



**Organismal Biology
and Ecology**

NEWSLETTER

Welcome to OBE

In 2014, the Biology Department was reorganized into two separate departments: Molecular Biology, which focuses on molecular and cellular biology, and Organismal Biology and Ecology (OBE), which is primarily concerned with evolution and ecology. Our majors study the structure and function of organisms in an ecological and evolutionary context. Thanks to the block plan, we are able to send students out in to the field for day, overnight, weeklong, and even block-long trips. Some of these courses include Ornithology which spends a week in the Chiricahua Mountains during avian spring migration, and Entomology which spends a week in Sonoran Desert. There are also blocks that go abroad each year to destinations including Patagonia, Belize, and Tanzania. Our faculty and staff are excited to invite you to read the first edition of the OBE newsletter, and learn about what our department, and your fellow student colleagues, have been up to since you graduated!

Letter from the Chair

Greetings alumni! We hope you are all doing well and that you will enjoy the enclosed information about the Organismal Biology and Ecology (OBE) faculty, students, and other alumni. This is my last year serving as Chair of OBE, and I will hand over the baton to Shane Heschel at the end of the school year. I am honored to have worked with such a great group of teachers and scholars, and am excited about what the future holds for OBE.

We are pleased to welcome Jim Ebersole and Emilie Gray back to the department after their sabbaticals. They certainly seem refreshed relative to the rest of us! Marc Snyder was on sabbatical this past fall, and we welcome him back as well. For the spring, everyone is now on board. Visiting faculty member Nick Brandley is finishing up his second year, and we are grateful to him for filling in, and bringing such great energy to the department. Our wonderful staff has done an excellent job, as usual. Donna Sison continues to run the show as our administrative assistant and both Jamie Micciulla (laboratory coordinator) and Steve Langois (animal suite assistant) have been invaluable. We are also indebted to our paraprofessional Devon Lucero, who filled in at the last moment and has done yeoman's work.

The faculty and students of OBE were highly active in research this year, working on a wide variety of project around the globe. Forty students graduated with a degree in OBE this past year, more than any other science department by 18 students! That alone is a testament to the hard work and quality of the OBE faculty. The faculty have been leaders on campus, serving on major committees, and they do a remarkable amount of community service as well.

The biggest news is that we have a new tenure track hire in Botany, who will start in September of 2017. We are proud to announce the arrival of Rachel Jabaily, who is leaving her job as an Assistant Professor at Rhodes College to come to CC. Rachel is from Colorado of all places! She completed her B.S. at the University of Wyoming, and her PhD at the University of Wisconsin–Madison. Rachel studies the systematics and evolution of bromeliads from a number of South American countries. She brings to the department a keen mind, high energy, extensive teaching experience, and an active research program. We are extremely excited to have her at CC!

One of the most exciting things to report for this past year is the establishment of the Hevey Family Fund for Student Research. Robert D. Hevey, Jr, Class of 1976, who provided this fund, was an Economics major at CC who had a very successful business career, and in his retirement is getting his PhD in Plant Biology and Conservation at Northwestern! Most of us think about playing golf or gardening in our retirement, but he is working on a PhD in a field he never studied! His gift will allow sophomore through senior students in OBE to tackle research projects in collaboration with faculty members at CC and other institutions. It even allows, in some cases, for recently graduated students to continue to work at CC with their faculty mentors to complete senior research projects and turn that work into published professional papers. This extremely generous gift will provide stipends, research and travel expenses, and room and board to a number of students each year. The donation is initially for three years, with the potential for renewal in future years. We will of course continue to support original research experiences for our students in other ways, but the Hevey Fund will help us to open more doors of opportunity for our students and increase our capacity for faculty–student collaborative research.

Finally, we are very lucky to have so many retired/emeritus faculty still within the Pikes Peak region, and it is a pleasure to see them around town and at various CC functions. It was with a heavy heart that we said goodbye to two of the lions of the Biology/OBE departments, Tass Kelso and Jim Enderson, who both passed away within the last year. These two were invaluable members of the department and the college, who were remarkably well respected and loved by students, faculty, administrators, and staff. We spent a lot of time grieving this year over their passing, and we wish their family and friends the very best.

Cheers,
Paul Myrow
Department of Geology

Faculty and Staff Updates

Boyce Drummond

I'm writing this report from South Water Caye on the Belize barrier reef, where Marc Snyder and I are currently teaching the "Belize Course" together this winter (Block 5) for the third time. Although I officially retired from CC at the end of 2013, I haven't given up teaching. The faculty and students at CC are just too much fun, so I'm averaging 3 courses a year since being put out to pasture. Last spring I taught Entomology (Block 7) for the first time since 2011 – the response was so strong that we've scheduled Entomology for 2017 and 2018 as well. In 2016, Shane Heschel and I combined our two classes (Entomology & Desert Plant Physiology) for a week-long

field trip to New Mexico and Arizona, where we camped at Organ Pipe National Park in sight of the infamous border wall. We'll do that again in 2018, but this spring I will be going solo.

After co-teaching "Literature and Nature" in the English Department with Dan Tynan for 5 years, we brought our fruitful collaboration to an end in May when Dan retired (although he also continues to teach part time). This interdisciplinary course was consistently stimulating and ranks as one of my favorite intellectual collaborations, so I'm sorry to see it end. Maybe we can revive it sometime in the future.

The summer brought an exciting new opportunity when Marc Snyder (my good friend and collaborator for 30 years) and I taught Tropical Rainforest Ecology in Ecuador in Block B (see description in Marc's report). The course was an outgrowth of a Spanish language study and scouting trip Marc and I made to Ecuador in 2014. Teaching CC students in Ecuador held particular meaning for me as I did my Ph.D. research in Eastern Ecuador in the 1970's and have returned there over a dozen times since for follow-up research.

When I'm not at CC, I live in Fort Collins where I am an Adjunct Associate Professor at CSU and an Associate Curator in the Gillette Museum of Arthropod Biodiversity. I do a lot of outdoor teaching in the summer and fall in northern Colorado as a Master Naturalist with the City of Fort Collins Natural Areas Program and as a Colorado Native Plant Master Naturalist for Larimer County.

