

# College of & Natural Resources & Sciences



Photos taken from @humboldtstate Instagram. clockwise from top left: (1) Faculty + students from #HumboldtState are working with vineyards to see if and how barn owls might be an alternative to chemical rodenticide. (2) Intertidal exploration with the Rising Tides place-based learning community (PBLC) (3) Katrina Nystrom and Samuel Davis doing some fieldwork on a tributary of Little River, which enters the Pacific at Moonstone Beach. (4) Mist netting, small mammal trapping, radio telemetry, setting up track plates and camera traps, spotlighting. A successful (WLDF) 311 camping adventure.

## IN THIS ISSUE

**Message from the Deans**

**Alumni Update**

**Agricultural Research  
Institute**

**Fall Events**

**Place-Based Learning  
Communities**

**Check Out What's New**

**Summer Research**

**Geology Department  
Spotlight**

**Forestry Grad Student Wins  
Research Award**

**Welcome New Faculty**

# MESSAGE FROM THE DEANS



DR. DALE R. OLIVER

*Welcome to the first e-edition of the College of Natural Resources and Sciences Newsletter! In it, you can learn about some of the amazing activities of our faculty, students, and alumni. Several of our features include links if you want to learn more. There is so much good work underway that we can't possibly include all programs and all activities in one edition. Look for more in subsequent quarterly editions, and send us your comments and suggestions to improve our communication with you. We hope you take a look.*

*- Dale and Rick*



DR. RICK ZECHMAN

## ● Recent Events ● ● Upcoming and Ongoing Events ●

### **CAL-PAC MEETING & HSU RANGE / SOILS 50TH ANNIVERSARY EVENTS**

October 11 - 14

### **THE ROLE OF AQUACULTURE IN THE GLOBAL FOOD SUPPLY CRAIG TUCKER ('74, ZOOLOGY)**

October 5

### **CNRS/INRSEP RESEARCH SYMPOSIUM**

September 28

### **GEOLOGY COLLOQUIUM**

Mondays at 5:00pm  
Founders Hall 025

### **MATHEMATICS COLLOQUIUM**

Thursdays at 4:00pm  
Behavioral&Social Sci 204

### **SUSTAINABLE FUTURES SERIES**

Thursdays at 5:30pm  
Siemens Hall 108

### **WILDLIFE LECTURE SERIES**

Thursdays at 4:00pm  
Wildlife & Fisheries 258

### **KIEVAL LECTURE "PROBABAILITY PARADOXES"**

October 25 7:30pm  
Founders Hall 118

### **GEOSCIENCE DISCOVERY DAY**

October 26 4:00pm  
Natural History Museum

### **SCIENCE ON TAP**

Nov. 7, Dec. 5 at 6:00pm  
Blondie's Food & Drink

### **GIS DAY**

November 14 11:00am-7:00pm  
HSU Library

### **A.S. ALL COLLEGE MIXER**

November 15 at 5:00pm  
Kate Buchanan Room

# INTERNATIONAL RESEARCH THIS SUMMER

## Geoscientists Without Borders



A combined group of Geology and Environmental Resources Engineering students under the supervision of Dr. Jasper Oshun (Geology) and Dr. Margaret Lang (ERE) spent a month in Zurite, Peru studying the hydrology of the Andean watershed supplying the town's water and surveying a section of their irrigation canals. The trip was the first visit for a two-year project funded by Geoscientists Without Borders. Students are using the data collected this summer to design irrigation canals to meet agricultural water needs. The group will return to Zurite in Summer 2019 to aide in the construction of the irrigation canals. Ongoing research combines a variety of geological, geophysical, and hydrological techniques with the goal of quantifying water resources in Andean Watersheds.

## Mission to India



A group of seven HSU students traveled to northern India with faculty members Dr. Meenal Rana (Child Development) and Lonny Grafman (ERE) to work with eight students from Lady Irwin College (Dehli) and community members from two rural villages (Daula and Tavelagarhi) for ten weeks. The students worked directly with community members on social entrepreneurship design projects while addressing the environmental issues of water conservation and waste management.

The projects resulted in direct engagements (such as fairs and marketplaces) and products (such as upcycled pens and safe water storage containers). The project was supported by the U.S. State grant, "The U.S. Mission to India," and the work continues through the existing engaged organizations, ESRO and GPVS, and new community teams formed in both villages.

# A Warm Welcome



## Tamara Barriquand, Oceanography & Physics

Dr. Barriquand is a physical oceanographer who studies internal waves and turbulence in the ocean. She has been all over the world, from South China to the Arctic Ocean, chasing internal waves. She did her graduate work at Scripps Institution of Oceanography and the Université de Paris, and was most recently a visiting professor of Physics and Environmental Science at Colorado College.



## Catalina Cuellar-Gempeler, Biological Sciences

Dr. Catalina Cuellar-Gempeler is a microbial ecologist specializing in host-associated microbial communities. She is originally from Bogotá (Colombia) where she attended the Universidad de los Andes to pursue a dual B.Sc in Biology and Microbiology.

