

Welcome from the Chair, Dr. Mike Antolin

Here we are again, starting another academic year, welcoming record numbers of new students, both undergrads (580 incoming freshmen and transfers) and graduate students (31). We've had a busy year, busier than usual because of construction on the new [Biology Building](#) (see updates below), which not only rose out of the ground but also took its form in shaping the Science Mall at the south end of campus.

We lived in a construction zone this summer while both Colorado State and the city of Fort Collins hurried to get their work done while the days are long and the sun is shining (well, the sun shines 300 days a year here, but you know what I mean). The excitement of welcoming so many to campus – some returning from great adventures in exotic places, some for the first time – is my favorite part of being chair. People and place: marking how much we've grown and are continuing to grow.

We've also had a year of accolades (see more below). Our faculty continue to gain recognition, with Dr. Janice Moore being honored with the Exemplar Award from the Animal Behavior Society for her lifetime of research on how parasites manipulate the behavior of their hosts. Dr. LeRoy Poff received the CSU Scholarship Impact Award for his work on stream ecology and water flows and the effects of water diversions (see below). Our graduate students have a record number of fellowships and grants to support them in graduate school and in post-doctoral fellowships and to move them along to the next steps in their brilliant careers. And of course, our Bachelor's students also find success, via scholarships to support their studies, in completing degrees through the university Honors Program and in finding their next opportunity. Two students I know personally, Karen Holcomb and Zane Moore, are heading to graduate school this

fall at the University of California, Davis, to study epidemiology (Karen) and plant sciences (Zane). Another, Laura St. Clair, started veterinary school at Cornell University. Current students are also busy. Read below about some of the many adventures they experienced in their summertime internships!

As a comprehensive life sciences program, we always look for ways to help our students succeed. Our [Professional Science Master's in Zoo, Aquarium and Animal Shelter Management](#) is attracting students from across the country, and graduates are finding jobs in places such as [Chimp Haven](#) (Louisiana) and the [Downtown Aquarium](#) in Denver. We've recently initiated new programs at Colorado State's Todos Santos Center in Baja California Sur in Mexico, with a marine biology course, informatics workshops and a One Health Research Initiative (see below).

And we celebrate the career of Dr. Steve Stack, who retired from CSU after an illustrious 47-year career studying and teaching genetics (see below). Steve is beloved both by students and colleagues, and his unique character will be missed. I'm sure most of our alums will remember him as one of their favorite instructors!

Finally, we recognize what a privilege it is for us in biology to have this place and time. Each day is a great day for discovery, spending every day learning things our predecessors found so appealing and tying their knowledge to new discoveries they might have never imagined. Each day we look to spur the next generation of scientists and world citizens, people who in their lifetimes will also discover the unknown. And we get to do this while sharing Charles Darwin's awe for "...grandeur in this view of life...forms most beautiful and most wonderful..." a love for all living things. Life matters.

– Mike Antolin, Chair



Biology Building Update

After this summer, we are closer to moving into the new Biology Building than we are to the beginning of our planning, back in 2013-2014. (Of course we would have to go all the way back to 2005, and former chair Dr. Dan Bush, for the real beginning.) But this long path will transform to a new beginning when we open our doors to students returning for fall semester classes next year. And we look forward to welcoming our friends and alumni as well. Perhaps come for a glorious autumn day of comradery on our west-side patio during Alumni Weekend – and a trip to the upper floors to take in the views of campus and the Front Range. Or visit and tour the modern classrooms and teaching labs, aquaria and displays, and state-of-the-art research laboratories. We're excited for the space – and full of anticipation for the great things we'll be able to do there, building excellence in the life sciences.

Most of the students left campus for the summer, but if anything, construction has continued at an even more furious pace! The Biology Building is just one of six projects in our neighborhood. Others include the Chemistry Research Building next door, the South College Avenue Parking Garage, the Health and Medical Center at College and Prospect, the Stadium just to our west, and the fully rebuilt Aggie Village North Apartments. The full listing of construction projects, along with photos and updates, is [here](#).



You can see more images and videos of the building on the [Biology web page](#). We maintain [time-lapse footage](#) of the construction site from a camera mounted on the top of the Anatomy-Zoology Building. The video covers the period from Thanksgiving 2015 until the present. As of August 2016, the basement, all floors, and the roof are in place, the exterior “skin” is being installed, and interior walls are being framed. Each day we have between 100-120 workers on site! In the video, you can also see the new Chemistry Research Building on the left (north), which is also slated for a fall 2017 opening. It sits on the site of the former Stock Pavilion. In the background to the east, you can see the new South College Avenue Parking Garage (opened August 1, 2016) rise from the ground and take form.