During my full-time years at CC I played recorders and percussion in the Collegium Musicum early music ensemble (directed by Nancy Ekberg) and classical guitar in the Guitar Ensemble (directed by Dale Miller). I really miss those enriching experiences, so to compensate I have joined the Fort Collins Recorder Society and I'm trying to learn to play mandolin and flat-pick bluegrass guitar.



Shane Heschel

The Heschel Lab - We have been busy with stress physiology research and publishing our results the last couple of years. A collaboration that began in 2013 with Lauren Ruane at Christopher Newport University yielded a paper to be published in 2017. Along with OBE student Marley Jamason, we investigated how heavy metals in soil impact a plant's ability to regulate its water use. We conducted greenhouse experiments in 2013-2014 and turned these data into a manuscript for publication in the International Journal of Plant Sciences. In 2016, two additional, student-centered research projects yielded peer-reviewed publications. First, three years of student independent study data (from BE309/409 courses with Chrissy Maruyama as lead) on the importance of a plant's maternal stress environment to water relations resulted in a Rhodora publication. Interestingly, seedlings derived from drought-stressed moms behave as if they are experiencing drought stress, even though the seedlings are in well-watered, benign conditions. Secondly, an additional long-term data set on tamarisk water-use efficiency was published in 2016 with Evan Craine as lead. In this case, four years of student projects on

the impact of bio-control on tamarisk water relations and fitness were published in the Western North American Naturalist. Interestingly, bio-control may be selecting for tamarisk (an invasive species) that waste more water than native species. I continue to give students a first-hand dose of plant stress in the Sonoran Desert with my plant eco-physiology class. Of course, much time was devoted this year to studying the Cubs glorious season – much of my many years of baseball stress has been alleviated with the World Series win!! Go Cubs Go!!

Jim Ebersole

I'm continuing to teach biostatistics, botany, and several ecology courses. The last two years have also provided multiple wonderful opportunities to travel internationally, which invigorates me intellectually and broadens my ecological perspective.

In fall of 2014, nine CC students and 13 other ACM students joined me as I directed the ACM semester in Tanzania <http://www.acm.edu/programs/9/tanzania/index.html>. The program spends about two months in the capital of Dar es Salaam where students take courses from Tanzanian faculty on ecology of the Maasai steppe, human evolution, and Swahili. During this time, I did the mountains of logistical work needed for a semester abroad in an African country (see <http://cjtanzanianadventures.blogspot.com/> for a description of one bureaucratic adventure!), and I supervised students as they wrote proposals for their field projects in and around Tarangire National Park in northern Tanzania. After this first part of the course in Dar, we spent two weeks visiting some of the premier sites in human evolution (Oldupai Gorge and Laetoli with its ancient human footprints) and the wonderful wildlife preserves of northern Tanzania, including Ngorongoro Crater and the Serengeti.

During the following month, we camped near Tarangire Park while students collected data for their independent projects. Ecological students went into the Park nearly daily, cultural anthropology students interviewed Maasai people in nearby villages, and two archeology and geology students excavated what appears to be an incredible find of a *ca.* million-year-old butchering site of early hominins! From their projects, five student co-authored papers with me, with possibly more on the way. These papers include studies showing benefits to impala from hanging out with baboons, Maasai attitudes toward conservation, interaction of Maasai infants with mothers and other care-givers, possible over-compensation of acacia trees after elephant browsing, the relationships of Maasai with their dogs, and how some animal species use lightly traveled roads in the Park as travel corridors.

During my 2015-16 sabbatical, I worked with students as they revised these papers, prepared to teach a CC block in Tanzania in February-March 2017, and accompanied a CC alumni trip to the Galapagos and Machu Picchu. Seeing the wonderful ecosystems and organisms of the almost mythical Galapagos was definitely an ecological-evolutionary highlight, as was sharing some info with alumni on Darwin and the recent evolutionary research in the islands. I found the high-altitude puna in the Peruvian mountains fascinating; its long-term anthropogenic impacts on ecosystems resembles the mountains of Europe more than the American West, where human have strongly impacted the region for a much briefer time.

Then it was off to jolly old England and Wales, where Carol and I visited cousins she had not seen in over 40 years; enjoyed the culture and history of London and places like Hadrian's Wall; and explored trails through heather and moor on the coasts and in the mountains. Wales is gorgeous, fascinating, and little known by North Americans—highly recommended!

Current projects include finishing co-authored student papers from Tanzania, taking a CC course to Tanzania February-March 2017, doing some new activities in the intro ecology course this spring, and returning with a CC course to Patagonia in January-February 2018.

I love to hear from alums! When you have a moment, send me a note with a brief update.

Emilie Gray

Spring 2016 marked the second half of my sabbatical. This sabbatical allowed me to recharge, continue some research and visit places, friends and family that I don't often get to see. During the first part, I went on a 3-month road trip with my dog through the Tetons, Yellowstone, Glacier, Banff, Jasper, Vancouver Island, then down through WA, OR and CA. The beauty of the parks and other landscapes I crossed blew me away, all of them were so majestic in the waning colors of the fall. After the trip I returned to Southern CA to collaborate on the writing of a manuscript and the acquisition of additional data. Then, upon my return to Colorado Springs, I obtained *Aedes aegypti* mosquitoes from other colleagues to pursue research towards understanding how insecticide exposure affects their fitness and metabolism. This type of work is becoming more pressing as mosquitoes evolve insecticide resistance and spread an increasing number of diseases! Late spring, I also spent a month with my parents back in Lyon, France. My dad, 85, was terminally ill from bone cancer and I was so fortunate to spend his last days at the family home supporting both him and my mom. Summer went by in a flash filled with numerous hikes and bike rides in the CO mountains, and some serious preparation for a new course I was about to teach: a first year experience course focused on the ecology of the Salton Sea region. I had a blast with my first year students in early fall: during block 1 we learned ecological theory and field research on campus and during block 2 we took a 10 day trip out to Southern CA, camping on the way and visiting dams and regional parks. During my non-teaching 3rd block I managed to fit in some more mosquito research, and then I finished the year with the classic BE106 and a bit of skiing in Crested Butte!

