appeal of the lab; while my fellow field ecologists observe their subject's in wild glory, the lab ecologists observe the limits of what natural selection has crafted. I may have blindly stumbled out of the field and into the lab but I am certainly enjoying the cool fish and the cooler A/C.

Alaskan trawl shrimp diversity - A research cruise was conducted to compare kelp forest to urchin barren communities across the Aleutian Islands during Summer 2016. Trawls were conducted offshore to assess the impact of nearshore kelp loss on offshore benthic biodiversity and yielded many different shrimp taxa with amazing color diversity, they are likely in the family Hyppolitidae - Scott Gabara

Alaskan urchin barren - The loss of sea otters across much the Aleutian Islands has caused release of otter prey. Urchin barrens can form when urchins are not controlled by otters and can consume much of the macroalgae, reducing primary productivity greatly from that of the kelp forest. As part of an NSF funded project between the Edwards lab (SDSU) and Konar lab (UAF), the impact of urchin barren formation on benthic biodiversity and productivity was assessed in the Eastern Aleutian Islands during summer 2016 - Scott Gabara

PERSPECTIVES

Weather moves in while field work carries on - Caitlin Peterson

Gaucho science: A lesson in persistence

Caitlin Peterson

The morning mist is thick and low on the ground. I'm guessing relative humidity of 100%. Vapor pressure deficit 0 kPa. Transpiration 0 mm/s. I can't even see Pedro and Jonathas as they put together a tripod on the far end of the field. I can just hear the clunks and clangs of the aluminum pipes as they slide into the iron tripod joint. The higher note of the hammer singing as it strikes the stakes, pulling the guy lines firm. One by one the long masts holding the sensor heads pop into view, until finally all six poke lamely into the heavy atmosphere above the soybean canopy. So much metaphor potential it's almost too easy.

I am in Rio Grande do Sul, Brazil, the country's southernmost state and home of the Gauchos, those quintessential South American cowboys. Espinilho Ranch, some 8 hours' drive from the state capital of Porto Alegre, produces thousands of hectares of beef cattle and soybeans and is my field site for the Brazilian summer. I have been here since October, foolishly trying to do plant physiology while counting on the cooperation of the weather. The tripods and the adorable little sensors attached to them are all part of my clever (read: foolish) plan to track vegetation indices throughout the day, looking for signs of stress in the crop when the weather heats up.

Back at my bunk at ranch headquarters, the morning's data collection finished, I tear through my book and check social media and the New York Times obsessively. Every few minutes a pause to survey the sky and the gathering clouds while prowling around the farm yard. Current events have me preoccupied, to say the least; in the time it has taken for the soybeans to grow from seedlings to knee-high plants, my future as a young, optimistic scientist has grown considerably murkier. I'm a government-funded researcher, but the government cares not for my work.

Frigging rain. What direction is the wind blowing? Will we even be able to go to the field this afternoon? Of course, we have to go, there are soil samples to collect from today and yesterday. We go. I send Pedro and Jonathas off with the shovel, while I head to a distant field with the sampling rings, a hammer, and a smaller trowel. The day's work has an extra interest to it due to Paulo's promised visit later in the afternoon, such a rare occurrence that I am anxious to demonstrate the slickness of my operation. Paulo, something of a demi-god in the world of Brazilian animal and crop science, has spearheaded a great deal of research on crop-livestock integration, and I'm here at his invitation.

He arrives at just the moment when I'm thrashing around in the soybeans trying to hammer my sampling rings into the ground. Sweaty and with mud all the way up my arms. Hat askew, hair flying around because my cheap sunglasses have rubber bits on the ear pieces that stick to my hair and pull strands out of my pony tail every time I take them off. Looking every bit like a slick operation. Then the storm clouds that I have been watching warily for the past hour decide to make their entrance, and within five minutes of Paulo's arrival conditions have deteriorated drastically. I suddenly begin to fear for our safety and the safety of my precious sensors, exposed as they are in this open field, inescapably attached to very tall and very metallic tripods. Minor chaos commences.

(Gaucho Science, cont.)

Pedro, Jonatas and I scramble to pull the sensor rigs from the tripod bases, jumbling strings, wires, and protective covers together, rushing to throw old raincoats over the more sensitive equipment in the truck bed as the rain begins pelting down, all while Paulo and his two traveling companions stand watching bemusedly, trying to stay out of the way and getting soaked to their proverbial boxer shorts in the process. The equipment stowed as well as possible, I manage to direct a shrug and a wry grin in Paulo's direction. He hides a giggle behind his dripping mustache, seeming to enjoy the show immensely.

For all its size and dominance in sectors like agriculture, Brazil spends only 1.4% of its GDP on research and development, putting it well below the global average of 2.1%. Things had been gradually improving for science in recent years, until the economic crisis of 2013 sent research funding straight back to the bottom of the government's agenda. The state of Rio Grande do Sul recently dropped its agricultural research program, FEPAGRO—just, dropped it, along with its zoo-botanical and science & technology programs—leaving its scientists scrambling to find replacement positions in industry or academia. Newly minted PhDs are obliged to look outside the country for employment, resulting in an exodus of Brazil's most highly educated human resources. Even one of Brazil's best-funded universities, the Federal University of Rio de Janeiro, has professors in limbo waiting for promised grant money to arrive, and a supercomputer that's not running for want of a simple repair.

Back at ranch headquarters again, huddling in the meal room. The drips from our wet clothes becoming puddles under the wooden benches. Jonathas prepares mate for everyone, and for once I'm grateful for the bitter, hot beverage. Paulo reveals he has brought a present: a grape cuca, pound cake frosted with sugary fruit, a great favorite of Rio Grandenses. I offer the tin full of wild passion fruits that I found down by the creek the day before. Brief skepticism, then delight as they find the tiny fruits to be sweet and refreshing. In any case, there are few treats to be found at Espinilho, and we munch happily on cake and passion fruit while taking sips of steaming mate.

In the intervening weeks, I have asked my Brazilian friends, how do you do it? How do you keep writing papers, collecting data, with an institutional environment that regards research – and especially agricultural research – as a non-priority? Their reliable answer is to look elsewhere. To not rely on the government, and to rely instead on connections and collaborations, on the private sector, on a broad national and international network, on people rather than institutions. I have since begun to suspect that one of Paulo's top strategies for keeping the machines oiled is to simply say "yes" twice as often as he says "no". He regards research not as mere work, but as a mission, a way of life, and a duty to his students. "Good research doesn't always require expensive equipment or facilities," he says. "Just brains, and willingness."