We've marked many milestones along the way. We held our [Ground Breaking](#) in October, 2015, and in May the last steel beam was set during a [Topping Out Ceremony](#). This is when the beam, which was signed by workers, students, and others dignitaries from the university community, was placed at the top of the building. This is an age-old tradition in construction, when we thank the workers for their care and dedication to providing us



Students, staff, faculty, and university dignitaries signed the beam before it was hoisted and bolted to the top of the southeast stairwell. The beam will forever remain visible to honor the workers' dedication to the project.

with the best.

The Biology Building project is still on time and on budget. We appreciate the support of the students of Colorado State University who approved a Facilities Fee to finance much of the construction costs. As a largely student-funded building, we focused on creating spaces where the record-number of Biological Sciences and Zoology majors can spend their times between classes in study rooms, informal “idea spaces,” and the grand entryway and atrium on the southwestern corner. But we are still looking to our alumni and friends to help us complete these finishes to make this *the* showcase for the life sciences on campus. For more information, contact Simone Clasen: Simone.Clasen@colostate.edu or 970-491-0997, or visit www.biology.colostate.edu/new-building.

Biology in Todos Santos, Baja California Sur, Mexico

In biology, nothing replaces the experience of hands-on field work. Animals, ecosystems, and lessons come alive in a way that's not possible from textbooks or lectures. While CSU students regularly experience the wilds of Colorado's Rocky Mountains and Great Plains, studying whales, sea turtles, and many other marine organisms in CSU's biology department has largely been an academic exercise – until this year.

This summer term, seven eager undergraduate students spent three weeks in the field – and on the water – in the first [Field Marine Biology](#) course at CSU's [Todos Santos Center](#) in Baja California Sur, Mexico, led by [Shane Kanatous](#), associate professor of biology, and [Graham Peers](#), assistant professor of biology.

Famous for biodiversity

Says department chair Mike Antolin: “Baja California, a narrow strip of land with Sonoran Desert soaring up to mountain peaks, the Pacific on one side and the Sea of Cortez on the other, provides a hugely diverse ecosystem of stark contrasts, a world of extremes essentially in our backyard. Accessibility to unique perspectives is key for our students, both as scientists and as world citizens. Todos Santos provides both within a half day's travel.”

Students also observed the impact of humans on the marine environment by interacting with local fishing communities and by exploring Marine Protected Areas, including [Cabo Pulmo National Park](#), home to the northernmost coral reef in the eastern Pacific. The biodiversity there is famous, even outside the scientific field. In the 1940s, author John Steinbeck described “the complexity of the life pattern on Pulmo Reef,” discovering, upon closer examination that “clinging to the coral, growing on it, burrowing into it, was a teeming fauna.”

According to Graham Peers: “Students get to observe how small changes in location or human behaviors can lead to vastly different patterns of marine life. I can think of no better place in the world to experience such a diversity of marine ecosystems.” A video of students in the field can be seen [here](#).

Once-in-a-lifetime opportunities

Each student brought a unique background, interests, and aspirations. “The Todos Santos program is especially important to me because this is how I will gain the field experience to

decide how I would like to make an impact to better the world,” noted Grace Komatz in [a student-led fundraising campaign](#) to help support the trip. A certified open-water diver, she explained that “I've been intrigued with marine mammal diving physiology, and the chance to work so closely with experts on the subjects is one of the most incredible opportunities that I've ever had.”

Other students anticipated discovering new passions. “I am excited about this incredible opportunity, especially since I live in a landlocked state,” noted Bethan Pulham. “I look forward to having my eyes opened up to the abundance of life around Baja California Sur.”

Antolin adds: “Our students now have a place to study marine biology, which is one of the main motivators among biology students to study abroad.”

Growing community

The Field Marine Biology course is just one of the biology department's initiatives under way at Todos Santos. Earlier this year, the department organized a Computational Biology and Genomics Workshop for local students, taught by biology faculty [Kim Hoke](#), associate professor, [Tai Montgomery](#), assistant professor, and [Dan Sloan](#), assistant professor – with local help from Dr. Aines Castro Prieto. “Making connections with the local biologists and researchers near Todos Santos was a really valuable experience,” Sloan says. “We are excited to expand this program and build on the relationships.” The department envisions permanent

programs in which CSU students will travel to Todos Santos to interact with their Mexican counterparts.

The department is also working with CSU partners through the One Health Research Initiative to establish biological research projects integrating human health into a full ecosystem view.

The new Todos Santos Center, opened by CSU in 2015, is particularly appealing to biologists for its stunning marine science opportunities. The town sits just across the peninsula from the Autonomous University of Baja California Sur in La Paz, which has a strong marine biology program. Not to mention, says Antolin, “It doesn't hurt that Baja California, and Todos Santos in particular, is a beautiful place!”



