

THE AGGIE BRICKYARD



assembling the blocks of ecology at UC Davis

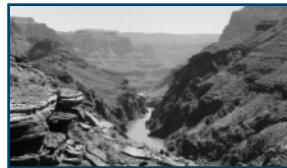


Editorials

STRESS & BURNOUT



RESEARCH
SPOTLIGHT



STUDENT
PERSPECTIVES
GAPS



COMMUNITY
DIVERSITY, GGE EXEC
COMMITTEE

HIATUS



- ♦ COVER: *Dusy Basin and Isosceles Peak, September 2018.* - **Ross Brennan**



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LETTER FROM THE EDITORS

“Hiatus can be defined as a pause or gap in a sequence, series, or process. However, in the context of ecological research, a hiatus can mean many different things to different people.”

In order to renew the life of a project, one may bring in some new energy, tackle the issue from a novel perspective, or simply take a break until ready to engage again. Well, with this issue of The Aggie Brickyard we have done all of those things. As the original “founders” of The Aggie Brickyard advance along in their degrees (or even finish!) and come into their fifth year, higher priorities and projects get in the way. After some time off from organizing this magazine-newsletter-celebration of community, we have brought in some new energy with a fresh cohort of editors, contributors, and ideas. Rather than theme this issue around a separate topic, we went meta and centered this issue around the topic at hand with The Brickyard itself, the need for a hiatus.

The nerds that produce the dictionary define “hiatus” as “a pause or gap in a sequence, series, or process.” However, in the context of ecological research, a hiatus can mean many different things to different people. We asked ourselves, students, and faculty to consider a time in their research career where they took a break or needed to recharge. In this issue you’ll find the usual goodness of recent student publications, outstanding art and photography, and updates from the various committees and groups that we organize ourselves into. You will also find helpful strategies for dealing with burnout, as well as introspection on what taking a break means and thoughtful advice for moving beyond it.

We hope this issue brings you some perspective, some renewed energy, and something to read for a few minutes when taking a little midday hiatus. Thank you to everyone who helped contribute context and encouraged us to resume our production of The Aggie Brickyard.

Sincerely,

Your Aggie Brickyard Editors



CHAIR-ISHED REFLECTIONS

Trumania (*Truman Young*)

Three Drunken Old Men

[Warning: the idiosyncratic views of this writer are not meant to be GGE guidelines, or any guidelines at all. Both students and their advisors are free to reject them completely.]



“Our lab has developed a strategy to deal with [finishing a dissertation].”
- T. Young, GGE Chair

nutritional data for making the main points of the paper?” They replied, “Not essential, but it would add a nice layer of richness.” I said, “Drop it! And if you have time later, add it for publication.” They finished their dissertation very soon thereafter. Out of this developed the advice I give my students in their third or fourth year:

Imagine what a bare minimum dissertation would look like—three bare bones papers, just enough in each that they could pass the muster of three drunken old men (to sign). It would not be something to be proud of, but it could just slip by. Put these on a list, including the data and analyses that would go into them. Then draw a line. Below the line, ask yourself, “What is the one thing that most efficiently (effort for impact) would most improve one of the papers (or the dissertation in general)?” Write that down. Below that, the next thing, and the next, up to a fairly substantial list, and a fantastic dissertation. Somewhere in the list there may be entirely different papers.

The goal is to see how far down that list (how far below the minimum line) you can get with the time (resources) allowed. The overall objective is still to produce as excellent a dissertation as you can. But this way, relatively early in the writing process, you have this minimum document in place, and **no longer need to constantly worry about having a dissertation**. Instead the concern is how good it is going to be, which is a very different psychological space.

In my experience, students always get further down the dissertation task list (and usually far down), but there have been occasions where a sudden job/post-doc opportunity came up and what could have been a frantic rush became instead a more calm, focused push. And remember, **do not confuse your dissertation with your research** (but perhaps that is grist for another essay).

There is sometimes considerable angst associated with finishing a dissertation. Pressure (time, funding, advising) to complete the thesis can be a major source of graduate student stress in their final year(s). Our lab has developed a strategy to deal with this that I call the “Three Drunken Old Men.” Some of you have heard this, but I thought it might be worth sharing more broadly.

Back when I was a graduate student (so many, many years ago), a friend of mine was having trouble finishing their dissertation. They had done a monumental amount of work, producing six nascent papers (chapters), but each of them was only 80% done, so there was basically nothing suitable to submit. One chapter in particular was holding them up. It was a complex analysis of how diet affected social structure, and the plant nutritional analysis was both time-consuming and statistically tricky. I asked, “How important are these



nutritional data for making the main points of the paper?” They replied, “Not essential, but it



would add a nice layer of richness.” I said, “Drop it! And if you have time later, add it for publication.” They finished their dissertation very soon thereafter. Out of this developed the

advice I give my students in their third or fourth year:



FACULTY Q & A

Faculty Q & A: Is burnout becoming too normal in academia?

It seems like a common theme in graduate school: stress, deadlines, and a deluge of responsibilities compete with social life and personal care to eat up all the white space in our schedules. Chronic overwork is so embedded in academic culture that it can even become a point of pride. But over the long term, these stressors make up a toxic cocktail that can be detrimental to students' mental and physical wellbeing.

As Jing Mai of UCD Student Health and Counseling Services writes, burnout—despite the glorification it is granted in some work cultures—is clearly related to loss of productivity, creativity, and motivation, often dramatically decreasing the quality of our work. We turned to our GGE faculty for more perspective on how burnout has affected our work lives.

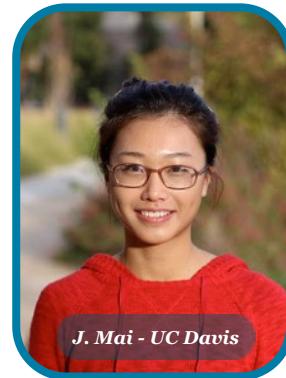
Have you experienced burnout during your career? What happened and how did you overcome it?

As I approached the end of my first year as an Assistant Professor, I felt stressed and unhappy. This was the first time I'd felt this way since starting grad school. The main reasons were: 1) going from 50% caregiver of the kids to clearly the secondary one, which was hard on my relationships with my family; 2) working quite hard on grant proposals while being aware that I wasn't doing it well. This made the work seem futile as well as distracting me from family and other work; 3) not keeping up with the things that support my physical and mental well-being—in my case, pretty intense exercise and some form of music. What happened: I was a jerk to family members, didn't spend enough time with them, and didn't approach time allocation rationally. I pushed ahead with a proposal I knew wasn't going to work just because I was scared to look like I wasn't trying hard enough. How I overcame it: 1) committing to reprioritizing my schedule to include necessary self-care and family time, despite potentially lowering work output; 2) organizing a meeting of my departmental mentoring group to put my cards on the table and get an objective look at how I was doing; 3) writing off the failed new project idea and instead developing a more fun and collaborative project for which I already had preliminary data. **-Anon.**

Periodically everyone gets sick of whatever it is they are doing. Academics are not unique in this regard. However, academics are lucky in that they can switch among tasks (different projects, teaching vs. research), which can help keep things fresh. If the burnout is just from working too hard too long, then a quick break can help. But the main reward of a career in academics is that you can work on what you are passionate about; if you find yourself repeatedly burnt out from your passion, then maybe it's not your passion after all. **-Anon.**

What are the indicators that tell you a student is burned out? Is there anything that you as a professor do to mentor the student through the experience?

Procrastination and listlessness. Not especially novel, but I try to encourage students to set small goals—or set small goals for them myself and make it clear that I expect them to meet those goals—to get them back in the confidence groove. I also try to encourage students to take a couple of days of complete break, then focus on their work (play hard, work hard instead of doing both half-heartedly). **-Erica Fleishman (John Muir Institute of the Environment)**



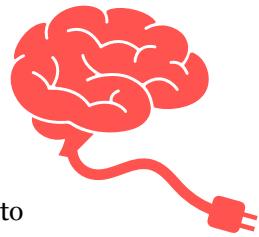
J. Mai - UC Davis



E. Fleishman - UCSB

FACULTY Q & A

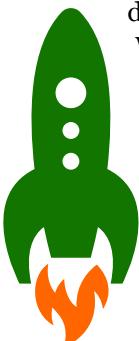
When I have to reach out more to a student to initiate meetings or when they seem stuck in endless loops (e.g. data analysis or writing) for a long time. I'm including writer's block here as a form of burnout. My response is usually more regular meetings, where I try to point out that they just haven't yet gotten to the interesting parts that make them tick and then help create a roadmap of what they have to do to get there. I've also told a student just to take a vacation, or to work on something different if a vacation is not sensible. - **Marcel Holyoak** (*Environmental Science & Policy*)



What are some of the factors that you think contribute to burnout being common in academia? What would help make it less common?