I am not alone in wondering where things are headed. My future as an ecologist may seem up for grabs, but my Brazilian friends face similar, perhaps even graver, difficulties. Still, they produce science. They invite me to exchange ideas and work in their fields, they lend their time, their hands, and their data to help me towards our mutual benefit. Nothing went at all as I had hoped today – quite the contrary. But we sit together, we share food and drink, we speak not a word of politics, and their solid presence makes me feel more secure.

A scientific community that faces outward, not inward, and that holds generosity and trust in the highest regard, thrives independent of transient policy environments. We are not the first nor the only ones to have our research disrupted by capricious rainclouds, and any case, uncertainty does not preclude action. We can meet it with creativity and persistence, continuing to build bridges with what bricks we have. After all, Gaucho scientists have been doing it for years.

A ranch hand at Espinilho works the cattle - Natascha Grinnell

A user's guide for graduate student worries about the end of the world

Rachel Wigginton

On the fourth day of the new presidential administration, I got an email from my funding source saying they didn't know if the money would keep coming. I knew the attitude toward science would shift with the new administration, but I never expected such concrete impacts to my life within the first week. When my paycheck did come two weeks later, I knew I had to change my approach. I wanted to feel I was working to make things better, and if I experienced a near miss, it's almost certain someone else had taken the hit. Like any good type A personality, I knew what I really needed was a plan.

I read a lot of think pieces, I talked to a lot of folks I respect, and, in the end, I developed an approach that felt right for me. I offer you my own guidelines now, not as prescription, but as an attempt to empower you to make a plan for how you will approach the coming years. Interrogating my own motivations and priorities was emotionally taxing, time consuming, and frustrating. Inventorying my special skills required grappling with imposter syndrome for the millionth, and I'm sure not last, time. I still haven't gotten over the daunting size of the issues we face, but as Cairns and Crawford once wrote, "***It is almost too late to start, but tomorrow is even later.***"

Step 1: Give myself permission to succeed

I'm the most effective change maker, in the long run, if I become an influential voice in my field. All my big science heroes, folks who advocate for the societal and professional values I hold, were amazing researchers before they became influential voices in a broader capacity. Focusing on both long and short-term success has been really challenging for me, especially with the current political situation throwing up a formidable combination of issues I hope to help address mixed with background noise designed to distract. To cut through the clutter, I created a space for myself during each day to orient my daily actions within the current global context and my long-term ambitions.

I started getting up earlier, around 6:30am, to wander my house with coffee, do my dishes, and listen to a daily news podcast or two. I want to stay informed, but I felt like the cable news cycle was turning up the knob on my anxious feelings and destroying my productivity. For me, escaping the 24-hour news cycle was a big step toward getting serious about my career goals. Plus, rising early gave me time throughout the day to internalize the things that were going on in the world, instead of just reacting to headline after headline.

I also began writing in a notebook I keep on my kitchen table. Before the events of the day have time to clutter my mind, I jot down responses to the news stories I'm hearing, especially if I think, "I want to do something about that specific issue," or "I want to work for the organization this individual is representing." I also gave myself permission to consider goals that still feel well out of reach. If I wrote a book, what would be its focus? If I founded a non-profit, what skills would I need to cultivate first?

When I get to my office, I sit down and spend 15 minutes goal setting for the day. I shift away from my morning meditations and force myself to be as practical as possible. I also have two accountability partners, who are graduate students at other institutions. We check in with one another regularly, with the expectation of receiving good natured peer pressure and encouragement if we are feeling down.

That's all in my ideal day. Sometimes I get an email about proposed cuts to the EPA or NOAA, both of whom have financially supported my dissertation, and my motivation tanks. Sometimes I go against my better judgment and read the news at night, subsequently can't fall asleep, and, thus, fail to roll out of bed as quickly the next morning. On those days, I remind myself my ultimate goal is progress, not perfection.

Step 2: Make my communication more meaningful

I'm married to a communications instructor who got his MS studying how the rhetoric communicators use can shape the attitudes of their audiences. We originally met as members of opposing teams during speech and debate competitions in college. It probably goes without saying that we have plenty of lively discussions about scientific communication. Training myself to explain complex concepts in accessible ways is an evolving skill for me, but I'm most excited about developing ways we, as scientists, can push beyond this stage. I think an examination of communication as a scholarly discipline is largely missing from the wider discussion about scientific communication. Two branches of communications studies I think particularly pertinent to our community are an understanding of public address and interpersonal communication.

As I mentioned above, I did competitive speech and debate in college, which is only news to folks who have never spoken to me, because I talk about it a lot. I was nationally ranked in rhetorical criticism, informative speaking, and persuasive speaking. I think I can do a lot, right now, to help scientists with public address, and I'm trying to start acting on this ambition. Why does it matter? Public speaking is about power, the power to help folks understand or to change minds. As scientists, I don't think we should forfeit that power to surrogates. I think we should speak for ourselves. I've written a blog post about this, and I guest lectured in a science communication course in the fall. I've got a few bigger ideas in my kitchen table notebook, but, for the time being, take this as my official offer to watch any of your conference presentations, job talks, or community outreach speeches, and give you public speaking notes.

Interpersonal communications are a powerful tool for scientists. With so much of the news focusing on science and federal scientific organizations, lots of my friends started wanting to engage with me about these topics in a more meaningful way. Folks can feel intimidated by science, and they were often worried that chatting with me about it was going to make them look dumb. I found this baffling, considering I have so many brilliant non-scientist friends. I want to empower the non-scientists in my life to become advocates for the importance of science. I also want them to see that scientists are people, like me, and not some monolithic human computer or crystal ball. Mediated communications (happening through media like text, Facebook posts, or tweet replies) have become an important part of my efforts in this arena. I blog; I tweet; I'm regularly over-sharing on Tumblr. Self-disclosure is an important part of interpersonal communication, but it gets tricky on the internet. However, I think bringing ourselves, as people, to communication can make what we say more meaningful.

Step 3: Pay it forward and build solidarity

My sophomore year of college, I read Life in the Treetops, a field biologist memoir about canopy ecology and, more meaningfully to me at the time, being a woman in a male dominated field. The author reflected on her mentoring relationships with her own students, observing that the next generation of scientists, my generation, would be the first with easy access to female mentors. I've had amazing mentors of all genders, but my female mentors have been particularly meaningful to me. Going forward, I want to be more intentional in supporting young female scientists.