Marc Snyder

I've had a wonderful year. I'm writing in early February from the South Water Caye Marine Reserve on the Belize Barrier Reef—Boyce Drummond and I are currently teaching the tenth iteration of 'The Belize Course.' As usual, the diversity we've seen here has been astonishing and has made for fascinating discussions of evolutionary ecology, as well as a good bit of idle Darwinizing I've just finished a half-sabbatical (fall 2016) during which I expanded my field research on interactions between tropical pines and Scolytid bark beetles. I'm eager to return to campus (but not too eager to leave Belize) to see how the plant chemistry unfolds. This past summer, Boyce and I also co-taught a new CC course in Ecuador, Tropical Rainforest Ecology. Joining us for parts of the course were a CC alumnus, Charlie Vogt ('76), who is an expert on the birds of Ecuador, and Dr. David Neill, who is the father of a recent alumna (Lizzie Neill, '15) and a biology professor in Ecuador who is a leading authority on neotropical tree systematics. It was all good fun and a wonderful teaching/learning experience. This year I've also been planning another new CC course I hope to teach in Kenya. Last summer I joined a group of U.S. and Kenyan veterinarians and wildlife biologists in various protected areas in Kenya to de-snare, treat, and release snared animals. In addition, we were able to vaccinate over three thousand animals in and around rural Kenyan villages. Great experiences all, that I hope to share with students soon. Also, last spring semester, I took my advanced ecology class to the Kaibab Plateau (20th time!) to study forest dynamics, and predator-prey and other multi-species interactions in that beautiful part of the Southwest. Finally, my family is doing well—some of you might remember my kids: Aaron ('10) finished his PhD in the spring, and he and his wife, Breann, are enjoying life in the Bay Area, and Zach ('13) is teaching and enjoying life—especially the music scene—in Portland. Barbara and I are still in Manitou, spending time together in open space when we can, enjoying our animals, and exploring ways to respond to recent events in our country!

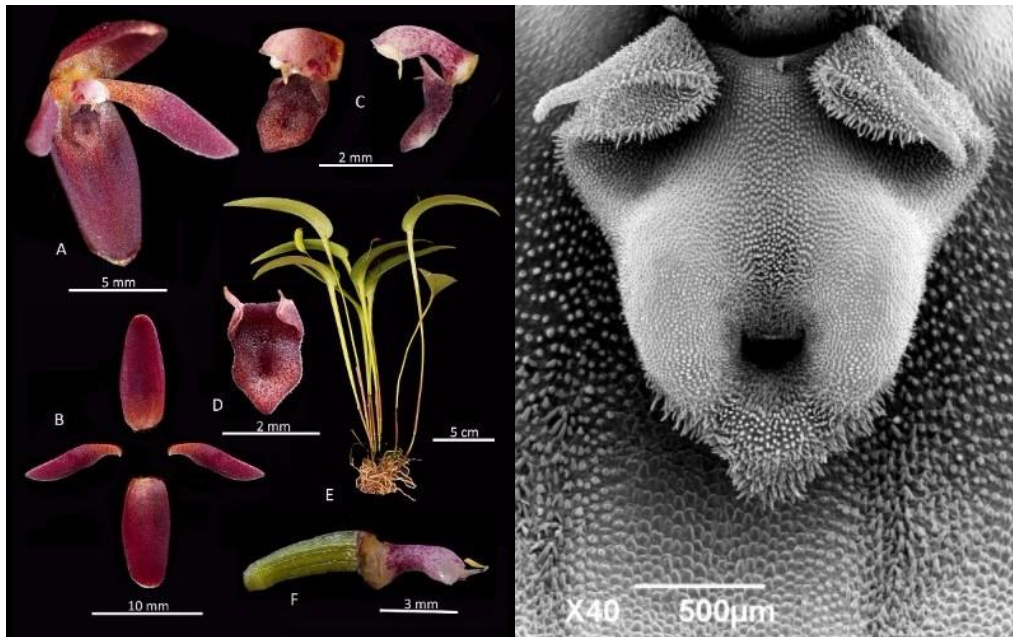
Mark Wilson

Over the last couple of years I have continued to work on the phylogenetics, systematics, morphology and pollination biology of the orchid genus *Pleurothallis* with collaborators from the U.S., Costa Rica, Colombia, Ecuador and Peru. In the fall, Katy Dupree ('16), coauthors and I published a paper describing three species of *Pleurothallis* new to science. At the end of the year Katy, coauthors and I submitted another three manuscripts describing an additional six new *Pleurothallis* species. In total I have published or submitted manuscripts describing eleven new species of *Pleurothallis*, including *Pleurothallis kelsoi* (photo bottom left), named to honor CC Professor Tass Kelso.

Thanks to instruction from Ron Hathaway, Katy and I used SEM to examine the flowers of *Pleurothallis* species from subgenera *Ancipitia* and *Scopula*. Pollination of some of these species probably involves “sexual deceit”, in which a male fly mates with the lip of the orchid flower (photo bottom right), mistaking it for the female of the species, in a process called “pseudocopulation”. Katy Dupree ('16) presented her research on the evolution of sexual deceit in *Pleurothallis* at Botany 2016 in Savannah, GA.

Graham Frank ('15) coauthors and I published a paper on the phylogenetics of the orchid genus *Andinia* based in large part on Graham's thesis research. This molecular phylogenetic study allowed us to recircumscribe or redefine the genus, transferring 50+ species into *Andinia* that had been erroneously placed in other genera.

In late fall 2015, I spent 6 weeks in South America attending the 5th Conference on Andean Orchids at Pontificia Universidad Javeriana, Cali, Colombia and then visiting botanic gardens, orchid collections and herbaria in various locations throughout Ecuador and Colombia.



Brain Linkhart

Hello all—it's been another great year of teaching in the field and doing research with students in OBE! Last January, I had my first opportunity to co-teach the Patagonia course with Marc Snyder, which was fabulous! From crazy cool Southern Beech and Araucaria trees to huge Andean Condors, Guanacos, and Elephant Seals, the ecology of the Patagonian landscape was as interesting as it was awe-inspiring. Closer to home, I have continued to involve students in Biology of Animals classes in field research projects in and around the Manitou Experimental Forest, and students in my Ecology classes still snowshoe or ski into alpine and subalpine field sites near Hoosier Pass each winter to learn about ecosystem processes and track cool predators and prey in the snow like Long-tailed Weasels, Snowshoe Hare, and White-tailed Ptarmigan. In the Animal Ecology course,

students have now been electro-fishing on the Yampa and Little Snake Rivers near Dinosaur National Monument for 13 years, contributing to a long-term study of the interactions between non-native and native fishes started by the venerable fish biologist, Dr. Ed Wick, in the late 1970s, and who by the way, continues to help lead—and inspire—students in the class every fall. And in Ornithology, Elegant Trogons, Magnificent Hummingbirds, Whiskered Screech Owls, and many other unique birds of the Southwest continue to greet students in the Chiricahua Mountains and other Sky Islands near the Mexico-Arizona border every spring, and students have now been trapping and banding Neotropical hummingbirds with noted researcher, Dr. Susan Wethington, for the past 10 years.