Many of us got into this field because we liked being outdoors and loved natural history. There didn't seem to be time for either of these pursuits (or other things I valued) while I was in grad school. I certainly was not encouraged to be poking around in different systems by my professors. If you find yourself in a similar situation, my advice is to prioritize doing the things you like to keep yourself sane and engaged (natural history, outdoor sports, whatever) and burnout will not become an issue. -**Rick Karban** (*Entomology & Nematology*)

Too many expectations and, to be honest, too many desires to do cool things with too few hours in the day. We're now expected not only to conduct solid research but to conduct that research with less funding, to communicate with end-users, to communicate with the general public, to promote work via social media . . . all good things, but resources haven't increased and there just isn't enough time to do it all. Also, there can be a considerable amount of academic infighting about petty nonsense and the number of rules and regulations never decreases. By the time one can finally get down to doing some research, one is wiped out. I don't think it's going to become less common, but I think many of us find ways to recharge our motivation or to find sufficient rewards to help us spring back. -**Erica Fleishman** (*John Muir Institute of the Environment*)



Working in isolation without regular, useful, individualized feedback seems dangerous and could easily lead to burnout. That's been my experience anyway. Relationships with other people are the key. Regularly drawing support from networks of mentors is critical because it helps avoid spinning wheels or losing perspective about expectations vs. reality. It can help clarify goals and concrete next steps, and air out any obstacles to taking those next steps. Second, developing relationships with peers informally or as part of formal study or writing groups can help. And finally, having some social connections outside of work is a way to put your brain on a different track. -**Anon.**

GGE coursework is intense, as is the whole QE experience, so planning vacations or time to be in the field is a must if you find your reloading comes from nature or travel (or family). Sometimes having a block of time when I can say, "Sorry I will be in Indonesia without internet access," is good to have on the horizon. -**Marcel Holyoak** (*Environmental Science & Policy*)



R. Karban - UC Davis



M. Holyoak - UC Davis



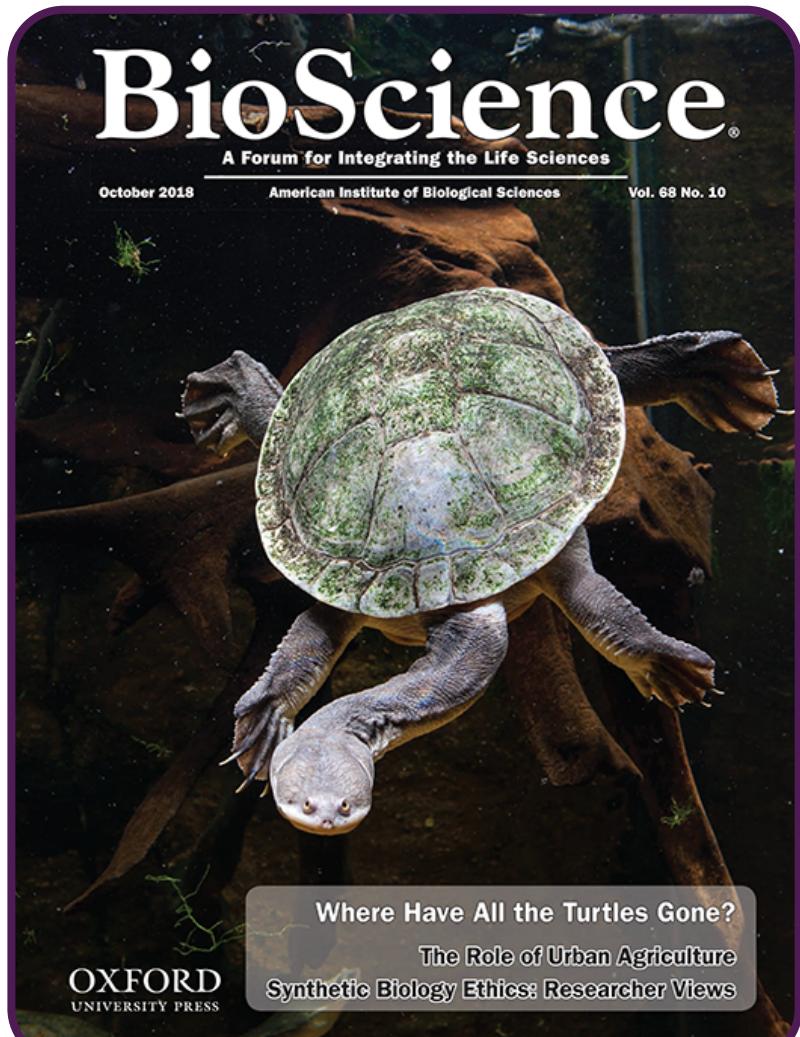
Phipps Wash, Escalante, Utah - Ross Brennan

RESEARCH SPOTLIGHT

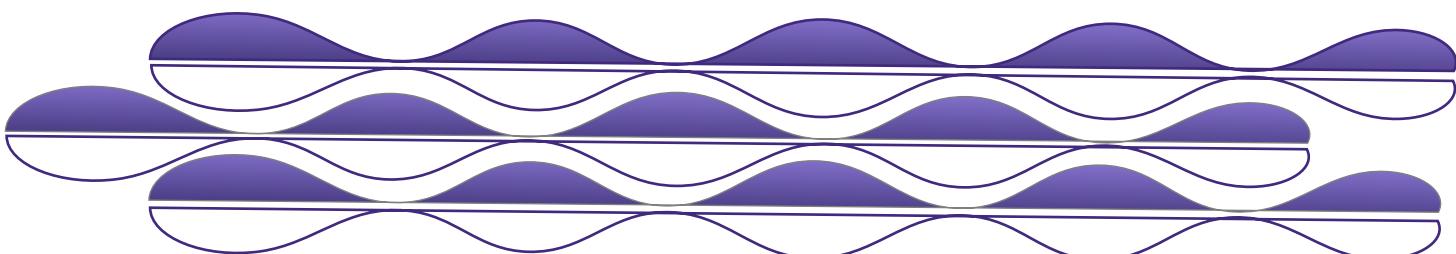
Editors' note: In this issue, we are highlighting two particularly prolific publishers: the GGE's Mickey Agha and Risa Pesapane.

Mickey Agha

- Aburto-Oropeza, O., A. Johnson, **M. Agha** et al. 2018. Harnessing cross-border resources to confront climate change. *Environmental Science and Policy*, 87: 128-132.
- Agha, M.**, B.D. Todd, **S. Skalos**, M. Falcon, M. Casazza, and O. Wang. 2018. *Actinemys marmorata* (Western pond turtle): Suspected predation/scavenging. *Herpetological Review*, 49(2): 313-314.
- Agha, M.**, J.R. Ennen, A.J. Nowakowski, J.E. Lovich, S.C. Sweat, and B.D. Todd. 2018. Macroecological patterns of sexual size dimorphism in turtles of the world. *Journal of Evolutionary Biology*, 31(3): 336-345.
- Agha, M.**, J.R. Ennen, D.S. Bower, A.J. Nowakowski, S.C. Sweat, and B.D. Todd. 2018. Salinity tolerances and use of saline environments by freshwater turtles: implications of sea level rise. *Biological Reviews*.
- Agha, M.**, **M.K. Riley**, E. Sanford, J.T. Carlton, W.A. Newman, and B.D. Todd. 2018. A Review of Epizoic Barnacles Reported from Freshwater Turtles with a New Record from California. *Herpetological Review*, 49(1): 25-28.
- Lovich, J., J. Ennen, **M. Agha**, and J. Gibbons. 2018. Where Have All the Turtles Gone, and Why Does It Matter? *BioScience* 68(10): 771-781.
- Lovich, J., S. Puffer, **M. Agha** et al. 2018. Reproductive output and clutch phenology of female Agassiz's desert tortoises (*Gopherus agassizii*) in the Sonoran Desert Region of Joshua Tree National Park. *Current Herpetology* 37:40-57.
- Nowakowski, A., L. Frishkoff, **M. Agha**, B. Todd, and B. Scheffers. 2018. Changing Thermal Landscapes: Merging climate science and landscape ecology through thermal biology. *Current Landscape Ecology Reports*, 1-16.