As a graduate student, one of the most important hats I wear is that of mentor to undergraduate students. Most of us would never get our degrees without the help of numerous undergraduate technicians and volunteers. Hiring and mentoring young women has been one of the highlights of my time working at UC Davis. Giving all different kinds of folks their first field experience, even when it was more time consuming or less convenient, has always been more rewarding than trying. Taking time out of my day to explain how to apply for graduate school, how to look for job postings, or how I really believe my mentees can be successful scientists has taught me a lot about myself. Honestly, I don't feel it's ever been an equal exchange. They've always given me more than I could ever hope to give them.

Having female mentors has kept me in science on more than one occasion. Thus, I want to do a better job of offering solidarity to folks in my field who still aren't easily able to find mentors with whom they can deeply identify. I'm still searching for the most effective ways that I can interface with this issue. As a humble start, I'm trying to make myself into the type of person who folks can be honest with, which requires a conscious effort on my part to be more open. I think that's a goal toward which we can all work.

Step 4: Stay Inspired

As I was making this plan, I realized the number one risk I ran was forgetting that this work wasn't grounded in an opposition toward something, but in my love for the planet and the people and other living things that call it home. I became a scientist because I wanted to understand how the world worked so I could protect it. But, this is a dangerous time for idealists.

We need to remember we aren't just working against something, **we are working for something.**

Stay inspired any way you can. That's the only way we're going to make it through this thing. I've been following amazing female scientists on Twitter, watching way more nature documentaries, and reading a lot more poetry. It's probably not even cute anymore how obsessed I am with Wendell Berry, but I've been reading a lot from his book Leavings recently. One of my favorite poems reads, ***"No place at last is better than the world. The world is no better than its places. Its places at last are no better than their people while their people continue in them."*** My true aspiration, then, is to make myself into the type of person who can improve her places and, thus, her world. I'm so grateful for all the role models I already have for this in my own community. Thank you for inspiring me.

Dark-eyed Junco - Shannon Skalos

In the safety of our spaces

Grace Ha

In the past few weeks, I have asked a number of people for their thoughts on the term safe space. I've gotten a wide variety of reactions. Some people rolled their eyes, citing their frustration with "pampered college kids these days." Some voiced sympathy for those who struggle to find such spaces in their lives, such as LGBTQ youth or victims of assault. Others were at a loss for any response at all; one friend of mine simply said, "Well, the term suggests there's a threat you need to be safe from."

As academics, we often hear about safe spaces in the context of marginalized students. However, we all need such spaces in our lives. They are the sanctuaries—places, people, or times—where we root, relax, and heal ourselves. These spaces make it possible for us to venture into the world and meet the challenges of life on an even keel.

As scientists, the very nature of our scholarship is dependent upon having safe spaces to do our most important thinking. Imagine doing our research under constant risk of hostility, punishment, or retribution. Such stress takes away from our ability to focus and maintain the necessary motivation to see our work through to completion. As members of the GGE, we know this intrinsically—or else, we would not devote such loving energy and expense to make new members feel at home through traditions like the Odyssey. We know community is central to our well-being and productivity.

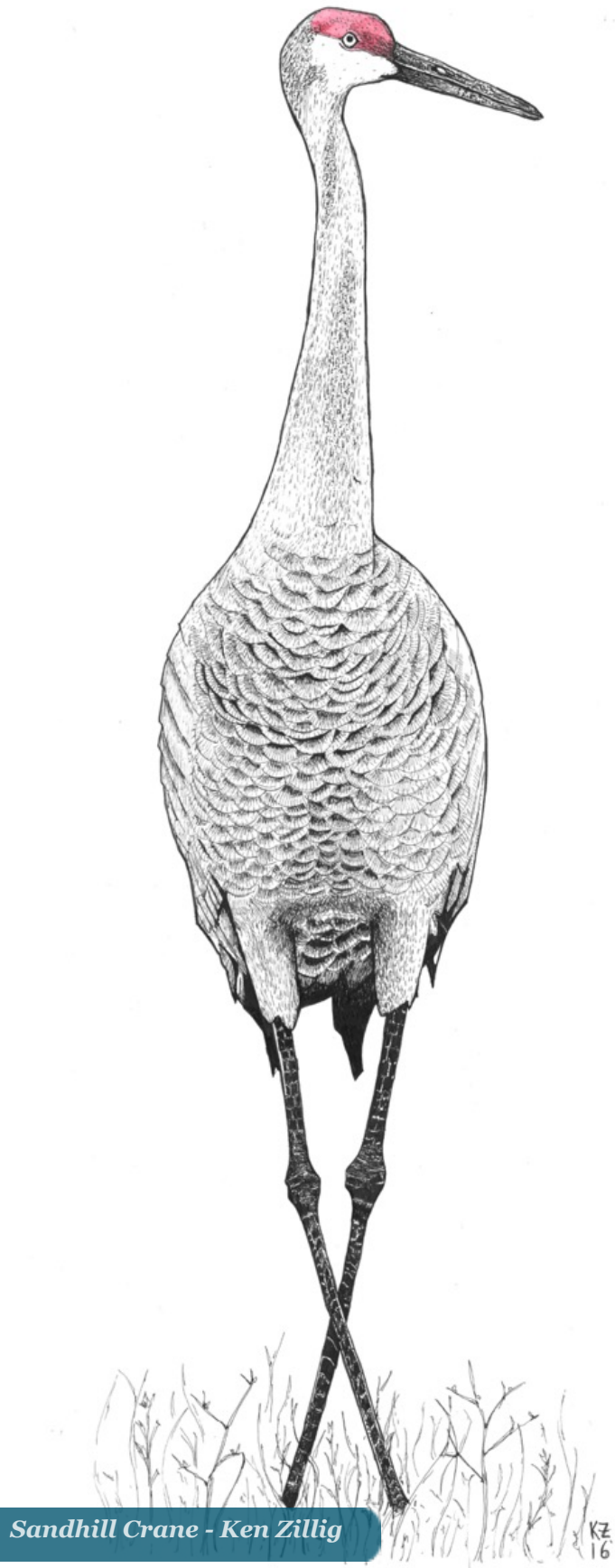
"As scientists, the very nature of our scholarship is dependent upon having safe spaces to do our most important thinking."