Biology Department Scholarships and Awards

Department Scholarship Recipients for 2016-2017

The Biology Department benefits greatly from the generosity of donors, and we would not be able to achieve many of the educational and research goals without this support! We are especially grateful for the growing number of scholarships that benefit individual students as they strive to earn their degrees! We thank our alumni and other donors for investing in the future of our students!

Biology Scholarship: Phalen Kohlruss-Reuman and Miranda Theriot

Martha Ann Henson Memorial Scholarship: Sarah Johns

Bruno Klinger Memorial Scholarship: Rachel Jones

Dr. Arne K. Peitersen Memorial Scholarship: Abigail Shotland

Sharon E. and David E. Kabes Scholarship: Abbie Reade

Edward and Phyllis Reed Fellowship: Holly Lafferty

Harold Harrington Fellowship: Jennifer Ackerfield

Stavros Family Fund: Peter Leipzig-Scott and Jennifer Ackerfield



CSU alumnus Tim Henson and his wife Nancy Dale with Department Chair Mike Antolin at last year's College of Natural Sciences Scholarship Luncheon. Mr. Henson created the Martha Ann Henson Memorial Scholarship, which was awarded for the first time in 2016.

Please invest and share in the education of our students, and in the research of our faculty and staff!

To donate:



Thank you!

Our Award-winning Faculty, Staff, and Students!

Biology continues its path to excellence, with a record number of awards to students, post-doctoral researchers and faculty in 2015-2016.

BIOLOGY DEPARTMENT AWARDS

Graduate Student Excellence in Teaching and Mentoring: Sam Dunn and Molly Womack

Excellence in Research Mentoring: Sunetra Das

Excellence in Undergraduate Teaching: Dr. Erik Arthun

Faculty Excellence in Graduate Education and Mentoring: Dr. Rachel Mueller

COLLEGE OF NATURAL SCIENCES:

Graduate Student Excellence in Teaching and Mentoring: Sam Dunn

UNIVERSITY AWARDS:

Multicultural Staff and Faculty Network Distinguished Service Award: Dr. Shane Kanatous

Scholarship Impact Award: Dr. LeRoy Poff

Vice President for Research Graduate Fellowship: Ava Hoffman, Robert Griffin-Nolan

CELEBRATE UNDERGRADUATE RESEARCH AND CREATIVITY:

High Honors: Samantha Eckert

College Honors: Haley Stapleton, Yun Zhang

CELL AND MOLECULAR BIOLOGY SYMPOSIUM:

High Honors: Lindsay Martin

FRONT RANGE STUDENT ECOLOGY SYMPOSIUM:

Oral Presentation by a Graduate Student: Sam Dunn, Keziah Katz, Robert Griffin-Nolan

Poster Presentation by a Graduate Student: Dale Broder & 8th grade students from Bella Romero

GRADUATE STUDENT SHOWCASE:

College of Natural Sciences Top Scholars Award: Alisha Shah

EXTERNAL AWARDS:

American Association of University Women Postdoctoral Fellowship: Dr. Jenny Stynoski

Animal Behavior Society Exemplar Award: Dr. Janice Moore

Colorado Native Plant Society John Marr Fund Fellowship: Alyssa Albertson, Jennifer Ackerfield, Jeff Carroll

Fellows of the Ecological Society of America: Dr. Alan Knapp, Dr. LeRoy Poff

Fulbright U.S. Scholar: Dr. Mark Simmons (travel to Uganda)

Garden Club of America Scholarship in Field Botany: Alyssa Albertson

Morris Animal Foundation Fellowship Training Grant: Ben Golas

NSF Doctoral Dissertation Improvement Grant: Monica Paez and Molly Womack

NSF East Asia and Pacific Summer Institutes Grant: Jacob Edwards

NSF Graduate Research Fellowship: Gretchen Kroh

NSF Postdoctoral Research Fellowship: Eva Fischer, Laura Stein, Molly Womack

Society for Integrative and Comparative Biology Best Student Oral Presentation: Molly Womack

Society for Integrative and Comparative Biology Best Student Poster: Maybellene Gamboa

Society of Herbarium Curators Student Research Grant: Jennifer Ackerfield

USDA NIFA Postdoctoral Fellowship: Nate Lemoine

Dr. Steve Stack, Long-time Professor of Botany, Retires

In 1969, a University of Texas graduate joined the Department of Botany and Plant Pathology at Colorado State University. That professor would spend most of the next five decades at Colorado State, eventually in the Department of Biology we know today. During his time, like most faculty, Professor Steve Stack assumed a variety of roles including adviser, teacher, mentor, committee member, researcher, Chair of the Cell and Molecular Biology Program, and Assistant Chair of the Biology Department. He would see the department, the university, and the city change rapidly, ushering in a new era of science and technology.

Dr. Steve Stack retired in May 2016. The Biology Department celebrates his time at the university, thanking him and honoring his service and investment in the faculty, staff, and students.