A broad-shelled snake-necked turtle (*Chelodina expansa*) from southeastern Australia. The ecological roles of turtles and the effects of their declining populations are discussed in an article in this issue of *BioScience* by Jeffrey Lovich, Mickey Agha (GGE) and colleagues. - Todd Stailey/Tennessee Aquarium

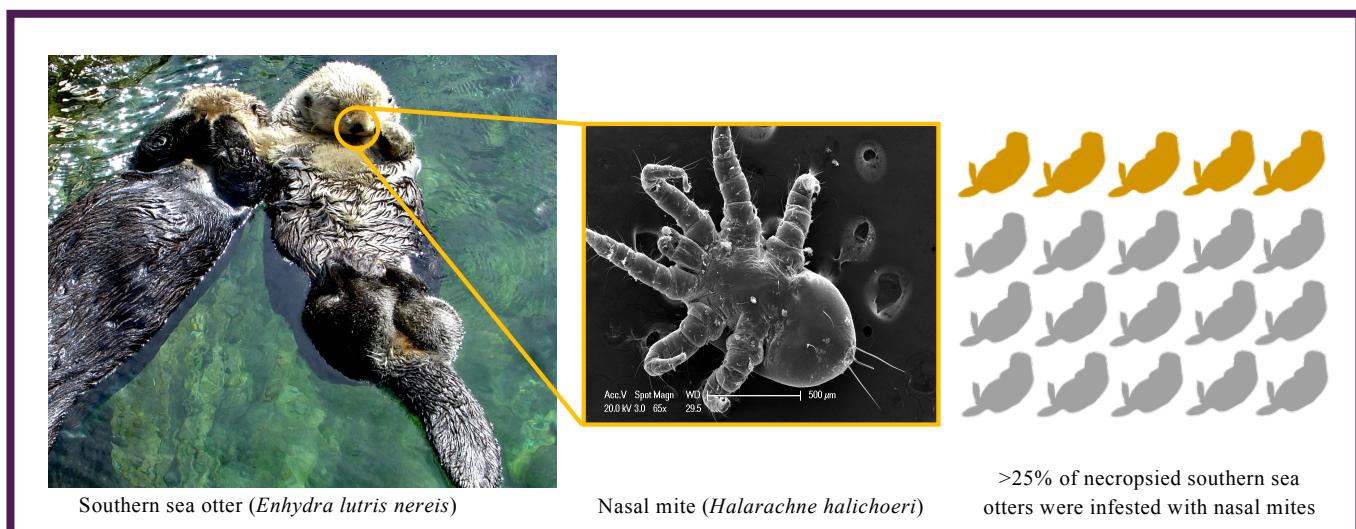


RESEARCH SPOTLIGHT

Risa Pesapane

Allan N., T. Knotts, R. **Pesapane**, et al. 2018a. Conservation implications of shifting gut microbiomes in captive-reared endangered voles intended for reintroduction into the wild. *Microorganisms* 6(3): 94.

Allan N., R. **Pesapane**, J. Foley, and D. Clifford. 2018. Successful care and propagation of the endangered amargosa vole (*Microtus californicus scirpensis*) in captivity. *Zoo Biology* 37 (1): 59-63.



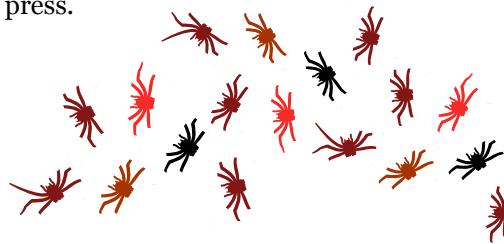
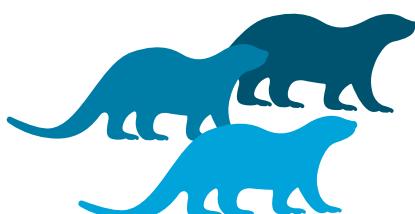
Mantovani S., N. Allan, R. **Pesapane**, et al. 2018. Eradication of a tropical rat mite (*Ornithonyssus bacoti*) Infestation from a captive colony of endangered Amargosa voles (*Microtus californicus scirpensis*). *Journal of Zoo and Wildlife Medicine* 49(2): 475-479.

Pesapane R., E. Dodd, N. Javeed, et al. 2018. Molecular characterization and prevalence of *Halarachne halichoeri* in threatened southern sea otters (*Enhydra lutris nereis*). *International Journal for Parasitology: Parasites and Wildlife* 7(3): 386-390.*

- Highlights: 25.6% of southern sea otters (*Enhydra lutris nereis*) necropsied from 2012 to 2017 harbored the respiratory mite *Halarachne halichoeri* typically associated with harbor seals (*Phoca vitulina*). This is the first documentation of *H. halichoeri* in southern sea otters and is suggestive of parasite exchange between sea otters and harbor seals. The 18S, 16S, 28S and ITS1-2 genetic regions of this mite were sequenced and submitted to GenBank to create a DNA reference for these organisms in southern sea otters as an aid in population management.

(*Featured publication)

Pesapane, R., B. Enge, A. Roy, R. Kelley, K. Mabry, B. Trainor, et al. (2018). A tale of two valleys: disparity in Sin Nombre Virus antibody reactivity between neighboring Mojave Desert communities. *Vector-Borne and Zoonotic Diseases*. In press.