However, in a world full of uncomfortable issues, at what point does our sanctuary become our bubble? At what point have we gone beyond rooting and healing ourselves to stunting our own growth? Perhaps it is the point when communication across the borders of our safe spaces has run dry—or perhaps it is the point when we no longer know how to venture beyond those borders at all.

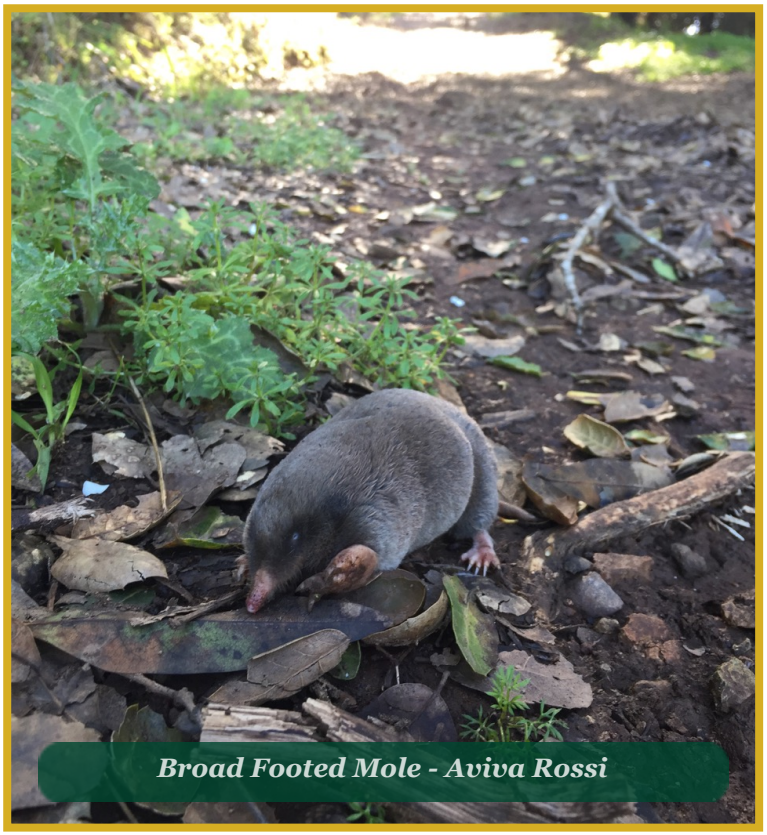
This contradiction of safe spaces—sanctuary vs. bubble—has troubled me for a long time, because it implies a certain level of work is required to maintain the function of safe spaces. But what work? What markers indicate when a safe space is one or the other? And how to accommodate those bounds for all individuals within that space, who no doubt carry with them different stressors, different thresholds, and different constitutions?

In the coming days of our uncertain future, our ability to sustain our personal, professional, and civic lives will become more important—for it is only through our continued presence and efforts that the issues of our society will improve. However, that ability will also depend ever more on our skills in navigating the demands of our society and our personal well-being. No two people will use the same methods. However, in the process, I can only offer the following advice: ask questions, of yourself and of others, and listen as deeply as you can.

We need the sanctuary of safe spaces to root us; but we cannot afford the delusions of a bubbled existence that not only renders us obsolete, but also makes us an active obstacle in the path of the hard work that must be done.



Sandhill Crane - Ken Zillig



Broad Footed Mole - Aviva Rossi

Three times heavier than a mouse, the Giant Weta (*Deinacrida heteracantha*) is the heaviest insect in the world. It is found only on a few of New Zealand's offshore islands - Matt Savoca

Anna's Hummingbird, El Paso House, CA - Ken Zillig

A Tuatara basking in the late afternoon light on Little Barrier Island, New Zealand - Matt Savoca

Black-capped Chickadee - Shannon Skalos


photo by Scott Gabara


photo by Jordan Hollarsmith


photo by Annelise Del Rio

(SOME) RECENT STUDENT PUBLICATIONS

GGE (current/former students) in **bold*

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(SOME) RECENT STUDENT PUBLICATIONS

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Shuford, W. D., G. W. Page, **S. K. Heath,** and K. Nelson. 2016. Factors influencing the abundance and distribution of the Snowy Plover at Mono Lake, California. *Western Birds* 47(1): 38-49.

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An Austrailasian Gannet comes in for a landing at its breeding colony in Muriwai, New Zealand - Matt Savoca

COMMUNITY

Anti-scientism is at least a two-front war

Arthur M. Shapiro

Not so long ago most Americans put science on a pedestal. My mother firmly believed that Albert Einstein and Jonas Salk sat on the right hand of God. But clearly, things have changed—so much so that a colloquium entitled "Science in a Post-Truth Era" was held at the Mondavi Center on February 22 to address the phenomenon of anti-scientism in contemporary America. It was scantily attended—and frankly not very useful. To understand how we got to the point that many Americans question the credibility of science and scientists, we need to look carefully at recent history. If we don't understand how we lost so much ground, we will be in a poor position to try to regain it. If we don't understand who our critics are and where they are "coming from," how can we rebut them effectively?

One of the reasons the colloquium was unsuccessful was that it had a strong quality of "preaching to the converted." Everyone, or nearly everyone, in the room was more or less familiar with the now well-documented history of how the tobacco industry led the way in creating a fake "controversy" over the role of its product in carcinogenesis, and how its very successful strategy was then adopted to obfuscate the blatant facts of climate change, sow public confusion, and turn climate denialism into a political "litmus test." So everyone was comfortable bashing the political Right and its backers in the extractive industries. That's only to be expected on most university campuses. But as I tried to point out on the floor—and it plainly made some people quite uncomfortable—that's only part of the story. The erosion of public confidence in science was also fed by elements of the academic "postmodernist" Left and by a persistent strain of Luddite romanticism that blames science and technology for sullying Eden.

The term "science wars" refers to the quite recent period when some humanists and social scientists, having embraced "postmodernist" relativism (there are no absolute truths; "truth" is an epiphenomenon of power), deemed science to be merely one among many "ways of knowing"—with no more ontological priority than, say, revealed religion or shamanism. But they were not content to stop there. Rather, they indicted science as complicit in, if not the motivating force behind, sexism, racism, imperialism and a string of equally execrable isms. One cannot deny that scientific ideas have all too often been used to justify or rationalize horrific acts. On the other hand, hindsight is cheap. We recoil today at eugenics and find much of its literature from the early 20th Century simultaneously horrifying and ludicrous. We rarely stop to consider that at the time eugenics was considered a liberal reformist program. The history of ideas is rarely so simple and straightforward as one is tempted to believe. One of the greatest champions of conservation America has ever produced, a man who was largely responsible for saving both the redwoods and the American Bison, was perhaps the most vicious intellectual racist America has ever produced: Madison Grant. (Google him.) We do not reject conservation as an idea because Grant was an evil man. We should not reject science as a human enterprise because it has been used for evil ends.