As a cytogeneticist, Dr. Stack is known for his extensive research on the structure of chromosomes and genetic recombination. This “old-school” genetic information was critical to the more modern sequencing and assembly of the tomato genome. This achievement was recognized with the 2014 Secretary’s Honor Award for Increasing Global Food Supply from the U.S. Department of Agriculture.

Dr. Stack spent many years teaching developmental biology, genetics, and cytogenetics. He genuinely embraced the education and outreach missions of this land-grant university and its support for higher education. As a botanist, he also appreciated the university’s dedication to agriculture and the plant sciences.

As a teacher, Dr. Stack was influential in upgrading our genetics curriculum, working closely with Dr. A.S.N. Reddy who adds: “He is an incredibly gifted teacher with a genuine passion for teaching. As a leading plant geneticist, he always brought his own research stories and a lot of enthusiasm into the classroom, presenting thought-provoking lectures with the latest developments. He had high expectations for students, and he masterfully helped them to meet those goals. He inspired and positively impacted thousands during his illustrious career as a teacher in genetics and other courses. It was an honor to co-teach genetics with him for about 15 years. He was also a great mentor to faculty colleagues, including me. On a personal note, he is one of the nicest persons that I know.”

In describing his time at CSU, Dr. Stack repeats how much satisfaction he gained and what a privilege it was to spend his career as a student and teacher. For more than four decades, he

worked almost all weekdays, most nights, and most weekends – because there was so much to do and he loved what he was doing, he says. He calls it a privilege to spend time as a student, and teaching is his repayment to the community. Stack’s passion and love for biology are evident in his own words: “I’ve never been bored!”

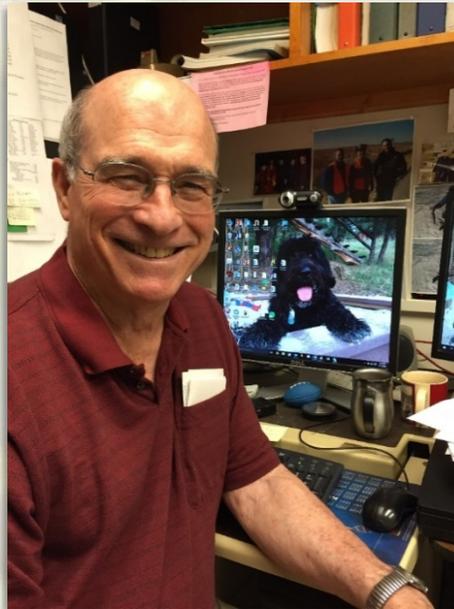
When asked what advice he has for faculty and students, he replies that undergraduates should pursue a broad education and not get too hung-up on practical and specialized courses. That can come later at work and/or in graduate school. The biggest benefit is for students to become broadly educated, he says. Students who are science majors should still take as many liberal arts classes as possible. And, he adds, liberal arts majors should also take as many science classes as possible. To him, this makes the world a more interesting and understandable place in which to live – and makes us all better spouses, parents, employees, and bosses. This also transforms students into better citizens of a democracy, which depends on an educated electorate for informed decisions. Graduate students need to read in their research area

extensively, work hard in the lab or in the field, take good notes, and think critically about their research, he says. Faculty should work hard and enjoy the pursuit of new knowledge and teaching in association with bright colleagues and students.

Dr. Stack is a unique character who will be remembered fondly around the department. Dr. Pat Bedinger recalls this about him, from fieldwork in South America to collect wild tomato varieties: “Steve is a gifted story-teller. When we were traveling in Peru, it became a competition each morning to get the seat next to Steve for our long van rides into the mountains. Whoever sat next to Steve spent the day laughing – which to me was a double blessing – listening to Steve’s delightful stories also meant that I was not being terrified by the extremely steep terrain as we bounced along!”

She adds: “Steve has been a wonderful mentor. There were many, many times that his calm wisdom and sense of humor came to the rescue when I needed it!”

It has truly been an honor to have Dr. Stack in the biology department. His long-term investment in faculty, students, and research changed the department, always for the better. We wish him and his wife Carolyn (a retired elementary school teacher) all the best in their next adventures!



Professor LeRoy Poff gains CSU's Scholarship Impact Award

When we think of legacy, we might ponder whether our work influences our world – and whether that reach is local or global. The answer to this question came to Professor LeRoy Poff when he received Colorado State University's Scholarship Impact Award for 2016. This is one of the highest honors bestowed to Colorado State faculty, awarded annually by the Vice President for Research to one faculty member along with \$10,000 to support their research. The nomination from the department points out that the expansive nature of Dr. Poff's research – ranging from basic ecology to applied river conservation and sustainability – is testimony to the broad curiosity and disciplined intelligence he brings to his work.