My summer nights are still spent mentoring (and keeping track of!) 6-10 students in Ponderosa Pine forests of the Pike National Forest, and last summer marked the 16th year (and 36th year overall) that CC students have joined me in studying the ecology of Flammulated Owls. Starting in 1981, my research has focused on determining long-term patterns in demography and habitat associations of the poorly known owl, and while those foci continue today, my research has broadened to include other aspects such as determining mating strategies of males, territorial status and productivity of owls by age class, and movements and habitat use patterns during migration. This latter focus has intriguing potential, as recent papers by my students and I are providing novel information on migration routes, wintering areas, and connectivity among breeding populations (using geolocators, we determined for the first time that owls migrate to southern Mexico for the winter), while also opening new doors to additional research opportunities in Mexico and Central America, where many conservation concerns exist. In addition, my current research also has expanded in a manner that utilizes long-term demographic study in Flammulated Owls as a means of shedding light on broader scale phenomena, such as effects of climate change on trophic interactions in ponderosa pine ecosystems, effects of forest thinning and altered fire regimes on forest vertebrates, and most recently, effects of prescribed burning on ponderosa pine ecosystems. Through it all, students have now helped capture and band approximately 1500 owls since the study's beginning (the weight equivalent of approximately 7 Andean Condors, 130 Abert's Squirrels, or 180 loaves of bread), and are fundamentally involved in all phases of data collection, entry, analysis, and writing, as well as in discussions regarding plant and animal ecology, and field study design and methodologies. Looking forward to another exciting summer field season in 2017!



Jamie Micciulla

I joined the OBE Staff in August 2015 after moving to Colorado to live with my husband who is stationed at Fort Carson. I completed my Master's degree in Molecular and Cell Biology from the University of Connecticut just a week before moving to Colorado. I come with a strong microbiology and genetics background, and have been able to integrate some more molecular techniques into our OBE classes. My Master's thesis was on the use of soil protists as molecular carriers for nitrogen fixing bacteria, *Rhizobia*, down plant root systems, so I have a bit of experience working with plants. I also work in the OBE greenhouse, tending to the plants we use in class and research. Recently I organized the plants in our "Desert Room" into families to make it more of an educational resource. If you are ever in the area, feel free to stop by and check out the greenhouses!

Devon Lucero

Hello All! I graduated last May as an OBE major and studio art minor. During my time at CC I spent a semester in Ecuador and a block in Patagonia exploring the ecology of South America. I loved spending time in the field during my time abroad as well as during my blocks here at CC. I also spent the last two summers working on Brian Linkhart's "flam crew" enjoying late nights in the Manitou Experimental Forest and sneaking up on owls. This fall I was excited to join the OBE department as paraprofessional and I got a puppy to be my sidekick. His name is Wallace and he comes to work with me most days to help me do chores, teach dissections, go on field trips and cheer students up on exam day (but he mostly just takes lots of naps)! We have really enjoyed our year spent in the OBE department and I hope that you enjoy the newsletter that I have put together for you!



Steve Langlois

The animals led by Chuck the ball python say hello. The animal suite houses frogs, doves, a turtle, fish and various insects and other invertebrates. Chuck lives upstairs in the paraprof's office and the Biology aquarium is still in place on the 4th floor landing. It has been converted to a fresh water community instead of the salt water tank that had been running for many years.

The College has established an Institutional Animal Care and Use Committee (IACUC). Veterinarians, faculty, staff and outside community members make up the committee that implements guidelines and protocols for the proper care and use of the vertebrates in the department. All animal interaction requires an approved protocol whether for class, research or wildlife studies. Helping us to meet some of the new mandates we have several great students helping out with animal care.

I'm in my fifth year with Biology and the animal suite. I send out a thank you to all the kind students past and present that have so graciously stayed in touch. It is nice to hear what is happening in your lives. Stop by and say hello some time!

Faculty memorials

James Enderson

I write this short article in memory of a dear friend, colleague and distinguished professor in the department of biology at Colorado College. When I arrived on campus at CC in 1968 Jim was a young professor in the department, and I am not certain how long he had been a faculty member. What I most recall is that from my first visit with Professor Enderson, he was extremely scholarly, articulate, intelligent, and anxious to describe his research and field studies in tracking the demise of the Peregrine falcon.

As a young ecologist he had considerable knowledge of the serious problems confronting the future of this beautiful bird, the rate at which they were disappearing, and the impact of thinning eggshells while still in the nests. Also, he understood the major concepts of the ecosystems in the Pikes Peak region that were so important to me. He expressed his interest in my background in floristics, and how I could contribute to his prairie research. I recognized from this first meeting we had a great deal in common, and that we would become close friends.

Jim had a striking appearance and countenance, he was good looking and soft spoken, but when he spoke you knew you should listen. He prepared well for his classes, be it general zoology, ecology, or a later introductory course in field botany, which he completed with me. A standing joke between the two of us developed during the years we were teaching related courses. We could load up his students in ecology and my students in field botany and work in the field over several days. But Jim would get aggravated that I could recall the names of so many plants, and he could just not remember them. His solution to this problem was that he would complete the 100 level Flora of Colorado course with me, which he did, and then teach the course, thus becoming knowledgeable of the plant species encountered. He did very well, and he became a good field botanist. At the same time I was learning the birds of Colorado from he, Dick Beidleman, Alex and others. Jim developed the idea that I was becoming so knowledgeable of the birds of Colorado that I should teach the course for non-majors. I always argued that students should not pay several thousand dollars a block to participate in an ornithology course taught by Jack Carter.

As chair of the department some years later, it was easy for me to describe to the administration why Professor Enderson was an extremely outstanding member of the biology faculty. During our first few years as friends I recognized why Jim was not too well known by the faculty and students across the campus. His life centered on quality teaching and his research, and he was not enthusiastic for faculty functions. But as he presented faculty seminars and led field trips and became better known, the faculty and especially the students who enrolled in his classes developed great respect for Jim. Our most outstanding students recognized that they were receiving the best in science education through his lectures and field courses.