Stephen Jay Gould was a frequent in-house critic of the uses to which evolutionary ideas had been put. After a very well-attended talk on the subject on this campus, he was asked how he thought our contemporary views on the applicability of evolution to our own species might be perceived 50 years down the road. "*Oh, I think we've got it right now*," he said. (I hope you see the problem.)

The "science wars" were more than a contest of world-views; they reflected underlying sociopolitical conflicts within academe. Many of the "postmodernists" were frankly jealous of the stature and the funding accorded science. Some were even up front about it. I was present at a "critical theory" conference ("critical theory" is a code word for postmodernism) when one speaker openly admitted that the impenetrable jargon that had recently proliferated in the politicized humanities was an attempt to emulate the sciences which, in his words, had "their own elite language accessible only to the initiated priesthood." That statement was followed by dead silence in the hall. At that same meeting, a very prominent postmodernist accused science as a whole of being a racist institution. How is one to respond to such a blanket indictment?

Anti-scientism is at least a two-front war (cont.)

Fortunately, this particular episode in intellectual history seems to have run its course. It never really entered the mainstream due to its intrinsic insularity and, frankly, its susceptibility to easy parody. It continues to be flogged by some conservative pundits, mainly because it lends itself to ridicule. But in its day it did its part to legitimate and make common cause with another group of critics of science, who show no sign of going away.

Although some postmodernists included the trashing of the environment in their litany of science's sins, most of them were concerned much more with human-centered issues. But their indictments meshed easily with critiques grounded in romanticism. Social scientists speak of the idolizing of the underclass—a contemporary derivative of Rousseau's "noble savage." Simplicity is good; sophistication is evil. Nature is inherently superior to culture. Scientists create pesticides that contaminate the environment and decimate biodiversity. Especially here in California we find widespread horror of "chemicals"—as if we and everything we eat were not made of chemicals. But to point this out is to be accused of being a shill for Monsanto. Few of those bitterly opposed to GMOs—genetically-modified organisms—are religious fundamentalists, but their horror at genetic modification is conceptually indistinguishable from the notion that man has no business messing with God's creation. A knee-jerk rejection of "frankenfoods" is barely distinguishable from the oft-voiced opinion in the 1960s that bad things (hurricanes or earthquakes, say) were sure to result from us "messing with the moon."

"We have to persuade people that science is working in their best interest, not against them"
A. Shapiro

The anti-vaccination movement is not underwritten by the Koch brothers and certainly not by Big Pharma. It's pure "mother Nature knows best."

Once upon a time only 150 years ago, students in Germany formed hiking clubs and went trekking in the Alps, singing and seeking the mythical magical "blue flower." They were called Wandervogel, or "migratory birds." From this healthy, invigorating expression of romantic joy in the outdoors grew the most malignant ideology in world history: Nazism. The Nazis used science, or a perversion of science, to justify and advance their goals—but their movement was born from anti-science, a flight from industrial and urban modernity. (I often encounter incredulity when I say Nazism was an outgrowth of German Romanticism. Don't take my word for it. Look it up.)

Both Right and Left anti-scientism seek to diminish our stature by caricaturing us as (to use a phrase used by a troll in attempting to characterize me) "grant-grubbing parasites." It suits the aims of our critics, wherever they are coming from on the ideological spectrum, to portray scientists as just like everybody else—venal and careerist. The days when scientists were viewed as idealists who gave up any hope of wealth or power in a single-minded pursuit of truth are long over. Of course, we never really were like that. We are human beings and we have egos. We even have political and (sometimes) religious beliefs. But if we are good scientists, we subjugate those to our pursuit of truth, wherever it may lead us. That may or may not make us more noble than anybody else, but it surely does not make us less.

So how did we get where we are today? By a confluence of anti-scientific critiques from both the Right and the Left. The Right is better financed, but the romantic Left appeals more deeply to many because it seeks to restore a lost simplicity. In a sense, our task in dealing with science denialism from the Right is easier. The economic motivations of our adversaries are hard to conceal. The facts of climate change are overwhelmingly straightforward (and tend if anything to be over-applied in the popular view as being behind any and all extreme weather events!) and the idea that climate change is a "hoax" or "conspiracy" so ludicrous that what is needed is much more psychologically-astute public communication than we have deployed to date to refute the nonsense. Dealing with the romantics is more difficult because they are perceived as "nice people like us," not rapacious robber barons. But here too, effective communication is the key. We have to persuade people that science is working in their best interest, not against them. It may sound silly to say we need to do that, but recent history demonstrates that it isn't. And we are not going to figure out effective communication strategies on our own. We need to read and heed the analyses of people like George Lakoff and Jonathan Haidt. If you haven't read them, do.

Fighting a multi-front war is never easy. But neither is doing science.

Art Shapiro is a Distinguished Professor of Evolution and Ecology and has been at UCD since 1971. He has taught Philosophy of Biology, graduate seminars on Ideology and Biology, and various advanced courses in ecology, evolution, and biogeography.

DIVERSITY

How to finish our dissertations while also supporting and engaging with our broader community

Humble suggestions from your Diversity Committee

The GGE Diversity Committee functions on the principle that all human beings deserve both equitable respect and equitable access to pursue our ambitions as ecologists. We are finding that in the current political climate, this guiding principle is being challenged in personal and professional ways. Compositional and temporal factors of personal and professional risk have emerged: certain members of our community are more at risk than others, and certain members of our community are even more at risk now than they were before the election.

What can we do as individuals to support our communities at risk, to put in the civic work that is required for the representation we want, while also fully engaging in the demands and pleasures of our research and professional goals?

The answer to this is of course going to be different for everyone, but we think these suggestions from organizers of support and advocacy work[1] might help make your balancing of choices a bit easier.

1) Do not measure your involvement against someone else's. Just get involved in any way you can.