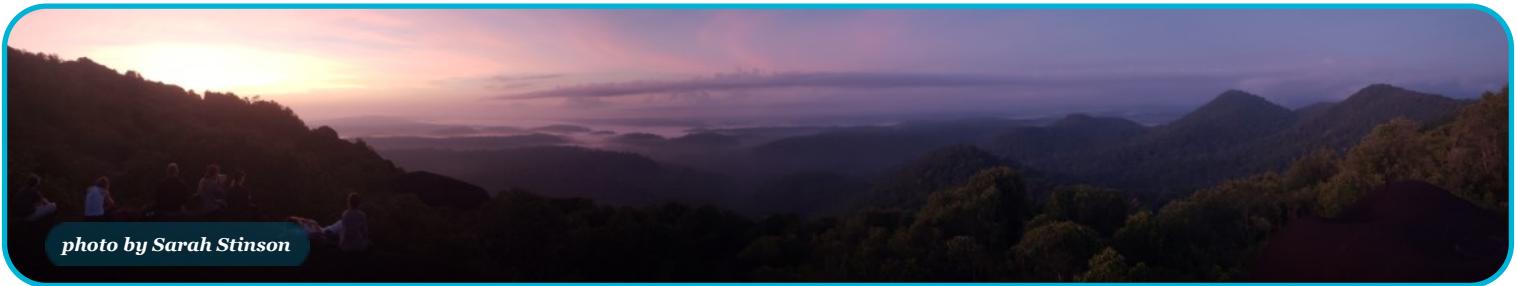


photo by Sarah Stinson

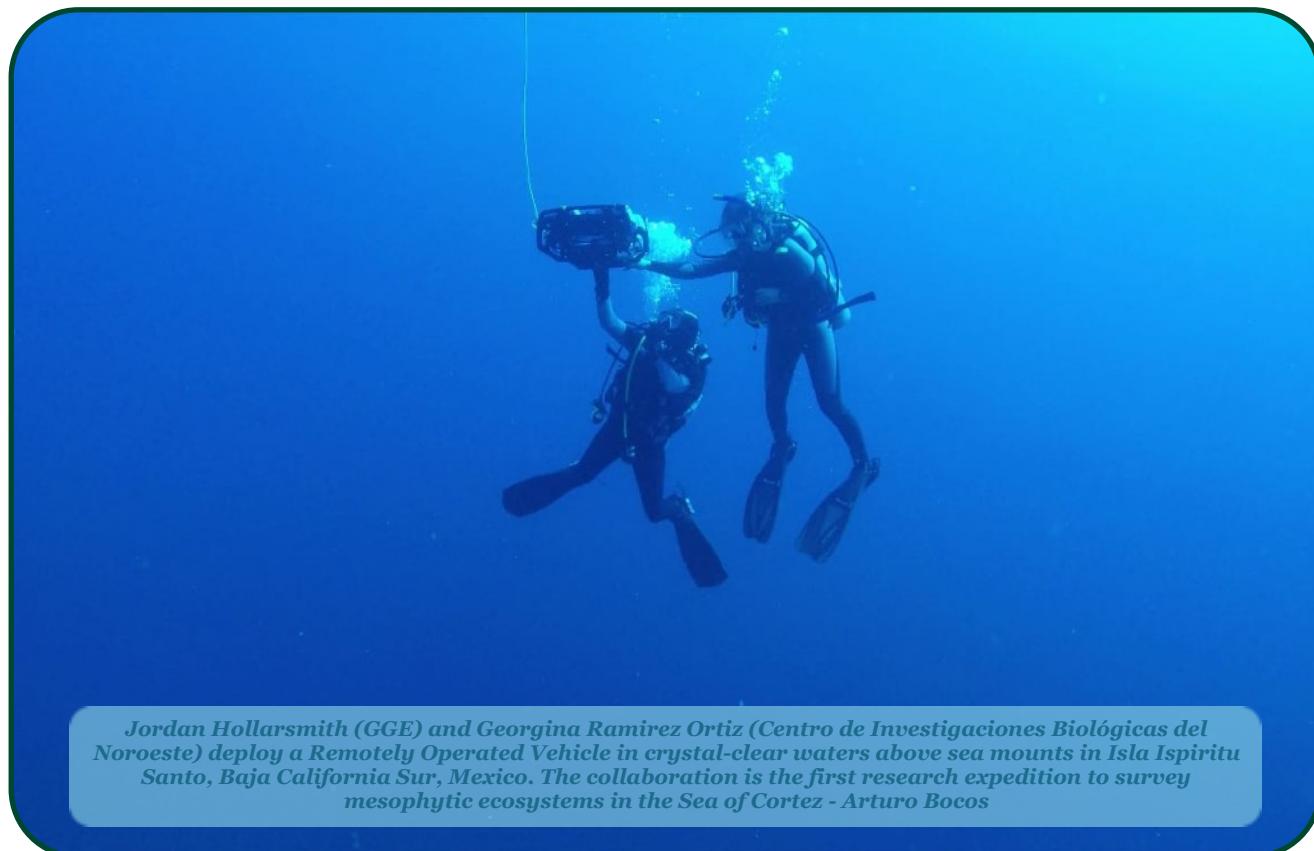
(SOME) RECENT STUDENT PUBLICATIONS

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

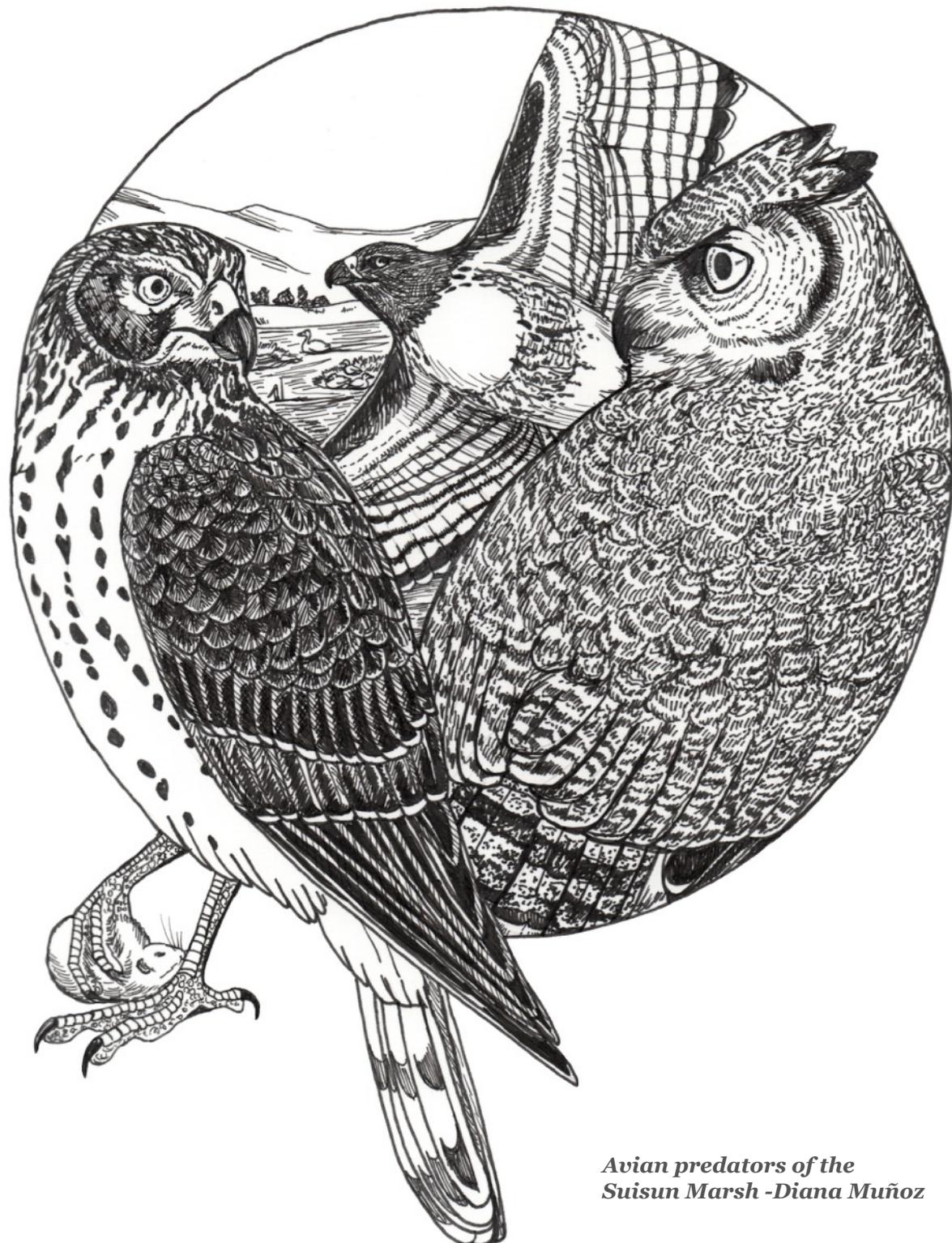
- Agha, M., T. Batter, E. Bolas, A. Collins, D. Gomes da Rocha, C. Monteza-Moreno, S. Preckler-Quisquarter**, R. Sollmann. 2018. A review of wildlife camera trapping trends across Africa. *African Journal of Ecology*.
•Student collaboration resulting from a 290 Course! Authors contributed equally; ordered alphabetically.
- Cassey, P., S. Delean, J. Lockwood, **J. Sadowski**, and T. Blackburn. 2018. Dissecting the null model for biological invasions: A meta-analysis of the propagule pressure effect. *PLoS Biology* 16(4).
- Cavalcanti, G., **P. Shukla**, M. Morris, B. Ribeiro, M. Foley, M. Doane, C. Thompson, M. Edwards, E. Dinsdale, and F. Thompson. Rhodoliths holobionts in a changing ocean: host-microbes interactions mediate coralline algae resilience under ocean acidification. *BMC Genomics* 19(1): 701.
- Hart K., **A. Iverson**, I. Fujisaki, M. Lamont, D. Bucklin, and D. Shaver. 2018. Marine threats overlap key foraging habitat for two imperiled sea turtle species in the Gulf of Mexico. *Frontiers in Marine Science* 5: 336.
- Lamont M., and **A. Iverson**. 2018. Shared habitat use by juveniles of three sea turtle species. *Marine Ecology Progress Series*. In Press.
- LoPresti, E., J. Wyk, J. Mola**, K. Toll, T. Miller, and N. Williams. 2018. Effects of wildfire on floral display size and pollinator community reduce outcrossing rate in a plant with a mixed mating system. *American Journal of Botany* 105: 1154–1164.
- Malfi, R., J. Walter, T. Roulston, **C. Stuligross**, S. McIntosh, and L. Bauer. 2018. The influence of conopid flies on bumble bee colony productivity under different food resource conditions. *Ecological Monographs* 88(4): 653-671.
- Peterson, C.**, V. Eviner, and A. Gaudin. 2018. Ways forward for resilience research in agroecosystems. *Agricultural Systems* 162:19–27.
- Riggio, J.**, F. Mbwiwo, F. Van de Perre, and T. Caro. 2018. The forgotten link between northern and southern Tanzania. *African Journal of Ecology*.
- Riggio, J.**, H. Kija, E. Masenga, F. Mbwiwo, F. Van de Perre, and T. Caro. 2018. Sensitivity of Africa's larger mammals to humans. *Journal for Nature Conservation* 43: 136-145.
- Sadowski, J.**, J. Gonzalez, S. Lonhart, R. Jeppesen, T. Grimes, and E. Grosholz. 2018. Temperature induced range expansion of a subtropical crab along the California coast. *Marine Ecology*. In press.
- Shaw, J.** Ammophila arenaria as a nurse plant: Implications for management of an invasive species. *Ecological Restoration* 36(2):171-173.
- Siefert, A., **K. Zillig**, M. Friesen, and S. Strauss. 2018. Soil microbial communities alter conspecific and congeneric competition consistent with patterns of field coexistence in three Trifolium congeners. *Journal of Ecology* 106(5): 1876-1891.

