

Summer 2019

College of & Natural Resources Sciences

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While the campus activity has slowed, research continues. Read more about student and faculty projects this summer. p. 02

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MESSAGE FROM THE DEANS

Dr. Dale R. Oliver and Dr. Rick Zechman

Still basking in the glow of the May 2019 graduation in which we celebrated the incredible accomplishments of our graduates, we have now turned to our usual summer activities, including catching a bit of R & R, registering the class of 2023, conducting research in the lab and in the field, and preparing our courses for the 2019-20 academic year.

In this early summer issue of the CNRS Newsletter, you will find a few highlights from graduation and from our summer field research, as well as additional highlights from our outstanding Department of Forestry and Wildland Resources.

Best wishes to all of our graduates who are transitioning to careers or to graduate study. As you are able, please stay in touch with your faculty and your departments. They will be most grateful to hear about what you are doing and how you are using what you have learned at Humboldt State University to address pressing problems and to promote environmental and social responsibility.



SUMMER RESEARCH

REDWOODS RISING GIVES BACK IN MANY WAYS

Forestry faculty Erin Kelly and Lucy Kerhoulas have been assisting with a unique and far-reaching restoration program in the redwoods region called Redwoods Rising. This collaboration between Save the Redwoods League, California State Parks, and the National Park Service is working to restore previously logged areas of the parks and reconnect their remaining old-growth forest stands. While the famous redwood forests in northern California are generally old growth, notable for their giant trees, two-thirds of Redwood National and State Parks were logged before they became part of the parks. Redwoods Rising is planning long-term, large-scale restoration projects in these previously logged areas to expedite their progression back toward old-growth forest conditions.

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Students involved in Redwoods Rising get real-world experience to complement their classroom learning, and they work closely with professional Parks staff and nonprofit leaders through Save the Redwoods League. Students also get to work on projects with lasting ecological benefits for the redwood region.

Professors Kerhoulas and Kelly have received funding (\$63,000 in 2018 and \$174,000 in 2019) to hire undergraduate HSU students for summer positions to help the park prepare to do this restoration work. In 2018, they hired eight students to assist Parks staff in collecting forestry and botany data. In 2019, they hired 18 students for data collection in forestry, botany, wildlife, hydrology, and watershed rehabilitation. These students represent the Forestry and Wildland Resources, Environmental Science and Management, Wildlife, Botany, and Environmental Resources Engineering programs.

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The Redwoods Rising program is anticipated to continue into the future, creating meaningful work experiences for HSU students, contributing to forestry-based economic opportunities in northern California, and most importantly, restoring the redwood forests that we all love.



CONIFER DROUGHT RESPONSES

Drs. Rosemary Sherriff and Lucy Kerhoulas received a National Science Foundation award for roughly \$400,000 to study conifer responses to drought across geographic and competition gradients. The project uses the recent, severe California drought as a test case to yield important insights on the effects of multi-year drought stress, competition, and habitat factors on tree vigor within the diverse group of conifers inhabiting northern California and southern Oregon.



This information is needed to model tree responses to climate change and as input for forest management in the face of future wildfire. The project involves field sampling across a diversity of land ownership types and analyses of growth and carbon stable isotope ratios in tree-rings. The team will involve undergraduate and graduate students, with the help of the newly established Student Opportunity Fund, and multiple collaborators including a local conifer expert, Michael Kauffmann, and a local forest ecologist with the U.S. Geological Survey, Phil van Mantgem.

[For more information, here is a link to a website featuring the study.](#)

HOOPA WATER QUALITY

Drs. Cynthia Le Doux-Bloom (Research Associate, Fisheries Biology), Eagles-Smith and Hladik (U.S. Geological Survey) and the Hoopa Valley Tribal Environmental Protection Agency (Ken Norton, HSU Alumni) collaborated on a pilot study which investigated the utility of using Pacific Lamprey ammocoetes as a surrogate of aquatic ecosystem health. Initial findings from ammocoete tissues tested from tributaries on the Hoopa Valley Indian Reservation showed toxic levels of the pesticide Bifenthrin (insecticide in the pyrethroid family highly toxic to fish and aquatic invertebrates) and methyl mercury.

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We hope that this methodology will become a cornerstone monitoring tools of the Klamath Basin Institute of the Sciences to help assess the impacts of dam removal on aquatic organisms.