When asked about the award, Poff added "It's a great honor to be recognized by my peers at CSU for my scholarly contributions to the science and sustainable management of stream and river ecosystems in the U.S. and abroad. I feel extremely fortunate to be able to pursue the research and applications I love and to have such wonderful colleagues to collaborate with here at CSU and around the world."



Poff is a world leader in research on stream and river ecology and how species and ecosystems change in response to human modification of rivers caused by damming and diversion. Finding a balance between ecosystem needs and human needs is one of the major challenges for conservation of biodiversity in the face of human influences on rivers. Recently, he has been lead investigator on a multi-university project funded by the National Science Foundation. This international project, called EcoTrack, compares the effects of elevation and climate change on stream ecosystems in Colorado and Ecuador. A spin-off smaller project, also funded by NSF, examines the effects of the 2013 floods on stream insects in the Big Thompson and other Front Range streams. Needless to say, his scientific work is timely and prodigious.

Beyond scientific publications, Dr. Poff profoundly influences policy as well. His work on watersheds has been applied by the Nature Conservancy, the U.S. Geological Survey, the U.S.

Forest Service, the city of Fort Collins, the states of California, Florida, and Massachusetts, and by the Australian government. He took the lead in writing the technical background of an *amicus curae* brief to the U.S. Supreme Court in a 2006 case affecting how hydropower dams are operated and relicensed.

At Colorado State, Dr. Poff just stepped down after eight years as director of the Graduate Degree Program in Ecology. Under his leadership, this nationally recognized interdisciplinary program has grown in strength to become one of the top graduate programs in the world. Graduate students finishing their degrees in his laboratory find great jobs in the field. Further, both his graduate and undergraduate courses in stream biology and hydrology are popular.

His is beginning a new partnership with the University of Canberra in Canberra, Australia. There, Dr. Poff will be taking on a part-time research and leadership position to study the aquatic ecology and sustainable management of the Murray Darling River in Australia. He is excited about building connections with Colorado State University and the University of Canberra through this partnership.

In making the award, Dr. Alan Rudolph, Vice President for Research, adds: "Dr. Poff's research touches on the global challenges we face every day, specifically dealing with the critical resource of water. His research contributions have furthered our understanding of human-induced effects on our planet. In his social-responsibility-focused research, he exemplifies CSU's land-grant mission values."

Dr. Poff is a former president of the International Society of Freshwater Science. He was selected as a Fellow of the Ecological Society of America, the Aldo Leopold Leadership Program of the Ecological Society of America, and the American Association for the Advancement of Science. At CSU, Poff has been named a Monfort Professor and a Professor Laureate in the College of Natural Sciences.

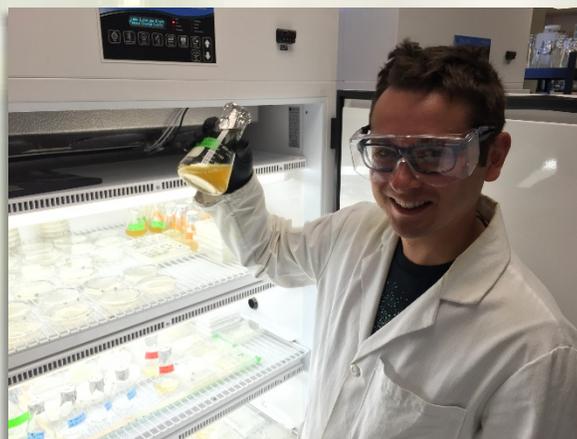
We proudly congratulate Dr. LeRoy Poff on his latest honor.

Doctoral Student, Mike Caballero

Mike Caballero, a graduate student in Assistant Professor Graham Peers' lab, is ready to wrap up his doctoral work by spring 2017, an eagerly anticipated accomplishment. Mike began his graduate studies at Colorado State University in August of 2011, supported by an NSF-funded interdisciplinary fellowship to a group of faculty from across the university to study biofuels: Multidisciplinary Approaches to Sustainable BioEnergy (MAS BioEnergy). Before coming to Colorado, he taught high school chemistry in Milwaukee after graduating from the University of Wisconsin – Madison in 2010. Fort Collins reminds him a lot of Madison, making the move here comfortable, he says.

The biofuels fellowship that brought him to CSU allowed him to provide biological context for the cohort of engineers, economists, and political scientists funded by the same project. He studies photosynthesis and carbohydrate metabolism in diatoms, single-celled aquatic and marine algae, which fix more carbon than all the tropical rainforests on Earth combined! Understanding how diatoms store carbon translates into the applied goal of manipulating algae to produce biofuels. In addition to the MAS BioEnergy Fellowship, Caballero was awarded a prestigious three-year Graduate Research Fellowship from the National Science Foundation, and another smaller award from NSF for a short-term visit to a laboratory in Japan.