(SOME) RECENT STUDENT PUBLICATIONS

- Simler, A., M. Williamson**, M. Schwartz, and D. Rizzo. 2018. Amplifying plant disease risk through assisted migration. *Conservation Letters*.
- Simler, A.**, M. Metz, K. Frangioso, R. Meentemeyer, and D. Rizzo. 2018. Novel disturbance interactions between fire and an emerging disease impact survival and growth of resprouting trees. *Ecology* 99: 2217–2229.
- Solins, J.**, J. Thorne, and M. Cadenasso. 2018. Riparian canopy expansion in an urban landscape: multiple drivers of vegetation change along headwater streams near Sacramento, California. *Landscape and Urban Planning* 172:37–46.
- Steel, Z., M. Koontz**, and H. Safford. 2018. The changing landscape of wildfire: Burn pattern trends and implications for California's yellow pine and mixed conifer forests. *Landscape Ecology* 33(7): 1159-1176.
- Webster, A.**, P. Groffman, and M. Cadenasso. 2018. Controls on denitrification potential in nitrate-rich waterways and riparian zones of an irrigated agricultural setting. *Ecological Applications* 28(4): 1055–1067.
- Williams, S., C. Sur, N. Janetski, **J. Hollarsmith**, S. Rapi, L. Barron, S. Heatwole, A. Yusuf, S. Yusuf, J. Jompa, F. Mars. 2018. Large-scale coral reef rehabilitation after blast fishing in Indonesia. *Restoration Ecology*.
- Yamasaki Y., **E. Graves**, R. Houston, B. Connor, P. Kysar, M. Straub, J. Foley, L. Tell. 2018. Evaluation of Proctophyllodes huitzilopochtlii on feathers from Anna's (*Calypte anna*) and Black-chinned (*Archilochus alexandri*) Hummingbirds: Prevalence assessment and imaging analysis using light and tabletop scanning electron microscopy. *PLoS ONE* 13(2).



Jordan Hollarsmith (GGE) and Georgina Ramirez Ortiz (Centro de Investigaciones Biológicas del Noroeste) deploy a Remotely Operated Vehicle in crystal-clear waters above sea mounts in Isla Ispíritu Santo, Baja California Sur, Mexico. The collaboration is the first research expedition to survey mesophytic ecosystems in the Sea of Cortez - Arturo Bocos



*Avian predators of the
Suisun Marsh -Diana Muñoz*

Diversity Committee Update

Deniss Martinez

Diversity Committee Mission:

The Diversity Committee will work to foster appreciation for the value of diversity in the GGE, to create and sustain a supportive and inclusive environment for all members, and to diversify our membership.

This fall the Diversity Committee (DC) has been working on a lot of exciting projects! We also welcomed our newly elected chair, Deniss Martinez, and a new head of outreach, Frederick Nelson. This academic year we aim to continue building connections with other graduate diversity committees across the UCD campus, offer workshops and resources within the GGE on how to support diversity and inclusion in higher education, and create more diverse community building opportunities. We are also brainstorming ways to make admissions more accessible, for example, developing a consolidated and highly visible guide to reducing admissions requirements that might not best predict success in graduate school. These conversations are ongoing and will require more GGE community input.

Our biggest update comes from the Admissions and Awards Committee, which has

spent the past 5 years working closely with the GGE Admissions and Awards chairs to update the GGE's application review processes. Their goal was to take a more holistic review approach that incorporates not only academic merit, but a diversity of personal and professional experiences into consideration when reading prospective students' applications to the GGE.

These changes have been informed by peer-reviewed research on what metrics best predict graduate student success and how personal biases can influence application review.

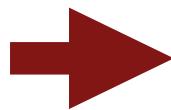
We presented our work at the Annual GGE Meeting last spring quarter, and we will be releasing a longer report that highlights the changes that have been made over time, the impacts of those changes on our graduate group, and how application reviewers envision this process. Quick highlights include:

- GGE application reviewers (both faculty and student reviewers) overwhelmingly feel positively about the holistic review process and the inclusion of a broader set of criteria in our applicant review process;
- Application reviewers rate applicants on different criteria (the "8 Evaluation Traits") using various components of their application package (see figure below).

Stay tuned for a more detailed report coming out in winter quarter 2019!

Application components

- Test scores (GRE and GPA)
- Transcripts
- Letters of recommendation
- Short answers
- Statement of purpose
- Personal history statement
- Diversity statement
- Curriculum Vitae



Eight Evaluation Criteria:

- Research experience
- Balance, focus, adaptability
- Perseverance
- Academic accomplishments
- Leadership and outreach
- Diversity (of) experience
- Work ethic
- Creativity and ingenuity



GGE Executive Committee

Jess Rudnick and Helen Killeen

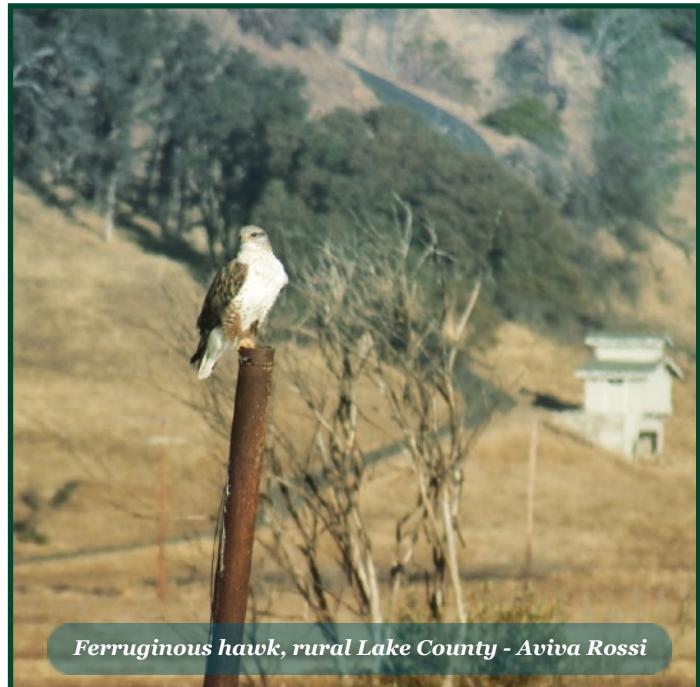
Executive Committee Update

We, Jess and Helen, are the 2018 student representatives on the GGE Executive Committee (EC). For all new students to the GGE (and any elders who may have forgotten...), the EC acts as the decision-making body for the graduate group. As student representatives, we participate in discussions and vote on official decisions on GGE-related issues, in concert with the GGE chair, Student Support Officer (Matt) and other faculty EC members, to ensure student representation is present in these conversations and decisions. Typical dealings that come to the EC include: new faculty applications for membership to the GGE; proposed changes to the GGE curriculum; proposed changes to the structure of Areas of Emphasis (AOEs); and as necessary, any other student- or faculty-driven issues that are brought to the EC by members of the GGE. There are always two student representatives on the EC who serve as representatives for the EGSA and GGE student body at large. The student members start in alternate years and serve a two-year term (this is Jess's second year, Helen's first year).

A few exciting updates that the EC will be working on this year include:

Implementing the R-Davis course to be offered every year during Winter Quarter: Last spring, the EC voted to permanently support the R-Davis course to ensure that it is offered every year. It provides critical training in R programming skills, particularly those that are uniquely relevant to ecology research. Offered during Winter quarters, the R-Davis course has been designed and taught over the past couple of years by GGE students Ryan Peek and Mike Koontz (with help from Taylor Reiter, Martha Wohlfeil, and Michael Culshaw-Maurer). EC financial support will ensure sustained funding for a student instructor and make the course a permanent resource for new and continuing students to build their R skills.

Surveying GGE faculty and students about GGE course prerequisites: The EC began a discussion in Spring Quarter 2018 to review prerequisite courses the GGE requires of applicants. Students admitted to the GGE without having met prerequisites must remedy deficiencies by taking appropriate UC Davis graduate and undergraduate courses within their first few years. We seek to ensure that course requirements accurately reflect the breadth of our graduate group, are not a major factor for students choosing whether or not to accept offers from the GGE, and don't have substantial impact on current students by drastically increasing course loads and terminal degree time.



Ferruginous hawk, rural Lake County - Aviva Rossi

Implementing a test-out option for EVE 100: In response to a large concern from GGE student having to satisfy the EVE 100 course requirement, despite having adequate coursework and work experience providing the background covered in EVE 100, the EC has decided to offer a test-out option as an alternative way students can fill this requirement. This test-out option should be available for all continuing and new students starting in Winter Quarter 2019.

Conducting a student survey on quantitative training needs: We know that quantitative training resources for GGE students are dispersed across many departments and are often limited or inadequate for our unique data and research needs. We are conducting a survey of the GGE student body this fall to gather what classes GGE'ers are taking to get their quantitative training, and what skills they feel need further development. This survey will be used to inform GGE quantitative course offerings.