Based upon these results, the team submitted a grant to U.S. Bureau of Reclamation Native American Affairs to conduct an expanded project to specifically investigate the water quality of the tributaries supplying the Tribe's drinking water using ammocoete tissues. The team will involve undergraduate and graduate students in the collection and sample preparation while making the data sets available for student projects. We hope that this methodology will become a cornerstone monitoring tool of the Klamath Basin Institute of Sciences to help assess the impacts of dam removal on aquatic organisms.

CALTRANS TIDEGATE MONITORING

As part of improvements to the Highway 101 Eureka-Arcata corridor, Caltrans is replacing nine tide gates at five separate locations. Five of these tide gates are being replaced with fish-friendly tide gates to mitigate for potential impacts to tide water goby and salmonid habitat. Replacing the tide gates will reduce maintenance needs, improve flood prevention, provide fish passage, and enhance habitat for listed species. As part of improvements to the Highway 101 Eureka-Arcata corridor, Caltrans is replacing nine tide gates at five separate locations. Five of these tide gates are being replaced with fish-friendly tide gates to mitigate for potential impacts to tide water goby and salmonid habitat.

Replacing the tide gates will reduce maintenance needs, improve flood prevention, provide fish passage, and enhance habitat for listed species. This project will characterize the pre-project hydraulic and water quality conditions at and upstream of the existing tide gates where fish passage gates are being installed to establish baseline conditions that need to be maintained or improved post-project. Following replacement of the tide gates, the monitoring will be repeated to confirm that post-project conditions match or improve hydraulics and habitat upstream of the replaced tide gates. This post-project monitoring data will be used to inform operation and adaptive management of the replacement tide gates to ensure habitat quality and hydraulic performance.

PALEOSEISMIC INVESTIGATION OF THE LITTLE SALMON FAULT ZONE

Tyler Ladinsky (MS Environmental Systems-Geology '12; now a Professional Geologist with the California Geological Survey), Harvey Kelsey (Geology Research Associate), and Melanie Michalak (Geology Assistant Professor) were awarded a one year grant of \$77,148 through the National Earthquake Hazards Reduction Program to conduct a paleoseismic investigation to evaluate the chronology and style of earthquakes on the Little Salmon Fault in Humboldt County in context of the Cascadia Subduction Zone. The Little Salmon Fault zone is an active fault zone outcropping within the Van Duzen River valley, through Hydesville, Fortuna, and Humboldt Hill. It is unknown, but suspected that the Little Salmon Fault may rupture and produce earthquakes in concert with rupture and large magnitude earthquakes along the Cascadia Megathrust. Their proposal, "In Southern Cascadia, Do Upper-Plate Faults Rupture in Concert with Subduction Zone Earthquakes: A Paleoseismic Investigation of the Little Salmon Fault Zone" will aim to test this hypothesis.

This work, commencing Summer 2019, is a collaborative effort between HSU faculty and students, the California Geological Survey, and the United States Geological Survey. This research builds upon decades of previous paleoseismic studies conducted by HSU Geology faculty and colleagues. Ladinsky, Kelsey, Michalak, and team will be using paleoseismic investigative techniques including trenching and quantitative age-dating of buried organic material that can constrain timing of past earthquakes. Their findings will influence our understanding of fault systems that may rupture sympathetically, and help modify seismic hazard estimates of Humboldt County.

The HSU Geology department offers classes to all students that focus on local tectonics and seismic hazards (including field trips!); these are, Geology 106: Earthquake Country, Geology 109: General Geology and Geology 306: General Geomorphology. They also periodically offer Geology 700: Finding Faults, which is a weekend field trip open to students and community members to visit localities of active faults in Humboldt County and learn how geologists apply descriptive and quantitative techniques to understand how Humboldt County's landscape is affected by active tectonics.



WILDLIFE GRAD RESEARCH

Lindsey Gordon is a graduate student in the Wildlife Department participating on a large-scale project evaluating which species, or types of species, will likely require conservation efforts in the face of climate change in collaboration with two non-profits and three universities. Within this project, she took advantage of the opportunity to develop her master's thesis. Her research is examining how climate change and invasive species interactively influence the native Northern red-legged frog by rearing red-legged frog tadpoles under incrementally shortened hydroperiods with and without the presence of invasive bullfrog tadpoles. While a great deal of research has focused on the direct impacts of climate change on a variety of species, there has been relatively little focus on how biological stressors will interact with a warming climate to influence native fauna, highlighting the importance of her research.