It is so easy to judge yourself harshly for not doing enough. Everyone's lives are different, and what we can give changes day to day. Some of us are very public about our activities, some like to maintain our privacy and prefer a quieter approach. If you are doing a lot, it is easy to get frustrated when you perceive others to not be participating on your level. The best thing you can do is not make assumptions, and lead by example.

2) Figure out what your involvement looks like and commit.

Involvement can look a lot of different ways. Some folks are inspired by participating in public meetings, marches, or vigils as effective ways to show support. Don't like crowds? Great, making calls[2] to your representatives on a regular basis is another important form of engagement. You don't like making calls? That's fine - regularly send out a set number of emails or handwritten letters instead. Afraid of perceptions by your professional colleagues or employers? Then do what you can quietly. Dislike all of this? Then find a way that works for you. Many of us would like to work for governmental or other institutions where public expression of personal beliefs are frowned upon if not outright forbidden. During the Civil Rights Movement in the South, many black employees were told by their employers they'd be fired if seen at protests. Instead, many who could not directly protest made lunches or chipped in to cover other's travel expenses. There is always a way to help. The most important thing is that you do it.

3) Schedule community involvement AND the work it takes to become a PhD AND self-care into your day/week.

You can't do the hard work it takes for the first two without the third. Set calendar reminders for 15 minutes after you finish your lunch (remember to eat!) to read that article about a new bill you care about. Tell yourself you can't get on Facebook until you've made your calls to your representatives and completed a certain task (big or small) on your PhD check-off list. Find friends to work with for added accountability and added fun. Find an already effective and active community group you can join so you don't reinvent the wheel in isolation. Listening to perspectives of others can help you contextualize your own involvement and connect more personally to issues that may seem overwhelming in their scope. Figure out a small reward you can give yourself for doing the work. Although community involvement can make people feel charged up, and it's super fun to code for 12 hours straight, make sure to regularly schedule down time from both. It can be anything - whatever is needed to stop that eye twitch and to reinvigorate you.

4) Simply look out for and support others in your community.

Do you disagree with any form of advocacy? Does the advocacy/science conflict give you too much anxiety? Are you genuinely too busy and focused on your research, your qualifying exam, or other life events? No judgement! We simply suggest that while out and about in our world, we look out for our community members and support them. Let us be aware that folks may be trying to balance more than usual right now. There are members of our community that are experiencing higher levels of fear and risk. Please do not suffer from bystander apathy. In your daily activities, if you witness someone in your community being treated disrespectfully, please say or do something. We've linked to a very accessible and easy guide[3] with tips on what you can do when you observe disrespect in your community. A little goes a long way.

[1] We cut, pasted, slightly altered and personalized points 1-3 from a Facebook post made by the organization Solidarity Sundays to their more than 15,000 national members.
[2] Check out this excellent guide "How to call your reps if you have social anxiety" - which also covers some of what is suggested here.
[3] What to do when you are witnessing islamophobic harassment. As Mareil notes, these tips are useful for any type of witnessed harassment.

Graduate group in Ecology annual Symposium

Erin Flynn

The 10th annual ecology symposium on February 11th featured an incredible mix of research, art, and community—as well as the highest attendance yet! With 163 registered attendees composed of graduate, undergraduate, prospective students, and faculty, the day featured eleven talks and seven posters by ecology graduate students. Dr. Joel Abraham from CSU Fullerton gave the keynote address on "Supporting undergraduate student success through computer-based instruction and assessment," which shared his successes and challenges with incorporating technology and active learning techniques into his undergraduate classes. In addition to admiring the talented artists and photographers over bagels and burritos, the GGE Diversity Committee also hosted a breakout room where students shared their thoughts on diversity in our community.

Best talk:

1st: Ash Zemenick - "*Ecological diversity: Alpha, beta...human?*"

Best poster:

1st: Cate Quinn - "*Distribution & connectivity of Sierra Nevada red fox in the Oregon Cascades*"

Best Art:

1st: Kate Borchardt - "*Melissodes sp., Male*"

Best Photo:

1st: Rob Blenk - "*Brillante coroniver*"

Admiring the GGE Symposium Student Photographs - Amy Collins

Symposium Organizers

Amy Collins, Emilie Graves, & Helen Killeen

Student Presenters

- ***Talks:***

  Ryan Bourbour, Erin Flynn, Ann Holmes, John Mola, Sophie Preckler-Quisquater, Jason Sadowski, Katie Smith, Joanna Solins, Alex Webster, Rachel Wigginton, Ash Zemenick

- ***Posters:***

  Ellie Bolas, Madeline Gottlieb, Emilie Graves, Breanna Martinico, Cate Quinn, Sarah Stinson, Joakim Weill

New administration brings new rules and new norms

Angee Doer

Regardless of political affiliation, the dramatic shift in administration style and priorities with our new President has resulted in a number of valid questions and concerns amongst professional scientists. From hiring freezes to budget cuts, scientists are left wondering how the policies of the new administration will affect them. Below, some of the major issues, with sources to enable follow-up on issues of particular concern.

Federal Hiring Freeze: There is some precedent for instituting federal hiring freezes; President Reagan signed an executive order doing so immediately following his inauguration. However, while hiring freezes may appeal to individuals worried about the cost or size of government, there is little evidence that federal hiring freezes reduce either (e.g. this report by the Comptroller General following Reagan's freeze). In the past, the positions frozen within the government were often filled through internal transfers or promotions, or by hiring contractors and short-term fills. While President Trump's presidential memorandum specifically prohibits filling gaps through contractors, short-term hires are still possible, which may provide graduate students an entryway into federal agencies. The federal hiring freeze is set to expire in April, 2017; however, it will be followed by a government-wide plan to reduce the size of the federal workplace, creating uncertainty about whether federal jobs will be available anytime in the near future.

Gag Orders: During any presidential transition, there is significant turnover at our highest levels of government. This is especially true when there is a party shift, and the new President selects Cabinet members with vastly different visions from their predecessors of how their Departments or Agencies should look. Such transition periods are often accompanied by "gag orders," while the new leadership teams determine what the outreach and communication priorities will be and what form external messaging should take. With the current administration, a delay in completing required background documents and vetting procedures resulted in the delayed confirmation of many Cabinet-level positions. As these individuals are confirmed, we will likely see a lifting of the gag orders. However, it is still unclear what new communication procedures may replace them.