If there are more issues or ideas that you think should be on our radar or that you want your student representatives to bring to the EC, please contact us by email or at quarterly EGSA meetings. Want to know more about the Executive Committee? See Article V of the GGE Bylaws (available at <http://ecology.ucdavis.edu/resources/bylaws2016.pdf>). If you are interested in learning more or think you might be interested in being a student representative in the future, please feel free to contact either Jess (jrudnick@ucdavis.edu) or Helen (hjkilleen@ucdavis.edu) at any time.

EGSA Update

Jasmin Green

As someone with a “Type A” personality, I enjoy structure and routine. I’ve always considered hiatuses a necessary evil – a break in my regularly scheduled programming that I’ve been forced to take to focus on a task that I’ve usually been putting off for as long as possible. I remember taking a three-month hiatus from playing in my volleyball rec league so I could concentrate on grad school applications (it paid off). However, while it might feel like life has been put on pause, the world keeps turning in the background.

It’s an amazing feat that EGSA manages to maintain its momentum and continuity in light of all of its moving parts. Leadership turns over annually as new co-chairs are elected, and each new cohort brings an influx of energy and ideas. Events come together

disjointedly as students cobble together time to serve on committees between navigating their coursework, research, and personal lives. Yet collectively, our graduate group contributes so much awesomeness to the Davis community. It’s honestly inspiring.

My goal as one of this year’s co-chairs is to help EGSA smoothly manage these transitions, as leadership transfers from person to person, cohort to cohort. As all EGSA events and activities are coordinated through committees, I want to create a workflow for committee chairs to document and share their wisdom with new students taking the helm. I also want to improve resource accessibility for all graduate group members by updating the EGSA website to include insights from former students as well as easy access to campus resources. Ultimately, I want to ensure that should you experience a hiatus at any point in time at Davis, EGSA is there to help when you’re ready to return.

– Jasmin Green, EGSA Co-Chair



STUDENT PERSPECTIVES – GAPS

Ellie Oldach

Author's note: I spent my gap years in Bar Harbor, Maine, on the shores of Frenchman Bay. Twice daily, a sandbar appeared and connected Bar Harbor to Bar Island—or maybe, twice daily, it disappeared and connected two parts of Frenchman Bay. What is a gap, anyways?

It's only a gap at certain times of day—and then the tide drops and the gravelly strip emerges and we're connected again, able to walk again from our home on the mainland out the widening path to the little sheep-shaped island.

The boldest of us sometimes swim over even when the tide is high. But the water's cold and it takes gritted teeth to take on the quarter-mile swim, even on a summer day.

So most of us cross as soon as the bridge opens and return just as its closing. We don't need much time to explore—it's a small island, after all, but beautiful enough to draw us over time and time again.

It has the same effect on the tourists that flood Bar Harbor each summer. And each summer, without fail, a tourist makes the crossing, misjudges the time, and gets stuck out there. Most of them call the water taxi, and the captain's all too happy to get an extra fifty bucks for a rescue mission across a quarter mile of safe water.

If the trapped tourists choose to wait, they'll be waiting a while. The bridge is more often a gap than a bridge.

So the best thing to do is to keep the tide in mind and not get stuck out there. Instead, wait for the tide to turn and move with the ocean as it makes its way back across the bar.

You can stand with your toes just touching the incoming surf and step back, increment by increment, as the water rises. It moves slowly, but then it moves fast, and for a moment you can stand in a very thin layer of water/land and be not certain if it's a gap or a bridge at all.

It's only a gap at certain times of day—and then the tide rises and the gravelly strip is covered and we're connected again, able to swim from the seaward side of the bay to the landward side with its stream inflows and calm water.

Some of us—the crabs, a snail on an ambitious day—can cross the gap without the tide. But it's a wide way, and they risk the wheeling gulls and crows above, their bird-eyes keen for that kind of easy lunch.

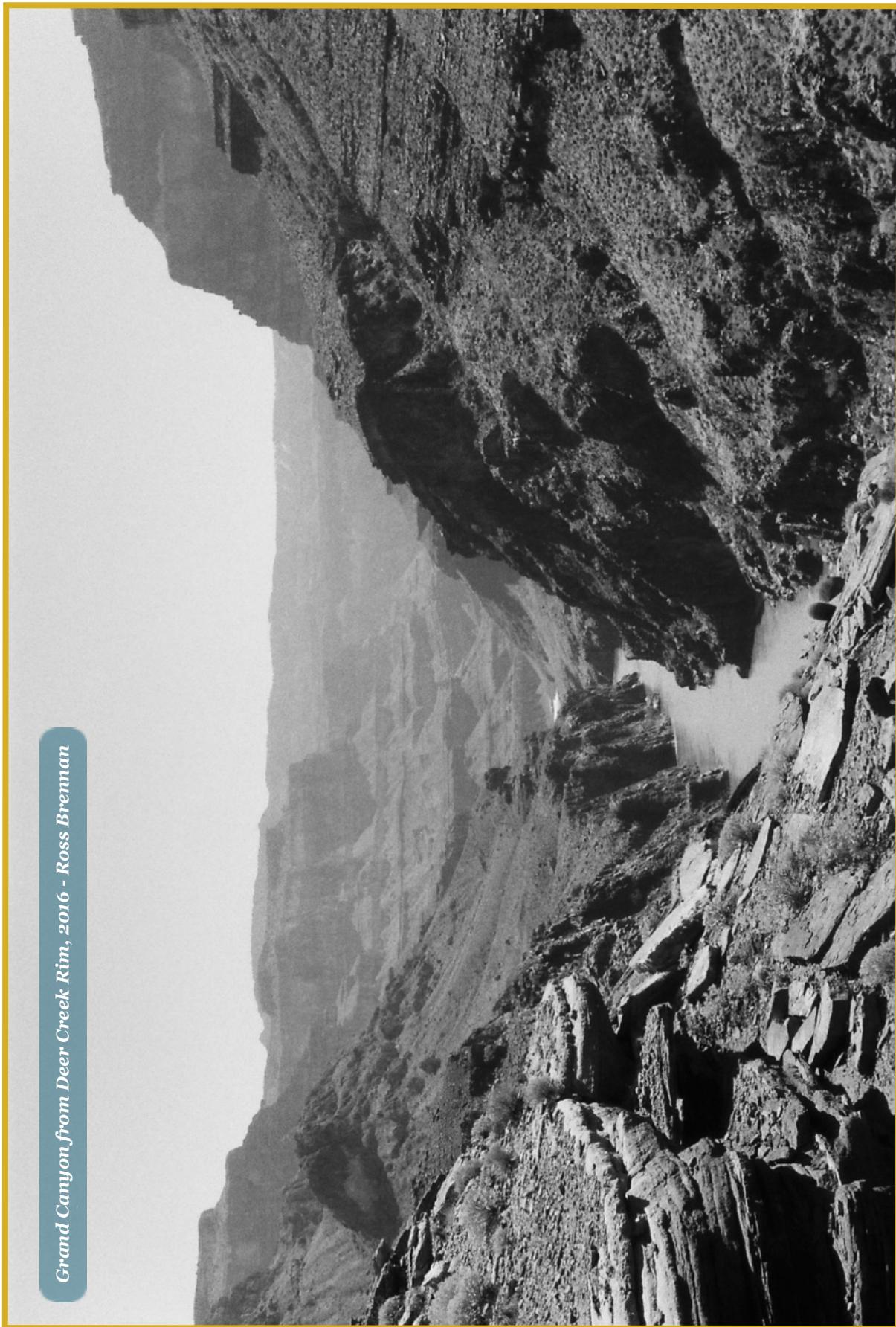
The rest of us are waterbound, and getting to the other side at low tide would mean going around through a long maze of rocky channels and strong currents—so mostly, we wait.

And then the tide comes in. It comes in slow at first, but you can feel it—the water's ever so slightly colder, or stronger. And we rise higher and higher, in increments, as the ocean fills in between pieces of gravel. And then, suddenly, water from the landward side meets water from the ocean and the gap is bridged and we're buoyed up and over the gravel wall.

It never takes long. The gap is more often a bridge than a gap.

It's impossible to miss the tide falling again. You feel it in every scale. And sometimes you choose to swim against it, to stay in the protected covewaters on the landward side of the gravel. But mostly you let go, and let the falling tide sweep you back over the gravel, back out towards bigger swells and saltier water.

And if ever you want to cross again, it's easy enough to wait. Tide rises, tide falls, the gap is there and not there, and it's all just a simple matter of time.