SEAWEED FARM IN THE HUMBOLDT BAY

Dr. Rafael Cuevas Uribe and his graduate student, Erika Thalman, are ready to launch the first seaweed farm in the open waters of Humboldt Bay with a project designed to benefit HSU students interested in aquaculture. Funding was awarded by CSU's Agricultural Research Institute (ARI) with additional support from HSU's Sponsorship Program Foundation. In collaboration with GreenWave and their California Reef Manager, Karen Gray, the team will provide farm set-up, hands-on farmer training, and project support.

The specific objectives are to:

- 1) Demonstrate the cultivation methods of two native red seaweeds, Gracilaria and Palmaria in Humboldt Bay;
- 2) Monitor, evaluate and compare the growth rate and yield for each species; and
- 3) Estimate the nitrogen removed by Gracilaria and Palmaria at harvest.

The project's success will serve to promote, support and demonstrate that an economically viable seaweed farming industry could be possible in Humboldt Bay.



COHO IN HOOPA VALLEY

The Coho Ecology - Hoopa Valley project is a collaboration with Fisheries Biologists from the Hoopa Valley Tribe. In recent years, the tribe has invested substantially in habitat restoration efforts on tributaries of the Trinity River on reservation lands to promote the recovery of coho salmon populations. The new project will support a graduate student who will work with Professors Darren Ward and Andrew Kinziger, and the biologists from the tribe to document the seasonal distribution of coho salmon in these streams.

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The (Hoopa) tribe has invested substantially in habitat restoration efforts on tributaries of the Trinity River on reservation lands to promote the recovery of coho salmon populations.

The goal is to determine when the sites are being used and to identify potential barriers to salmon that might prevent them from accessing restored areas and other suitable rearing habitat. The project will combine traditional field surveys (visual counts by snorkelers) with cutting-edge environmental DNA analysis (assessing the presence of fish by detecting their DNA in water samples). It's a great opportunity to participate in research that will be immediately useful for restoration assessment and planning and provide a training opportunity for a native student working on tribal lands!

HSU SUMMER RESEARCH EXPERIENCE AWARD

Luisa Segovia received a 2019 CSU-LSAMP at HSU Summer Research Experience Award to conduct eight weeks of research on immunogenetics of invasive frogs with Karen Kiemnec-Tyburczy (Biological Sciences). Luisa will be isolating and characterizing the genetic diversity of a rapidly evolving immune gene in American bullfrogs collected by a collaborator from three National Wildlife Refuges in California. Assessing a population's immunogenetic variability may provide insight into how resistant that population is to pathogens and therefore how persistent an invasive population may be over time. She will also be comparing her data to those available from other native and non-native amphibian populations around the world.



Luisa is a senior majoring in Biology with a Microbiology concentration. She is a first-generation college student from Los Angeles. Her interest in participating in genetics research grew from informal conversations she had with Dr. Kiemnec-Tyburczy during office hours. After she finishes her degree in December 2019, she plans to attend graduate school and continue studying genetics.

OUTSTANDING STUDENT OF THE YEAR

Tanya Garcia has shown exemplary commitment to her double majors in Environmental Resources Engineering and Math, as well as the broader STEM community during her tenure as an undergraduate at Humboldt State University. She co-founded the Society of Hispanic Professional Engineers, a student-run club that seeks to promote academic excellence among Latinx engineers, and has served a number of leadership roles.

Garcia is also committed to Engineers without Borders, and participated in a service trip to Nicaragua where she and fellow engineering students worked with professional engineers to install a water well for a rural hospital. Fluent in Spanish, she also served as translator for the group. She was awarded the “Engineers without Borders Excellence in Service” award for her work.



In addition to her work through student organizations, Garcia has been an active source of academic support to her peers. She served as a Jeffrey S. Navarro engineering peer mentor from 2017-2018, providing academic, professional, and personal support to a cohort of sophomore engineering students. She has volunteered for local math competitions and science fairs, and has also spoken publicly at a number of events to advise peers. Throughout her tenure as an undergraduate, she was a frequent volunteer at admitted student events.