When asked what he likes to do when he isn't in the lab, Caballero says "I love being outdoors, and Colorado is a beautiful place to explore! I hike and camp and I have fallen in love with cross-country skiing. Right now I'm training for my first trail marathon. I am also proud of the small vegetable garden I have set up at home. Last year I harvested over 30 pounds of tomatoes and cooked up some chutney to send to friends and family from Berkeley to



Cleveland.”

Thinking back over his time as a graduate student, his advice to other graduate students is “don't be afraid to ask for help!

Experts are all around you, and they are happy to relate their advice, expertise, and support. This is easy to forget as we specialize during our studies, but being open to these broader interactions has led to some impactful gains in my research. For example, even though I study algae and molecular biology, a collaboration with chemists studying tuberculosis led to a key figure in a paper we recently submitted for publication. The willingness to collaborate at CSU – between labs, departments – has been fantastic.”

Caballero has invested an abundance of time into his research while working in the Dr. Graham Peers' lab. About the great impact his time in the lab has been, he shares that “Dr. Peers and his guidance in my research efforts have helped me stay the course and appreciate the journey of working towards a doctoral degree. It takes time to develop into an effective researcher. I can confidently say that my last two months have been more productive than my last two years, thanks to sharper critical analysis skills and also developing molecular tools in the lab. Persistence through difficult theoretical and technical problems has made completion of research projects all the more rewarding.”

The inspiration for his doctoral studies has been fueled by his interest in the interface of science, technology, and society. Mike says he has been fortunate to be able to explore this intersection through biofuels-related research. After graduation, he is looking forward to applying his interdisciplinary skill set to a career in patent law.

Professional Science Master's in Zoo, Aquarium, and Animal Shelter Management: Student Projects

Alex Gregory

Alex Gregory joined the PSM program in Zoo, Aquarium, and Animal Shelter Management after graduating from Virginia Tech. She has had previous experience training dolphins for the Navy and wanted a different challenge for her master's project. This summer, Gregory travelled to Tampa Bay, Florida, to work with mentor Otto Fad and the elephants at Busch Gardens to address an important research question related to enriching this highly intelligent and social species.



Animals in captivity have contact with humans for a majority of their day. Human contact can serve as both enrichment and training, but after the facility closes, these animals can lack stimulation. Gregory is working to identify enrichment that can



increase the amount of activity that elephants engage in on a daily basis. Normally, elephants would have access to many hundreds of square miles of home range and would travel significantly each day by walking during foraging. The goal of Gregory's project is to see what form of enrichment

can most closely approximate elephant activity levels in a wild setting.

Delaney Laughlin

Cheetahs are an endangered species whose habitat is being fragmented by roads and development throughout their natural home range in Africa. Cheetahs are also at risk for conflicts with local farmers and are seen as competition for trophy wildlife. A large part of successful conservation of this species is education of local people in Kenya. People conserve what they know, and demystifying predators is important. Children are receptive to conservation education, but programs are hard to implement. So development of a curriculum specific to cheetahs is a key element to success.



Delaney Laughlin began the Professional Science Master's program in Zoo, Aquarium, and Animal Shelter Management as a senior Zoology student, a part of the sequential degree program for a few students each year able to complete their undergraduate degree and their PSM degree in just five years. This summer Laughlin travelled to Kenya, under mentor Mary Wykstra, to work with Action for Cheetahs in Kenya. She is



working to develop and test a curriculum for conservation education about cheetahs. She is evaluating what children gain from different programs and how that affects their feelings towards cheetahs. They hope to eventually learn, long-term, how this change in appreciation affects the actions they and their families take towards conserving cheetahs in the future.

How I Spent My Summer Vacation

Biology Undergraduate Students Make a Difference through Internships

Megan Sass: Massachusetts General Hospital



I had the privilege of interning in the Department of Surgery Research Lab at Massachusetts General Hospital (MGH). I assisted the anesthesia team on large animal research projects being conducted at MGH and in addition learned how the research process works, from grant application to the institutional protocol review process (Institutional Animal Care and Use Committee – IACUC).

The hands-on experience I gained was unique. Anesthesia is a complicated field that requires an understanding of what the patient vitals mean and how to react accordingly depending on what is happening during surgery. Beside understanding the basics of anesthesia, I practiced how to place vascular catheters as well as intubate on both pigs and non-human primates. My anatomy knowledge increased substantially along with my understanding of dosage and drug usage. Another part of my internship was understanding how an operating room functioned. I saw the importance of teamwork and communication between both the surgeons and the anesthesia team.

Because I wasn't attached to a specific research project, every week was something new. On a daily basis, I was exposed to research projects in fields ranging from lung transplants to liver transplants and many more topics in between. I was able to talk with the primary investigators about their projects and the importance of that day's surgery for their research. I always walked out of the OR having learned something new after every surgery.