Soon after arriving on campus I became the editor of the *American Biology Teacher*, and consequently I was continuously receiving a large collection of new books in the life sciences for review. These books were piled high on a file cabinet in my office, and I encouraged the biology faculty to look through the books for those in their fields of interest, and select one they might wish to review. Jim was always one of my best customers, and he wrote some of the very best reviews. He was a critical and knowledgeable reader of up to date findings in the field of ecology, which strengthened his teaching and research.

Jim always had a life away from the campus including hunting, flying, illustrating birds and wildlife, and sports cars. Several times we were invited to his home for elk or venison dinners. He enjoyed the ownership of rather old, but classy cars, and he was an excellent airplane pilot. In fact he developed a procedure for tracking birds from the air, and I enjoyed assisting him in this activity. He developed a system of placing very small antenna on wild bird species, and then from the air, with telemetry, tracing the movements of individuals or flocks over large areas, recording their movements and locations by section, range and townships over weeks or months. When tracing the travels of scaled quail or falcons over eastern Colorado for extended periods, I was always amazed at the distances they traveled.

Jim was a talented illustrator and artist. I do not know how far he followed this hobby in retirement, but he did present Martha and me with a beautiful drawing of a Peregrine falcon on one of his visits to our home in Silver City, NM. In later years he became an enthusiastic birder in southeastern Arizona and southern New Mexico. Colorado College was so fortunate to have had James Enderson on the faculty for so many years.

-- Jack Carter, Professor Emeritus of Biology, Colorado College
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Tass Kelso

Sylvia "Tass" Kelso, Professor Emerita of Organismal Biology & Ecology (OBE) at Colorado College, died in June 2016. Tass was a member of the Biology/OBE Departments for 29 years, where as a teacher, scholar, and advisor she helped hundreds of students over the course of her career to become better scholars and stewards of the Earth through the study of botany.

The geography of her life spanned the breadth of the U.S., ranging from coastal New England to the Alaskan tundra to the mountains and prairies of Colorado. After graduating from Dartmouth College, she began sharing her love of learning with elementary school students in New Hampshire. Eventually, her interest in plant diversity and the habitats sustaining it led to a Master's Degree from the University of Colorado and PhD in Botany at the University of Alaska. There, her investigations of arctic and alpine flora took shape, launching a research program that eventually led to more than 50 publications and professional reports. Her research largely focused on the biogeography of alpine flora, including habitat requirements, plant-pollinator relationships, species distributions, and phylogenetics. Tass' expertise in the genus *Primula* encompassed detailed studies of its ecology, breeding systems and taxonomy that spanned three continents and drew upon morphological and genetic studies. Moving beyond the "true" primroses, Tass' interest in edaphic specialization drew her attention to a rare evening primrose, *Oenothera harringtonii*, endemic to the silty prairies of southeastern Colorado. Through the medium of this plant, Tass established a large collaborative team ("Dimensions of Biodiversity") whose comparative studies of *Oenothera* have stretched across western North America.

Tass' love of evolutionary biology and systematics was further expressed in her work with herbaria, which she began as a graduate student at the University of Colorado Museum in Boulder. Tass was a champion for herbaria and trained dozens of students in the finer points of plant collections. At Colorado College, Tass' curatorial work with the Jack Carter Herbarium was instrumental in establishing it as a national resource for studies of Southwestern flora.

As a botanist, evolutionary biologist, and conservation scientist, Tass was deeply committed to preserving the biodiversity of alpine, grassland, and riparian systems in Colorado. For this work she was recognized as an Outstanding Volunteer by the Colorado Natural Heritage Program. In addition to training botanists who have continued in their educations as graduate students and practicing conservation stewards, Tass, her husband George Maentz, and her students have developed detailed management plans for many parks and open spaces in Colorado. In Colorado Springs alone, Tass and George's efforts led to the preservation of several parks and open spaces, such as the land adjoining the University of Colorado and Red Rock Canyon. Their work continues to conserve important and amazingly diverse habitats. Her efforts as a teacher-scholar will richly benefit generations of botanists and lovers of plant biodiversity.

Tass and George welcomed botanists from afar into their home and accompanied them in exploring the Rocky Mountain flora. Visitors were rewarded with evening pollination performances by hawkmoths and yucca moths, followed by morning conversation over hearty cups of espresso and walks that revealed glimpses of rare and elusive plants hidden in the wetlands, fens, meadows and alpine habitats of Colorado.





Tass' passion for teaching was infectious and her students and colleagues richly benefited from their interactions with Tass. A John D. and Catherine T. MacArthur Professor at Colorado College, Tass was a master teacher who regularly taught courses in botany, evolution, and conservation biology, able to inspire every student in the room with a quiet confidence and a respect for learning styles that was superseded only by her love of plants. Tass' influence as a mentor has been long lasting and transformative. She was a demanding but gentle advisor who modeled hard work, attention to detail, and thoughtfulness for generations of students. Her love of the natural world, her enthusiasm for botany, and her great talents and generosity shaped many lives and careers.

The botany community has lost a master teacher/scholar, a champion for biodiversity, and a wonderful person who saw great beauty in the world.

Contributions in Tass's memory can be made to the Kelso Fund for the Study of Plant Diversity in the Pikes Peak Region at Colorado College, PO Box 1117, Colorado Springs, CO 80901. This fund will support student research in botany and especially, fund projects making use of the herbarium to study biodiversity.

-- M. Shane Heschel, Associate Professor and Associate Chair, Organismal Biology and Ecology Department, Colorado College; Robert Raguso, Professor and Chair, Department of Neurobiology and Behavior, Cornell University; Jill S. Miller, Professor of Biology and Environmental Studies, Amherst College; Candace Galen, Professor of Biological Sciences, University of Missouri.