OTHER OUTSTANDING CNRS STUDENTS RECOGNIZED

Excellence in an Academic Discipline: College of Natural Resources & Sciences
Amanda Agosto Ramos—Biology

Outstanding Artistic Achievement in Visual & Performing Arts
Jen Kelly—Journalism and Physics

Excellence in Sports Club
Karsten Hayes—Environmental Resources Engineering

Brian Lorensen Residence Life Staff Award

Kawai Navares—Forestry
Mikayla Kia—Environmental Science & Management; International Studies

Recipients of the McConkey Outstanding Graduate Student Awards
Alexis Bernal—Natural Resources



CNRS OUTSTANDING STUDENT RESEARCHERS

Gabriel Goff won second place for a graduate student in the Biological and Agricultural Sciences category. Goff, a Forestry major, won for his project “Physiological responses of *Quercus garryana* to conifer encroachment and removal in Northern California.”

Adrien Bouissou and Ian Cullimore, Undergraduates, Biological Sciences
“Distribution of western thatching ants (*Formica obscuripes*) and their effects on soil conditions in a coastal dune ecosystem”

Megan King, Undergraduate, Biological Sciences
“Loss of IgI1 affects cellular migration and anchorage independent growth and increases sensitivity to mTOR and MAPK signaling of murine neural progenitor-like cells”

Spencer McLintock, Graduate, Environmental Resources Engineering
“The Use of UV Light for the Treatment of Cyanotoxins in Small-Scale Drinking Water Treatment Systems”

NEW FOREST FOR HSU

Thanks to the generous support of R.H. Emmerson & Son LLC, owned by the family of Sierra Pacific Industries founder Archie Aldis Emmerson and the hard work of HSU alum Mark Andre, City of Arcata, Humboldt State now owns an almost-900 acre property just 25 miles from campus. Management of this acquisition will be centered in the Department of Forestry and Wildland Resources. In particular, a Registered Professional Forester from the Department, Dr. Kevin Boston, will begin this summer creating a management group consisting of representatives from a few interested departments as well as stake-holders such as the Wiyot, Humboldt Redwood Company, and City of Arcata.

Given its close proximity, it will be used by multiple departments for field trips. Revenue from logging will help to augment the field trip budgets for the departments within the College of Natural Resources & Sciences. It is expected that the property will also be used widely by HSU researchers. Finally, the Forest will be the first Forest used in North America to emphasize research on the ecology and exploitation of non-timber forest products through a collaborative partnership with Wiyot Basket Makers.



NEWS FROM FORESTRY AND WILDLAND RESOURCES

New Tenure-Line Faculty Member

The Department of Forestry and Wildland Resources looks forward to the arrival of our newest tenure-line faculty member, Dr. Hunter Harrill. Originally from California, Dr. Harrill is a lecturer of Forest Engineering at the University of Canterbury's School of Forestry in Christchurch, New Zealand. He teaches forest operations, provides research for the forest industry through New Zealand Forest Growers Research (FGR) as well as outreach and extension services to loggers and forest managers in New Zealand and abroad. Some of his research interests include: evaluating new and innovative steep slope harvesting technology such as cable logging systems, the emerging world-wide practice of winch-assisted (i.e. tethered) felling, biomass harvesting and minimizing environmental impacts from forest operations. Hunter's teaching philosophy includes creating exciting and interactive content which engages students and applying theory with real-world applications and field experience. He believes in involving students in research projects to help further their development, understanding and skills so they are best prepared for their future careers.



New Concentration in the Works

The Department is awaiting approval for a new concentration, Tribal Forestry. There is only one other four-year major like this in North America, a very small program in Montana that graduates only a handful of students each year, and thus HSU will become the center for tribal forestry research and teaching in this country.

The motivation for this proposal is two-fold. First, reservations have a difficult time finding foresters willing to work for them, and willing especially to spend their careers there. Second, few of the foresters they do attract have any background in forestry issues from a native perspective or understand the paramountcy of the concept of sovereignty to tribes. It is expected that students in this concentration will develop an appreciation for the varied products Indians take from the woods (e.g. basketry materials, food, skins, ornamental materials) as well as the legal and financial difficulties they face in management. It is hoped that money will be procured from the Bureau of Indian Affairs to aggressively recruit students from native high schools across the west.

CONGRATULATIONS, CLASS OF 2019!



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Maria Forrest
CNRS Philanthropy Advisor
707.826.5038
Maria.Forrest@humboldt.edu

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