Grand Canyon from Deer Creek Rim, 2016 - Ross Brennen

TEACHING & LEARNING ABROAD

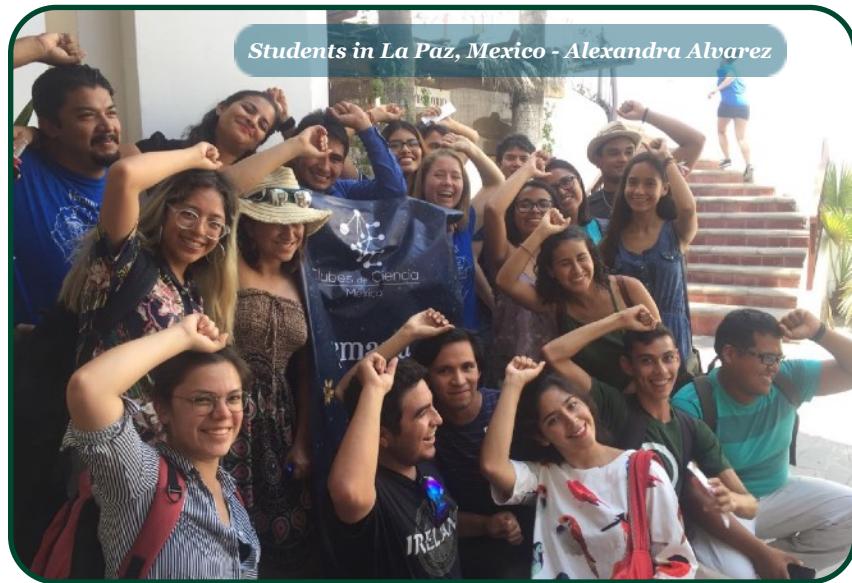
Clubes de Ciencia

Jordan Hollarsmith

We sat around the table, laughing over huge plates of fresh tortillas and ceviche as we swapped stories about our students and learned more about one another's lives and research around the world. We had all traveled from across Mexico and the United States to spend a week in La Paz (Baja California Sur, Mexico) to teach college and high school students science as part of the **Clubes de Ciencia** ("Science Clubs") program. The experience was one of the most rewarding of my life. I returned exhausted to my core and wanting to shout from the rooftops to all of you to apply and participate in this incredible program!

Clubes de Ciencia is a program run by the non-profit Science Clubs International. *Clubes* currently exists in twenty cities spanning six countries (Mexico, Colombia, Brazil, Bolivia, Peru, and Paraguay) and grows every year. Its mission is to expand access to high quality STEM education and promote international collaborations across Latin America. The program pairs a local and a foreign researcher (from Masters students to P.I.s with laboratories) and together the two researchers create a week-long science course from scratch. A combination of private and public funds ensure that all costs are covered – travel, lodging, meals and classroom equipment for the researchers and all tuition and course costs for the students. Yes, that means this experience is FREE for you, and FREE for the students. While it is easier if you speak Spanish, knowledge of the language is not a requirement. All that is required is the motivation to learn and teach.

My course was titled "Biodiversity in the sea: from coral reefs to microbes" and was the product of an amazing collaboration with my co-instructor, Dr. César Cardona Félix, a researcher at the Interdisciplinary Center for Marine Science (CICIMAR). Together we exposed twenty Mexican students from ages 18 to 28 to methods used in marine ecology and microbiology. We used transects and quadrats to estimate diversity and benthic cover in local coral reefs; we grew bacterial colonies from samples taken in the field; we brought algae back to the lab and explored the effects of algal metabolic activity on water chemistry and identified the small organisms living inside. In short, in one week we learned about biodiversity from the coral and large fish to the small invertebrates hiding in algae to the "invisible" bacterial diversity. Throughout, we highlighted the changes that humans are making to this biodiversity, from the trash and fishing gear we observed at our field



sites, to the effects of overfishing and climate change. The other courses in La Paz varied from physics to biomedical sciences to astrobiology. The week culminated in a poster session and presentation from each group. From beginning to end, each course created hypotheses, collected data, and analyzed and presented findings, all over the course of a single jam-packed week.

The results were profound. Many in my course, including Dr. Félix, had never seen a coral reef despite living adjacent to the ocean. It was their first time donning a snorkel, using underwater paper, and observing an ecosystem from a scientific perspective. Feedback from the students included such statements (translated from Spanish) as "this course inspired me to continue to pursue science" and "I was able to see firsthand the impact of humans on natural ecosystems and this course made me realize that taking action is urgent." *Clubes* is an opportunity to create real partnerships across borders and have an impact on the lives of your students.

The call for applications to *Clubes de Ciencia México 2019* opens in January. Club proposals are due by the end of February, decisions made April, and courses take place in July. If you have any questions about the process, I would love to talk more – please email me at jahollarsmith@ucdavis.edu.

TL;DR (specific to the Mexican *Clubes* program)

Who: US and Mexican graduate students and post docs (US citizenship not required).

What: a week-long science camp for Mexican high school and college students. You are paired with a Mexican researcher and together you two create your own hands-on curriculum.

When: end of July/beginning of August.

Where: Guadalajara, Guanajuato, Merida, Ensenada, Chihuahua, Monterrey, La Paz, Xalapa, Oaxaca.

Metabarcoding School

Sarah Stinson

We huddled in a group next to the helicopter pad, a bare patch of red earth surrounded by an impenetrable wall of lush jungle foliage. The hypnotic hum of insects added a rhythmic pattern to the heat waves rising visibly in the tropical sun. The small group consisted of graduate students, postdocs and professors from across Europe and America, awkwardly navigating islands of conversation that, as soon as they appeared, sank back into distracted silence. We were all a little nervous at the prospect of the adventure ahead: helicoptering into a remote tropical jungle in French Guiana with a group of total strangers. Our attempts at conversation were soon swallowed up as the distant thrum of the helicopter engine quickly became a deafening roar. As it approached, the force of the propellers sent debris swirling into the air around me. I grabbed my backpack (a little too tightly) and marched towards the open door. The pilot gave a thumbs up as we buckled ourselves in, and deftly maneuvered the helicopter skyward. The patch of red earth shrank below us and was rapidly swallowed by an unending sea of jungle canopy - a stark reminder of just how isolated we would be for the next 7 days.

The Metabarcoding School, now in its 8th year, is the brainchild of the metabarcoding.org editorial board, namely [Pierre Taberlet](#) and Eric Coissac. The course includes lectures and practicals designed to introduce the fundamental techniques required for conducting DNA metabarcoding experiments. DNA metabarcoding uses molecular techniques (PCR and high throughput sequencing) to assess biodiversity from environmental DNA and bulk samples. This technique requires an understanding of molecular biology, bioinformatics, biostatistics, and ecology, and can be applied to a wide variety of ecological questions. Topics range from biodiversity monitoring, to animal diet assessment, to the reconstruction of paleo communities. Each year, the workshop is held in a different remote location. This year's workshop was co-organized by the [Center for the Study of Biodiversity in Amazonia \(CEBA\)](#) and the metabarcoding.org team (Eric Coissac, Pierre Taberlet), held at the [Nouragues Scientific Station](#). The Nouragues Natural Reserve is located in central French Guiana, and comprises 76,910 hectares (190,000 acres) of pristine tropical rainforest. It's one of the most biodiverse places on Earth. Two research stations, administered by the [CNRS \(Centre Nationale de Recherche Scientifique\)](#), offer researchers the opportunity to explore this ecological paradise. The Inselberg Camp (where we stayed) sits at the base of the Inselberg des Nouragues, a spectacular 420m granite mountain.

During the course, our time was split between lectures, round table discussions and hands-on practicals.

We learned the major components of a basic metabarcoding workflow, from experimental design to bioinformatics, through ecological analyses. Lecturers [Frédéric Boyer](#) and [Lucie Zinger](#) provided more in-depth exploration of a bioinformatics pipeline ([QBITools](#)). Lectures and practicals always included a healthy dose of caveats and “lessons learned,” an important component of this type of work that is sometimes glossed over, even in publications from major journals.

Occasionally, we were distracted from the intense coursework and reminded of our unique surroundings. It's hard to focus on your computer when a troupe of capuchin monkeys decide to crash the party! We took night hikes through the forest, spotting caiman, scorpions, tarantulas, snakes, poison dart frogs, howler monkeys, and a wealth of insect diversity. One morning, we hiked to the summit of Inselberg des Nouragues, arriving just in time to watch the sunrise. It was a breathtaking view. As the pink glow of sunrise spread slowly over the misty canopy, stretching out endlessly in all directions below us, a cacophony of tropical birds stirred to life, serenading our vista. I decided that the view alone was worth the trip.