Budget Cuts: Currently, proposed budgetary cuts to departments, agencies, and programs of particular interest to the GGE are a major area of uncertainty. The EPA is potentially facing drastic cuts, with programs focusing on environmental protections and cleanup threatened with significant reductions of funding, or removal altogether. In addition to the EPA, the State Department (and, within it, USAID), the Department of Interior (particularly the US Fish and Wildlife Service (USFWS)), the Department of Energy (DOE), and the National Endowments for Humanities and the Arts are currently expecting large cuts to their funding levels. There has been a considerable push within Congress to scale back or defund the Endangered Species Act, and budget cuts to the USFWS would certainly inhibit both the listing of new species as well as the enforcement of protections for currently listed species.

Impacts to students and faculty: This administration's policies have the potential to impact GGE students and faculty in a variety of ways, and while many of these impacts may be negative, there is potential for some positive outcomes as well. A major concern, linked directly to budget cuts, is decreased opportunities for federal funding. A large cut to the EPA would likely result in the dissolution of STAR grants, an important source of funding for graduate students. It is unclear at what level the National Science Foundation (NSF) will be funded, and whether specific lines of funding within the NSF will be cut. Congress has called for a restructuring of NASA, shifting funds and focus away from their Earth Sciences Division, limiting their ability to perform and fund climate research. However, while budget cuts will almost certainly impact research funded by the DOI, DOE, and EPA, grants from the Department of Defense, such as Defense Advanced Research Projects Agency or the Office of Naval Research, may increase due to proposed military budget increases.

In addition to funding opportunities, the administration's revised travel ban may restrict travel between certain nations, limiting the countries students and faculty can conduct research in, and potentially impacting UC Davis' ability to recruit students and faculty from abroad. The language for the revised executive order should be released shortly, and may be available as of the publishing of this article. As you graduate and transition to the next stage of your professional life, it is also important to consider health insurance. A bill to repeal, and potentially completely overhaul, the Affordable Care Act is expected to be released within the next week. This bill has not yet been made available for public view, but will be especially important for graduates pursuing contracting, self-employment opportunities, or taking positions with small offices that may not offer health insurance.

Although there is much to be concerned about, there are also some reasons for optimism. California is a very science-friendly state, and Governor Brown will continue to support the funding of scientific research at a state level. As existing funding opportunities narrow, new possibilities may open in other agencies, or through private foundations. And there are individuals in Congress, on both sides of the aisle, who continue to champion science, and push for continued funding and integration of science into policy. With any luck, these numbers will only increase as more scientists become interested in the intersections between science and policy, and more scientists decide the best way to ensure scientific advancement is to run for political office.

Books for the field: Echoes of the familiar in "Annihilation"

Erin Flynn

> "I COULD EASILY LOSE HOURS THERE, OBSERVING THE HIDDEN LIFE OF TIDAL POOLS, AND SOMETIMES I MARVELED AT THE FACT THAT I HAD BEEN GIVEN SUCH A GIFT:
>
> NOT JUST TO LOSE MYSELF IN THE PRESENT MOMENT SO UTTERLY BUT ALSO TO HAVE SUCH SOLITUDE, WHICH WAS ALL I HAD EVER CRAVED DURING MY STUDIES, MY PRACTICE TO REACH THIS POINT."
>
> *–Annihilation, page 108*

I never expected a novella that could be described as a post-apocalyptic thriller and climate change-inspired horror sci-fi to contain such a relatable first-person narrative. ***Annihilation*** (Farrar, Straus and Giroux, 2014), the first book in Jeff VanderMeer's Southern Reach Trilogy and currently in post-production for a 2017 Paramount film release, is a tense and atmospheric story that its just under 200 page length practically demands it be read in one sitting. On the 12th expedition into Area X, the biologist and her three female team members hoped their exploration into the mysterious lands, which had been reclaimed by a lush, but hostile ecosystem, would end better than the previous ones (disease, mutiny, and self-inflicted death). Known only by their occupations, the biologist, psychologist, surveyor, and anthropologist must navigate an unwelcoming landscape, where every rustle in the bushes and unnatural flight pattern of birds becomes deeply unsettling as they evaluate the remnants of human habitation eroding away. While fans of genre stories, such as the TV show "Lost", are obvious people to recommend this book to, its portrayal of a field ecologist struggling to find her place in the world was so unique and connected with me in an emotional way, that I think others in the GGE may also enjoy this book.

Like the biologist in Annihilation, so many of us were brought into this field finding joy and purpose in studying natural history and the processes shaping ecosystems, from our backyards to field trips to sites halfway across the world. While trying to understand the novel environment in Area X, she flashes back to her

Annihilation - Erin Flynn

childhood carefully monitoring the recolonization of the abandoned family pool, frog by frog, and to later coastal field work studying a novel species interactions in a set of tide pools. Some of us may also struggle, like the biologist, with solitude slipping into loneliness, attention to detail becoming self-destructive perfectionism, or desire to be "in the field" not wanting to be a rejection of those who love us at home. While her decision to volunteer for the expedition is about her skills, service, and exploration, it is also a chance at reconnection, redemption, and closure with both herself and a lost loved one.

Area X is based on the author's walks in St. Mark's National Wildlife Refuge in Florida, and is effective at creating a sense of place and specificity, even when some of the scientific details would have benefitted from external review. While the second (***Authority***) and third (***Acceptance***) books in the series become much more focused on the genre aspects of the story, full of twists, conspiracies, and a new web of characters, to me they never quite achieve the broadly appealing pairing of dramatic tension and emotional resonance of the first book. However, I appreciated the inclusion of many women, LGBTQ, and non-white lead characters at the center of this story about an alluring, hostile ecosystem where a little natural history knowledge may make all the difference in the world.

PLEASE BRING THE DROUGHT BACK

Ernst Bertone Oehninger

A few months ago, California was living what some would describe as the worst drought in living memory. Reservoirs were down to record lows, and the practice of traditional aquatic sports such as inner-tube water polo and water sliding were seriously affected.

Fast-forward to February 2017, when flood fears caused more than 200,000 people to be evacuated from areas surrounding the Oroville Dam. With record humidity levels, sales of dehumidifiers soared after thousands of citizens were found drowning in sweatiness while attempting to sleep. In a remarkable twist, the absence of the drought became our biggest problem. And a growing number of voices are asking the drought to come back:

"I was going to bury bodies at the bottom of the reservoir, but now they just keep floating up" - Ted Grosholz (probably)

At the University of California, Davis, students are complaining about how hard is to bike under the rain, or the difficulty of finding a parking spot between the puddles. The University started taking measures against the lack of drought. Researchers developed intelligent sprinklers that are turned on even when it's raining or the soil is already wet, increasing water inefficiency. "No drop counts" stickers were glued over all bathrooms on campus.