News

Awards 2016

Richard G. and Reba Beidleman Award — Salvador Bastien, Kathryn Dalton
Jason Wilkes Memorial Biology Award — Devon Lucero, Jin Mei McMahon
Enderson Award in Conservation Biology — Evan Levy, Ellen Rigell
Mary Alice Hamilton Award in Organismal Biology & Ecology — Brittany Denzer, Brooke Davis
Laboratory Award in Organismal Biology & Ecology — Katharine Dupree

OBE Day Presentations 2016

Dynamic specialization of native bees due to spatial and temporal factors - Evan Levy '16

Impala (*Aepyceros melampus*) Associate with Olive Baboons (*Papio anubis*) for Feeding and Security in Tarangire National Park, Tanzania - Brooke Davis '16

Floral Morphology, Pollination Mechanisms, and Phylogenetics of *Pleurothallis* Subgenera *Ancipitia* and *Scopula* - Katharine Dupree '16

Niche Partitioning in an Avian Cavity-Nesting Community - Ellen Rigell '16

Effect of Pulse Precipitation Variability on *Bouteloua eriopoda* Demography and Fitness – Salvador Bastien '16

Treated flue gas as an alternative CO₂ source for open pond cultivation of the green alga, *Nannochloropsis oceanica* – Brittany Denzer '16

Seminars 2015-2016

Block 1

Dr. Kyle Wittinghill, Visiting Professor, Colorado College Department of Organismal Biology and Ecology
Modeling Riverine Nitrogen Processing at Multiple Spatial Scales

Block 3

Dr. Nick Brandley, Visiting Professor, Colorado College Department of Organismal Biology and Ecology
Through the eyes of the beholders: Physiological Asymmetries and the Evolution of Black Widow Coloration

Block 6

Dr. Candace Galen, Professor of Biological Sciences, University of Missouri
Shifting baselines and changing partners: ecological and evolutionary responses to climate change in a high alpine ecosystem

Block 7

Dr. Emily Mooney, Assistant Professor of Biology, University of Colorado - Colorado Springs
Why do we have a green World? Herbivory and harvest in native plant species

Faculty Publications

Shane Heschel

In press: M. Shane Heschel, Kathryn Dalton, Marley Jamason, Ashley D'Agnesse, and Lauren G. Ruane 2017. Drought response strategies of *Clarkia Gracilis* (*Onagraceae*) populations from serpentine and nonserpentine soils. *International Journal of Plant Sciences*.

Maruyama, C., Z. Goepfert, K. Squires, T. Maclay, Q. Teal-Sullivan, and M.S. Heschel. 2016. Effects of population site and maternal drought on establishment physiology in *Impatiens capensis* MEERB. (*Balsaminaceae*). *Rhodora* 118:32-45.

Craine, E.B., A. Evankow, K.B. Wolfson, K. Dalton, H. Swedlund, C. Bowen, and M.S. Heschel. 2016. Physiological response of *Tamarix ramosissima* (*Tamaricaceae*) to a biological control agent. *Western North American Naturalist* 76:339-351.

Behrman, E.L., S.S. Watson, K.R. O'Brien, M.S. Heschel, and P.S. Schmidt. 2015. Seasonal variation in life history traits in two *Drosophila* species. *Journal of Evolutionary Biology* doi: 10.1111/jeb.12690.

Jim Ebersole

In revision: Webster, L. and J. J. Ebersole. Maasai perceptions of dogs in northern Tanzania. *Society and Animals*.

Johnson, J. E. and J. J. Ebersole. 2017. Response of *Acacia tortilis* to elephant browsing in Tarangire National Park, Tanzania: possible above-ground compensation? *Journal of Young Investigators*.

In press: Hägerling, H., G. and J. J. Ebersole. Roads as travel corridors for mammals and ground birds in Tarangire National Park, Tanzania. *African Journal of Ecology*.

In press: Kehlenbeck, M. A. and J. J. Ebersole. Influences, perceptions, and understandings of wildlife conservation in Oltukai village, northern Tanzania. *Organization for Social Science Research in Eastern and Southern Africa Bulletin*.

Walker, D. A., and 35 others including JJE. 2016. The Alaska Arctic Vegetation Archive (AVA-AK). *Phytocoenologia*. Published online August 2016; hard copy pending.

Davis, B. R. and J. J. Ebersole. 2015. Impala (*Aepyceros melampus*) associate with olive baboons (*Papio anubis*) for feeding and security in Tarangire National Park, Tanzania. *African Journal of Ecology* 54:238–241

Greenler, S. M. and J. J. Ebersole. 2015. Bird communities in tropical agroforestry ecosystems: an under-appreciated conservation resource. *Agroforestry Systems* 89:691-704.

Mark Wilson

In press: Wilson, M., Frank, G.S., Jost, L., Pridgeon, A., Vieira-Urbe, S., and Karremans, A. 2017. Phylogenetic analysis of *Andinia* (*Orchidaceae: Pleurothallidinae*) and a systematic re-circumscription of the genus *Phytotaxa*.

Wilson, M., Baquero, L., Dupree, K., Jimenez, M., LeBlanc, C., Merino, G., Portilla, J., Salas, M. and Werner, J. 2016. Three new species of *Pleurothallis* (*Pleurothallidinae; Orchidaceae*) in subsection *Macrophyllae Fasciculatae* from northern South America. *Lankesteriana* 16(3): 349-366.

Doucette, A., Wilson, M., Portilla, J., Kay, A., Moreno, J.S. and Cameron, K.M. 2016. Two new species of *Pleurothallis* and a new name for *Acronia rinkei*. *Orquideologia* 23(2): 123-139.

Brian Linkhart

Yanco, S. W.*, and B. D. Linkhart. In Press. Habitat selection by Flammulated Owls in a postfire landscape. *Studies of Western Birds* (special issue on “Avifaunal Change”)

Linkhart, B. D, S.W. Yanco*, and J. Fox. 2016. Migration timing and routes, and wintering areas of Flammulated Owls. *Journal of Field Ornithology* 87:42-54.

Hevey Family Fund for Student Research

Robert D. Hevey, Jr. is a graduate of Colorado College, Class of 1976. He was an Economics major while at CC, and after earning a Master’s Degree in Business he became a certified public accountant, working for a wide variety of businesses and accounting firms.