My career goal is to become a veterinarian. This internship gave me a background in two different aspects of vet medicine: surgery and research. Having previously little experience in both, my time at MGH opened me up to more options for my future and motivated me to continue striving for my current goal.

America Elias Martinez: Kaiser Permanente and the Anschutz Medical Campus

I was able to do a second year of the Undergraduate Pre-Health Program internship with Kaiser



Permanente in Denver. I worked alongside my preceptor in the department of Urgent Care and Regional Acute Diagnostic and Referral (RADAR).

During the internship I had an extended project of doing chart audits. The chart audits were used to collect data on how Registered Nurses triage patients in urgent care. These data were also used to see if their documentation has gotten better. This project is a tool that is being used to improve patient care, communication, economics, and time.

I not only did a project that would help improve the department but I also was exposed to many different areas in the medical field. With this internship, the interns are given the opportunity to shadow as much as possible. I have been able to shadow physicians, physician assistants, surgeons, registered nurses, LPNs, MAs, nurse practitioners, pharmacists, community specialist, and even staff on the administration side of health care. The departments I was able to work in have ranged from orthopedic surgery to internal medicine. I have shadowed in the trauma department, family medicine, OB/GYN, allergy, urgent care, and RADAR.

This internship has been so amazing because I have been exposed to so many different opportunities. Not everyone is given the opportunity to shadow almost every day, nor the opportunity to broaden their network system. I have benefited from this program because it has opened up so many avenues of healthcare that I was not aware of. I have also solidified that I want to pursue a career in the medical field. I have experienced so much and have acknowledged what it takes to be an excellent physician.



How I Spent My Summer Vacation

Biology Undergraduate Students Make a Difference through Internships

Francis Commercon: Avian Field Technician in Southwestern China

I spent this past summer in Man'E Village in Southwestern China as an avian field technician for a restoration ecology experiment and a personal project of my own design. I lived with a local ethnically Dai homestay family and spent considerable time learning the Dai language and culture, as well as raising a wild baby Collared Scops Owl.

Man'E is located in Xishuangbanna Prefecture of Yunnan Province. The lowland seasonal rainforests here boast the highest concentrations of biodiversity in China, but they are shrinking rapidly as smallholder farmers convert the land into monoculture plantations of cash crops, especially natural latex. Because of regular herbicide application, these plantations lack understory and thus support a very poor faunal community. Yet this land use occupies over a fifth of the prefecture.

In June, I completed baseline bird monitoring for Green Rubber, a World Agroforestry Center experiment that will determine how economic and environmental variables respond to various levels of experimental intercropping on smallholders' rubber plots. Green Rubber is based on the concept that interplanting other economic crops in plantation understories will increase agricultural complexity and thereby improve income security, soil conditions, and, hopefully, faunal diversity. Because I lived in the village, I also played a role in helping the researchers in charge of Green Rubber organize meetings and discuss the experimental contract with the participating farmers.

Over the month of June, I completed six survey replicates for each of the 20 treatment plots. I also established 20 control plots in non-intercropped plantations far from the treatment sites so that evaluation of the treatments could be made within any given year of the experiment. Learning hundreds of new bird songs and calls and establishing quality control plots both proved to be major challenges – learning experiences in both field ornithology and study design. I am optimistic that perhaps

my work this summer, combined with surveys after the experiment is planted, will prove the feasibility of using intercropping techniques to improve ecological conditions for birds within these agricultural landscapes across Southeast Asia!



My second project looked at villagers' wildlife exploitation. Man'E lies near a portion of the Xishuangbanna Nature Reserve, which protects natural forest from conversion to rubber plantation. However, enforcing the reserve's ban on hunting has proven more difficult. Young men still frequently go into the reserve to net bats and birds as a recreational activity, despite improved incomes and availability of domestic meat in town. I interviewed hunters to better understand their bird and bat catching practices, their motivations, and their attitudes on conservation. My

study also dipped into fishing practices and a fascinating commercial trade in living butterflies and lightning bugs. I discovered that a recent increase in fines and jail time for hunting, combined with the rumor of hidden cameras in the forest may have halted bird and bat catching at least temporarily. However, the new regulations have not yet survived a winter hunting season, and I worry about the long-term sustainability of this approach on its own. I want to see a conservation education program by the local reserve patrol office and the local ecological research institute. I attempted to make my study useful for informing the design of such an outreach effort in the near future.

Internships Welcome

Do you work in an organization that could serve as a learning environment for an undergraduate biology major? You receive extra help plus the enthusiastic energy of a student eager to learn, and the student gains practical application of the concepts they are learning in class.

Contact our Academic Success Team by calling the main office to learn more!

Biology Department: 970-491-7011 | www.biology.colostate.edu

Congratulations to our graduates!