The absence of drought is causing an uproar among farmers who are now complaining about the excess of water. Some farmers reportedly travelled to Sacramento to protest, and were seen dumping water in front of the State Capitol. On I-5, the famous "No water = No Jobs" signs were replaced by "Now hiring." The State of California decided to take action. Lawmakers voted on a bill that bans drip irrigation in the state, at the same time providing subsidies for flood irrigation and central pivots.

Even the Glory Hole in Lake Berryessa, widely recognized as the only good thing about the lack of drought, is not being well accepted by the public:

"This Glory Hole is definitely overrated"

– Anonymous Glory Hole enthusiast describing the Monticello Dam spillway in action. See ratemygloryhole.com for more info

Finally, the lack of drought is also raising doubts among respected experts about the existence of Climate Change:

Take action

The lack of drought is a serious problem, but there's no reason why we should be afraid of taking action against it. Here are a few things you can do at home or as a community:

- Take long showers
- Flush the toilet several times
- Avoid turning off the tap when brushing your teeth or washing dishes
- Put a "please water your lawn" sign on your front yard, encouraging your neighbors to do the same.
- Call out and publicly shame neighbors who have drought-tolerant gardens
- Make your own water garden with a little fancy pond. Tropical plants like water lilies are beautiful in the pond. And aquatic plants like Horsetail, Aquatic Mint Creeping Jenny and will make a great entourage.
- Eat beef. Each pound of beef needs about 15,000 pounds of water to be produced, this is the best deal you could ever find. The West wasn't won on salad.

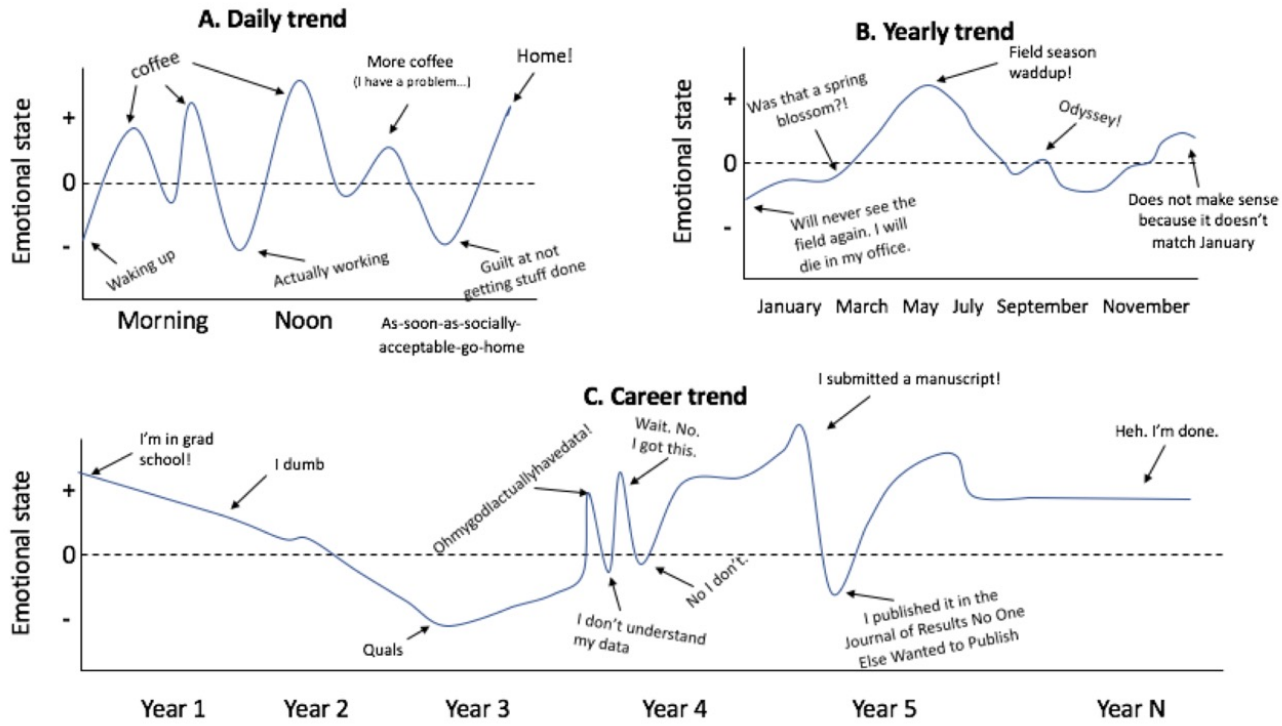
An emotional phenology of graduate school across three temporal scales

John M. Mola[1], Cassie The Dog[2*]
1. Graduate Group in Ecology, UC Davis
2. McLaughlin Reserve and floor of the field vehicle
* *Corresponding author: Email: WhoIsAGoodGirl?@dog.com—will accept pets and cuddles after barking at you*

Ecological research often focuses on research, and ecology, but little research has been conducted into other things, namely the thing I now will write about. To better understand the well-being of ecology grad students through time, I conducted a brief survey of 3-5 (I forget how many) Brickyard contributors in my living room. I asked participants, "*Quick! I forgot to write this bit for the Brickyard! What makes you feel good or bad in grad school?!*" Their answers were recorded haphazardly on a white board, and were then divided into three temporal scales: daily, yearly, and interannual variation (i.e. entire grad school career). Their answers were then subsequently ignored. Lines were drawn with minimal thought as to what the subsequent jokes would be, and then annotations were shoe-horned into the appropriate locations.

It is clear from observing Figure 1 that the overall trend for graduate school is a delayed relationship with reality, expressed by a flatline between start and finish. However, many emotional swings exist at briefer timescales, demonstrating how graduate students can simultaneously experience being "*fine*", "*ok*", "*stop asking me so many fu*$ing questions, John*", and "*are you going to finish that?*" at the same time. I conclude further research is needed to understand what the hell I'm talking about.

Figure 1. A) Daily trend in grad student emotional state, B) yearly trend, C) career-long trend.



The Aggie Brickyard

National Elk Refuge Jackson Wyoming - Annelise Del Rio

Want to get involved? Comments, Corrections or Concerns?

Please contact us!

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https://aggiebrickyard.github.io/