Rob is presently in the second year of a PhD program that is run jointly by Northwestern University and the Chicago Botanic Garden. He is studying plant biology and conservation, with specific interests in invasive species. He is one of a growing number of nontraditional students who are attending graduate school later in life, in Rob’s case after he retired. Rob expects to finish his PhD in ~5 years, at which point he will be a young 66 years of age. If you would like to learn more about him, and other PhD students who earn their degree later in life, see the following article in the New York Times: <https://www.nytimes.com/2016/04/16/your-money/taking-on-the-phd-later-in-life.html>

The new Hevey Family Fund will create paid research opportunities for sophomore through senior students in OBE. In addition to funding current students, this gift will also allow, in cases, for a recent OBE graduate to continue his/her senior thesis work at CC in order to convert their thesis into a professional paper. This extremely generous gift will provide stipends, research and travel expenses, and room and board to a number of students each year. The donation is initially for three years, with the potential for renewal in future years. The OBE department is extremely grateful for this gift and we are looking forward to watching student projects unfold in the coming years.

Course Spotlight

FYE BE100 Crisis in the Salton Sea - Emilie Gray

For fall 2016 I developed a new FYE course entitled: BE100 - Crisis in the Salton Sea. In this 2-block course my students and I explored the notion of sustainability through a place-based investigation of the interdependence of ecology, socio-economics and culture in a major and crisis-stricken feature of the southwest: the Salton Sea. We examined the history of the Salton Sea, the ecological and socio-economic impacts of its current condition, and how possible solutions to this crisis are being developed and assessed. While emphasis was placed on the biology/ecology of the Sea and its surrounding ecosystems, the course also surveyed broader topics including historical geography, water laws, socio-economic and health implications, and engineering solutions. Many of these topics involved meetings with local stakeholders in the Salton Sea region. An extended 10-day field trip to the Salton Sea region took place during the first half of block 2. During this trip, we visited Glen Canyon and Hoover dams, camped in and explored various regions of the southwest, and also stayed at an ecological research station in Borrego Springs that is owned and managed by the University of California. Using the station as our base, we did multiple trips throughout the Imperial Valley and met with local farmers, employees of the Imperial Irrigation District, State park employees and local scientists. The culmination of this experience was an 80-page report, written by the students, covering topics ranging from farm worker rights to Salton Sea restoration impacts on seabird ecology.





What OBE Means to Me – Zoë Moffett '17

When I came to CC, I knew two things: I loved being outside and I seemed to excel at science. Much of the Biology that I learned in high school seemed to focus on the simple concepts and the uninspiring details of how animals and plants function. I came to CC with the idea that environmental science would probably be my path to a scientific field that would let me play outside. However, when my friend told me that he was signing up for a Biology of Plants class 5th block, freshmen year, I decided to give biology another shot.

It was in this class that I met Dr Tass Kelso, and it was during this class that I declared as an OBE major. Tass pushed us to be creative and enthusiastic when it came to all things plants. We'd sketch out plant cells, plant organs, and many of the biological processes occurring within them. Tass made me feel like I had created artistic masterpieces. Tass climbed on the tables and imitated plants, and she rewarded our A's with plants chosen from the greenhouse. I began to fill my dorm room windowsill with my treasured plants. I felt myself beginning to mirror Tass's joy and passion inside and outside of the classroom.

My sophomore year, I took as many OBE classes as I could. I quickly discovered why OBE is probably the best department for the block plan: the field trips. I can't imagine how one could gain nearly as much field experience without the block plan. As I took more and more OBE classes, my list of biological or ecological interests grew to the point where I was struggling to imagine picking one specific field to pursue.

I feel that much of my identity at this moment in time has to do with my academic pursuits. I feel motivated and empowered by my identity as an ecologist and botanist. I am grateful for this love and passion for all things ecology, and I am even more grateful to the people who have lead me to this path. Within the OBE department, I truly feel surrounded by the most kind and intelligent mentors I could have asked for.

Alumni Spotlight

John T. Lovell '07

Field ecology courses were the highlight of my undergraduate experience at CC and led me to pursue a career in science. I graduated in 2007 and moved to Florida to begin an internship in rare species demography at Archbold Biological Station. The following year I was accepted into a Ph.D. program at Colorado State University hoping to understand why rare species are restricted to such small geographic ranges. My focus has gradually shifted away from rare species to ask a more general question: *what factors affect the potential for adaptation?* During my dissertation I tackled this question from an eco-physiological perspective, employing a combination of field and greenhouse experiments. In 2010 I was awarded an international fellowship to study in Germany.

The laboratory and computational skills I learned there have helped me to transition from a field ecologist to an evolutionary geneticist. Currently, I am a postdoctoral fellow at The University of Texas, where I sequence and analyze whole plant genomes. My recent work in the biofuel crop switchgrass has uncovered a set of genes that are responsible for drought adaptation. By defining the genes that respond to stress, this research can help produce renewable energy crops that are able to tolerate drought and withstand changing climatic conditions.

Alumni Updates

Anderson Shepard '03

I got married to my lovely wife Liz Whiteley in Crested Butte on September 24th, 2016. We had a huge posse of CC folks there, many of whom were in the bio dept. I attached a photo of all of us (plus our non-CC additions). I bolded the bio folks...

From L to R. (Front row): Liz Whiteley, **Anderson Shepard ('03)**, Clint Francis (and Pfeiffer Francis). (Back row): Erin Hill, **Bisco Hill ('03)**, Brad Kraushaar ('03), Arlen Ginsburg ('03), Tara ____, Courtney Ginsburg, Pat Holmes ('03), **Mona Zellers (Johnston) ('04)**, Kevin Blair ('03), Janet Vilsack, Doug Vilsack ('03), Emily Francis (DeCloudt) ('03), Andrew Zellers, Todd Chapman ('03), **Scot Grossman ('03)**, Ellie Lowsley (Hoecker) ('04), **Jonathan Lowsley ('02)** (and Clara Lowsley), Michael Goldstone ('03), Ryan McKeon ('03) (and Opal McKeon), Trisha McKeon.



Jennie Greenwald Areson '75

Hi!! Jennie Greenwald Areson '75 here. After receiving my BA in Biology, I spent a couple of years working with a physiology professor at Dartmouth College in lung growth research (animals), then moved on to become a respiratory therapist in human health care at numerous hospitals around the country. Relocating back to Colorado, I spent 20+ years as a clinical research coordinator in asthma, allergy, COPD, oncology, and hepatology, performing trials that help bring new medications to market. You probably do, or will, commonly use many of those meds routinely. Following "early retirement" in 2015 (but not "real" retirement), 2016 was spent back in college, and I will graduate this March with an Associate's Degree in Veterinary Technology, along with a bunch of students younger than my own children. I'm extremely excited to start a whole new career in veterinary medicine and a move the west side of Colorado. So I've never stopped applying my biology education, and have done so in quite a variety of medically-associated fields. Thanks to CC for starting me on my fantastic path. Education need never end!!