Twice a year, in December and in May, we celebrate commencement, a time of great joy and satisfaction, reconnection between students and their families, looking both back in time and forward to exciting futures. In 2015-2016 the biology department awarded more than 273 Bachelor's degrees (211 Biological Science, 62 Zoology). Here we recognize students who gained graduate degrees and those undergraduates who gained academic distinction. We take pride in all and recognize our Honor's Scholars, each of whom completed an Honor's thesis in their last two years of study.

Doctor of Philosophy

You Soon Baek, *Botany*
Anne Marie Casper, *GDPE*
Kathy Cosenza, *CAMB*
Eva Fischer, *Zoology*
Sarah Fitzpatrick, *Zoology*
Margaret Fleming, *Botany*
Corey Handelsman, *Zoology*
Natalie Pitts, *CAMB*
Luke Tembrock, *Botany*

Master's Degrees

Guadalupe Aguirre, *CAMB*
Kevin Chu, *Botany*
Jeremiah Colborn, *Professional Science Master's*
Steven Culligan, *Botany*
John Dietrich, *GDPE*
David Alexander Enden, *Professional Science Master's*
John Fitts, *CAMB*
Carlee M. Fiddes, *Professional Science Master's*
Bretton Skyler Griffin, *Zoology*
Ashley Barbara Heim, *Zoology*
Anne Kellner, *GDPE*
Ashlea King, *Professional Science Master's*
Peter Leipzig-Scott, *GDPE*
Jose Lopez Arriaza, *Zoology*
Clifton McKee, *GDPE*
Erik Mohlhenrich, *Zoology*
Nicholas Ross Naitove, *Professional Science Master's*
Kent Timothy Schnacke, *Professional Science Master's*
Bryce Thomas Shields, *Professional Science Master's*
Samantha Rae Steele, *Professional Science Master's*
Jacqueline Marie Thomas, *Professional Science Master's*
Matthew Youngblood, *Botany*
Molly Zeller, *CAMB*

Bachelor's Degrees Awarded with Distinction and Honors:

Summa Cum Laude:

Susana Aide Rosales, *Biological Science*
Laura Marie St. Clair, *Zoology*

Magna Cum Laude:

Micaela Margaret Boubel Brown, *Zoology*

Megan Nicole Doan, *Biological Science*
Kristina Elise Glapa, *Biological Science*
Paige Nicole Johnson, *Biological Science*
Monica Lopez-Islas, *Biological Science*
Daena Louise Rowlinson, *Zoology*
Kayla Elizabeth Sherman, *Biological Science*

Cum Laude:

Allison Jean Brasche, *Biological Science*
Shannon Nicole Duong, *Zoology*
Madison Lynn Flewelling, *Biological Science*
Jillian Claire Gerberich, *Zoology*
Rebecca Angela Grieser, *Zoology*
Kaitlin Michele Kaiser, *Biological Science*
Erin Michelle Snowden, *Zoology*
Ryan Kwong Wah Yee, *Biological Science*

University Honors Scholars:

Allison Jean Brasche, *Biological Science*
Samantha Joan Eckert, *Biological Science*
Amanda Fairbanks, *Biological Science*
Natalee Franz, *Biological Science*
Marissa Kaye Fuertges, *Zoology*
Dawn Hajdu, *Biological Science*
Kimberly Hallowell, *Biological Science*
Laura Erin Harper, *Biological Science*
Brittany A. Hartman, *Biological Science*
Emily Janik, *Biological Science*
Linzy J. Jauch, *Zoology*
Paige Johnson, *Biological Science*
Morgan Brynn Kahle, *Biological Science*
Kaitlin Kaiser, *Biological Science*
Michaela Koretko, *Biological Science*
Abigail Larson, *Biological Science*
Delaney Laughlin, *Zoology*
Monica Lopez-Islas, *Biological Science*
Caroline Manthei, *Biological Science*
Kaleigh Marlin, *Biological Science*
Forrest Nielsen, *Biological Science*
Abigail Pearson, *Biological Science*
Julia Pinckney, *Zoology*
Adrienne Prueitt, *Biological Science*
Katherine Redd, *Biological Science*
Jennifer J. Robinson, *Biological Science*
Susana Rosales, *Biological Science*
Kaitlin Ross, *Biological Science*
Daena Rowlison, *Zoology*
Taylor M. Runion, *Biological Science*
Kathryn N. Schoen, *Biological Science*
Kayla E. Sherman, *Biological Science*
Casey Smith, *Biological Science*
Erin Michelle Snowden, *Zoology*
Laura Marie St. Clair, *Zoology*
Lisbel Torres, *Biological Science*
Miranda Wade, *Biological Science*
Matilda Wagner, *Zoology*
Taylor Williams, *Biological Science*