All too soon, the week came to an end. We unstrung our hammocks, folded up our mosquito nets, and packed them into our backpacks. The helicopter took us down to the lower camp at Saut Pararé, situated just below a series of high rapids on the Arataye River. From there, we boarded *pirogues* (motorized canoes) and set off on the 4-hour trip downstream. The river itself was broad and shallow, alternating between stretches as smooth and still as glass, and rocky rapids, which required all the skills of our pilot to navigate. The heat combined with the sound of rippling water was just beginning to lull me to sleep when one of the other students gasped audibly. “I think I saw something... slithery”, she whispered. The pilot slowed and turned the boat around. As we approached the shore, we all spotted the source of the slitheriness. An anaconda, full from a recent meal, looked up from her sunny spot on the riverbank and regarded us warily. It was the biggest snake I'd ever seen, outside of a vivarium. She was easily nine feet long. “Un petit!” smiled the pilot. Apparently he was not as impressed as the rest of us.

As I sorted through my notes from the course, wrapped in the glow of a semi-jetlagged, sleep-deprived haze, I came across a group photo taken on the last day at the station. In the photo, we're laughing and completely at ease – the perfect appearance of a well-oiled team. Beyond the course material and the exotic destination, equally valuable are the personal and professional connections that we made. Yes, it sounds completely cheesy, I know. Then again, how often do you get to hang out with an editor of Molecular Ecology, discussing your research while drinking caipirinhas and watching howler monkeys? To learn more about the recent publications from work being conducted at the Nouragues Scientific Station: www.nouragues.cnrs.fr/spip.php?article125



Our field site on the Uur River in Mongolia, Summer 2018 - Lea Pollack

Climate Science as a Respite from Climate Change

Priya Shukla

I documented the effects of climate change on ocean organisms, trying to understand how increases in carbon dioxide make the ocean more acidic and impact the physiology of many organisms. In the case of calcifying shell-builders—like the mussels I hope to study for my dissertation research—the news is often bleak: Their shells become more fragile (especially during their larval phase), minimizing their likelihood of survival. Yet, while I have been attempting to predict the ocean's future, climate change has already arrived in my backyard.

After unprecedented precipitation in winter 2017, the newly grown vegetation provided tinder later that year for some of the most horrific wildfires California had seen. During this time, I was flanked by fires to the north, south, and east—grateful that I only ever had to grapple with poor air quality and a new, uneasy sensation when I smelled burning wood.

As the fires were contained and the air cleared, I returned to my intellectual fantasy, predicting scenarios for eras I wouldn't be alive to experience in places I may never visit. *How much more acidic would the ocean be in 2100? What will that mean for mussels in Portugal?* For six months, while others picked up the charred remains of their lives, I lamented the defaunation and devastation of the oceans that science had forecasted. But I never realized that it is indeed a luxury to only have to worry about the future.

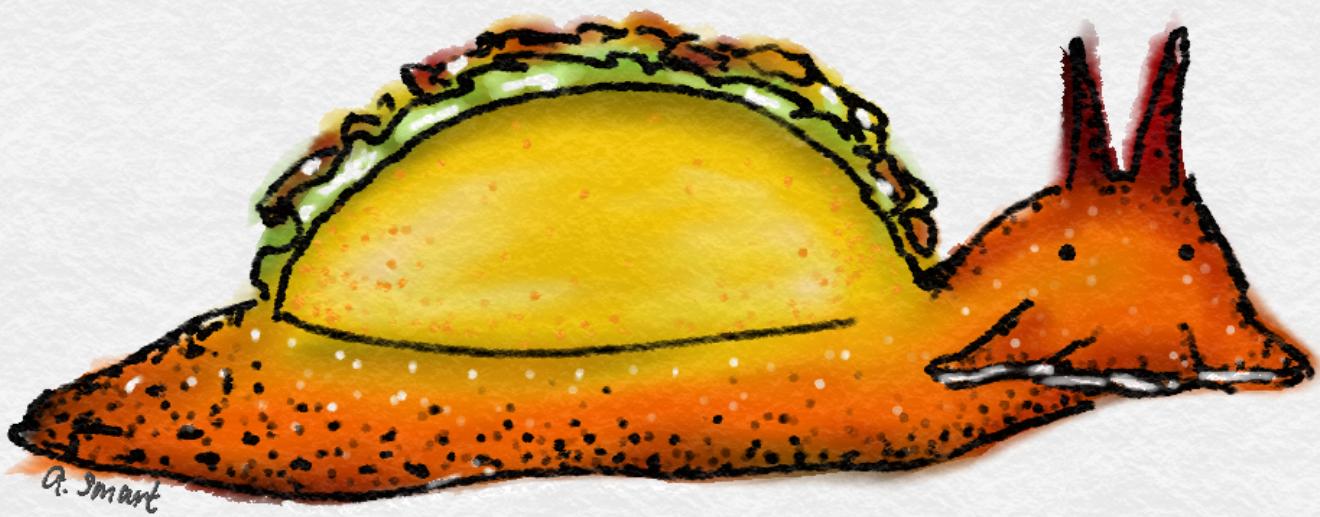
It was a hot summer day and I was loading groceries into my car. As I looked off in the distance, I saw an ominous black cloud hovering over the hill I live on. In a single instant, my vision and sense of smell aligned—*SMOKE!* While my partner swore obscenities at the Everbridge app on his phone, I contacted our landlords to learn what they knew: the fire was in a park half a mile away from our house; the road to enter our community had been closed; we weren't allowed to come back until they were done fighting the fire.

The despair and anguish we felt in that moment was gradually overridden by a sense of helplessness—there was literally nothing we could do. After considering our options, we drove to a nearby alehouse with a view of our hill—we drank beers until the smoke dissipated and a Nixle alert gave us permission to return home.

In much the way of my beloved mussels, I am seeing my own emotional and intellectual shell deteriorate. There is privilege in only having to consider “broader implications” and “next steps”—thinking about the future is easy when wildfires aren’t razing your community. Although changing ocean conditions are wreaking havoc on marine ecosystems, I feel guilt-laden relief that the ocean’s rich, blue color obscures many of these impacts from my view.

I have not suffered any real losses from wildfires—my loved ones are safe and my house is intact—but my baseline level of anxiety has changed. As I toggle between fearing for human communities impacted by fire and ecological communities affected by changing ocean chemistry, I see that the oceans’ drawn-out responses to climate change are merely a reprieve from the horrors that fire season brings.

Aplysia californica reimaged with the body of a taco - Ashley Smart



WHITE MOUNTAIN ODYSSEY 2018



WHITE MOUNTAIN ODYSSEY 2018



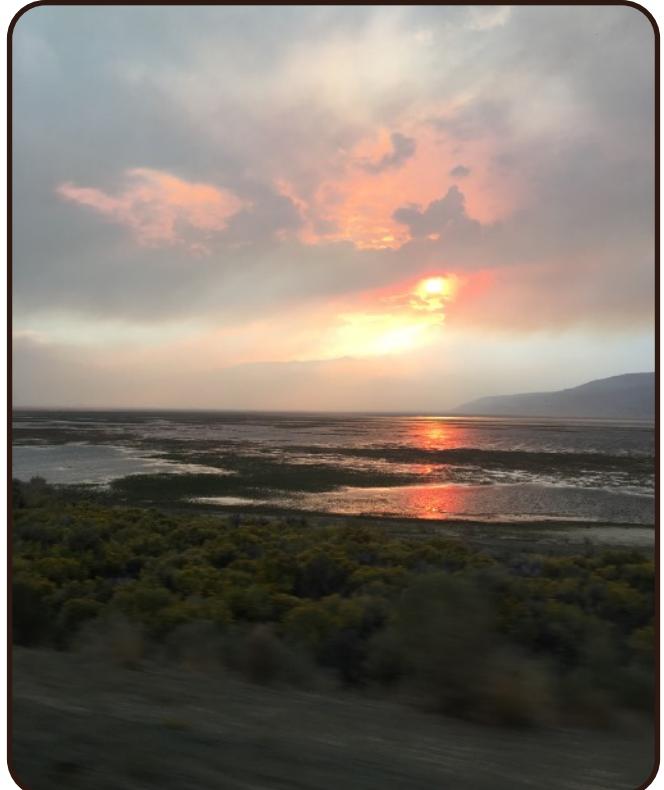
Ernst with the Ruby Lake hikers. Shortly after this he took off for distant shores.



We met some spacemen (Rob and John) on the way to White Mountain.



Above, Truman is excited about plants.



Right, smoky sunset bodes ill for air quality. ►

THE AGGIE BRICKYARD



Students quantifying biodiversity at Pichilingue, Baja California Sur, Mexico - Alexandra Alvarez



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