Cindy Marsh '88

September 10-11, 2016. I completed the Ragnar Trail Tetons-WY, an overnight trail running relay at Grand Targhee Ski Resort. Our team of 8 ran relay style on the green(3 miles), yellow(5 miles) and red(7 miles) loops through the forest and to the top of the highest peak. Each teammate runs all three loops, leaving the tent whenever it is your time to take the baton. My 5 mile leg was at midnight and really tested my headlamp AND my courage. The total elevation gain on the red loop was 2151 ft., but the effort was rewarded with a spectacular view of the Grand Tetons. The experience was both challenging and rewarding with lots of shared misery and comradery.



Amanda Cormier '14

I am in my third year of veterinary school at the University of Minnesota College of Veterinary Medicine. This past summer I went to Peru for three weeks with the Nuñoa Project. This is an organization that goes to Peru twice a year to do vet work on llamas and alpacas. I learned a lot and had an incredible time working with the animals and the group of people I was with. I hope I will be able to go back after I graduate in 2018.

Sarah Jo Manson (Chadwick) '06

Graduated from Stanford's Civil & Environmental Engineering Department's Atmosphere/Energy Program with an MS in December, 2016; with the support of my husband, Grant, and 2 year old daughter, Haley Jean.

Wag Schorr-Ratzlaff '84

In 2016 I was promoted to Associate Professor in the Department of Medicine at the University of Colorado.

Katie Remine '95

I co-facilitated a graduate field course in Malaysian Borneo in June 2016 with Project *Dragonfly* at Miami University of Oxford, Ohio. The course - Borneo: Primate Conservation - provides Project *Dragonfly*'s graduate students with the opportunity to explore the complexities of wildlife conservation in a changing landscape along the Kinabatangan River in the state of Sabah. This was my fourth time leading the Borneo course, preceded by three summers of leading the Baja course

(see www.earthexpeditions.org). The wildlife diversity in Borneo is overwhelming - hornbills, saltwater crocodiles, katydids, lantern bugs, Bornean pygmy elephants and 10 species of primates are just a few of the species that inhabit the local forests. Local conservation organizations and communities in the region are striving to maintain the rich biodiversity of species while supporting sustainable livelihoods, as pressures on the region's natural resource continue to grow.

Photo: Katie Remine (dark purple shirt, right side) with graduate students and the all-female forest restoration team of the HUTAN conservation organization in Sukau, Malaysian Borneo.



David Kim '94

2016 was amazing. Leslie (Blaugrund) Kim (CC History major, 1995) and I celebrated our 20th anniversary this past August and then the brewery we own (with two partners) earned two gold medals and mid-size brewpub of the year at the Great American Beer Festival in October.



Russ Johnson '84

I am now in my 21st year of teaching biology at Colby College (in Waterville ME). One exciting thing I did in 2016 was to teach a field course (*Plants of the Tropics*) in Costa Rica during our January term. Our January term is pretty much the same as a block at CC, so I have a special affinity for it and very much enjoy the opportunity to teach intensive field courses. I have attached a photo of me showing the students parts of a palm (*Welfia regia*) in the rain forest at the Estación Biológica La Selva.





Susan K. Dutcher '74

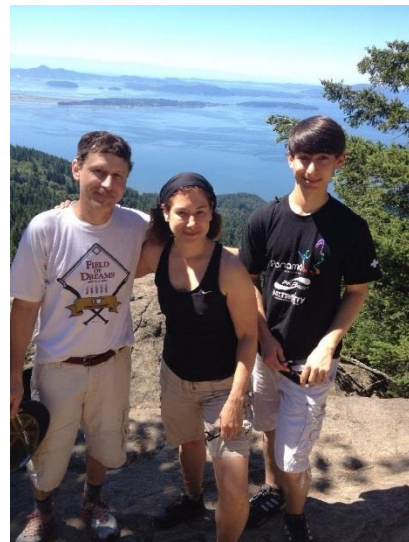
For the last 17 years, I have been a professor in the Department of Genetics at Washington University in St. Louis. I look back on taking Genetics from Dr. Heim as the beginning of my scientific endeavors. My lab works on understanding the role of cilia. Cilia play many roles in human health and their dysfunction result in defects in heart development, respiratory and kidney function as well as a variety of birth defects. This year, I became the acting director of the McDonnell Genome Institute (<http://genome.wustl.edu/>). MGI is a large center that uses sequencing technology and analysis to dissect a variety of biological questions. I have also received a Distinguished

Faculty Award for mentoring of junior faculty at the School of Medicine. The photo is from my induction in to the American Academy of Arts and Sciences.

Linda Brown '82

Dear fellow alumni. I have had a wonderful career in ophthalmology since graduating from CC then attending the University of Colorado medical school and then an internship in internal medicine and a residency in ophthalmology in Denver. I have been in private practice in Anacortes, Washington on beautiful Fidalgo but

Island. I am married with two incredible boys. My oldest son Garrett Manion '19, is a molecular biology major with a music minor with a pre-Med emphasis as a sophomore at CC. I am currently president of the medical society for the third time and have served as chief of surgery and chief of the medical staff. I love to travel and have been to many countries including in the last year trips to the Galápagos Islands and Machu Picchu to study biology and culture with fellow CC alums and Professor Jim Ebersole. I also traveled to Prague and Vienna with my son while he performed with music groups as well as Breckenridge and Whistler for skiing, Lake Chelan, Washington for a leadership conference and CC and CU for alumni reunions. I just returned from another CC sponsored trip to Cuba in February with CC alums and parents and with Professor Juan Lindau, a Cuban Studies professor. The CC trips are both educational, fun and exceptionally organized and I would highly recommend them. If anyone is traveling near the San Juan Islands and wants to stop by I would be happy to visit with you.



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We hope you enjoyed reading about faculty travels and research, our FYE class and their visit to the Salton Sea, and the ACM class taught in Tanzania. We look forward to more great updates from our alumni in 2018 – If you are interested in sending in an update, please email it to OBE@ColoradoCollege.edu.