She then obtained her PhD from the Ecology, Evolution and Behavior graduate program at the University of Texas at Austin where she developed innovative perspectives on the assembly of bacterial communities on coastal crabs. Before joining the Department of Biological Sciences at Humboldt State University, Dr. Cuellar-Gempeler worked as a Postdoctoral Scholar at Florida State University where she investigated the role of dispersal and eco-evolutionary feedbacks on pitcher plant associated microbial communities. At Humboldt State University, Dr. Cuellar-Gempeler studies the microbial communities associated with several species of invertebrates and plants, with the overarching role to understand the ecological and evolutionary processes that control host-microbe interactions.



## Jose Marin Jarrin, Fisheries Biology

Jose got a B.Sc. in Biology at the University of Guayaquil in Ecuador and a M.Sc. in Marine Biology at the University of Oregon's Institute of Marine Biology. Jose then obtained a Ph.D. in Fisheries Science from Oregon State University's Hatfield Marine Science Center.

Since finishing his Ph.D., Dr. Marin was a postdoctoral fellow at Central Michigan University, and a research and teaching fellow at Escuela Superior Politecnica del Litoral, Ecuador. He previously worked at the Charles Darwin Foundation (CDF) as a Senior Fisheries Ecologist. During that time, Jose was also the interim scientific coordinator for the CDF, and participated in the sharks, seabirds, seamounts and climate change programs. Dr. Marin Jarrin's research is geared towards high-use and/or low-information/data-limited fisheries species, and towards the provision and analysis of vital early and adult life history data of fishes and crustaceans, especially with respect to impacts expected from local fishery pressures and climate change. In order to achieve this goal, Jose uses a suite of techniques, applying varying methods and pursuing collaborations based on the problem at hand.



## Margarita Otero-Diaz, Environmental Resources Engineering

Dr. Margarita Otero-Diaz is from Puerto Rico where she obtained a B.S. in Chemical Engineering from the University of Puerto Rico at Mayagüez. She then obtained a M.S.E. and Ph.D. in Environmental Engineering from the University of Michigan. Her prior research has centered on the interactions of

chemical species with solid surfaces in a variety of contexts and on environmental chemistry, water quality, and the physico-chemical aspects of contaminant fate. Her doctoral research assessed the impact on surface water quality due to ethanol/ethanol-blend fuels spills. Her work showed that ethanol acts as a cosolvent increasing the aqueous solubility of pesticides over three to seven orders of magnitude. She is currently working with Native American communities in northern California to assess the effectiveness and feasibility of small-scale UV water treatment systems to remediate cyanotoxins found in local drinking water supplies.

**Our college is grateful  
for these recently  
established student  
opportunities**

*James F. Welsh Biology  
Scholarship*

*Stephen Hillenburg  
Marine Science Research  
Award Endowment*

*Siering/Wilson Research  
Endowment*

*Lowell Diller Wildlife  
Scholarship Endowment*

*Geology Field Camp  
Scholarship*

If you're interested in giving to any of these opportunities or would like to create your own, contact our Philanthropy Advisor, Maria Forrest, at 707.826.5038

# Alumni Update

**BENJAMIN J. CRAIN**

*Biological Sciences Alumni, 2008*

Benjamin earned his master's degree at Humboldt State University, where he studied plant ecology and conservation in Napa County, California. He later moved to Puerto Rico to earn his Ph.D. at University Puerto Rico-Rio Piedras where he worked with rare and endangered orchids in Latin America and the Caribbean.

Benjamin has been working as an Ecologist with the Smithsonian Environmental Research Center and the North American Orchid Conservation Center since 2017. With a diverse group of collaborators, he conducts research in the Republic of Palau where he is documenting and studying the diversity and distribution of orchids in this critical component of the micronesian global biodiversity hotspot.

Dr. Crain also monitors orchid dynamics in the Ngardok Nature Reserve, home of the Smithsonian ForestGEO program's newest permanent forest dynamics monitoring site. He also studies the fundamental ecology of orchids by looking at their relationship with vegetation attributes, host trees, and mycorrhizal fungi and aims to develop predictive models for understanding patterns of orchid diversity world wide. The team's goals are to improve knowledge and increase awareness of orchid diversity in Palau and elsewhere, to understand the ecology of these unique plants, and to develop strategic plans for conservation and restoration of orchid communities and their habitats.



# PLACE-BASED LEARNING COMMUNITIES

## PBLC



Place-based learning communities (PBLC) is just one of four components of the Hispanic Serving Institutions (HSI) STEM grant. The communities are composed of cohorts of first-year students, assigned to one of five place-based themes (SCI 100, specific topics listed below) based on their major. PBLCs will be available to all 1st year STEM students by 2020

### Klamath Connection

*Launched in 2015: Env. Sci, Env. Engineering, Fisheries, Forestry, Wildlife, and Biology, Botany, Zoology*

### Stars to Rocks

*Launched in 2017: Chemistry, Physics & Astronomy, and Geology*

### Rising Tides

*Launched in 2018: Marine Biology and Oceanography*

### Among Giants

*Biology to launch in 2019*

### Math & Computer Science

*The Mathematics and Computer Science Departments will offer an Area E Sci 100 course in Spring 2019. Similar to the other Sci 100 courses, it is developed and taught by faculty in the place-based learning communities. It will introduce students to the majors, provide professional development in STEM and remind students of campus resources. The course is expected to be the "prototype" of Sci 100 as it will be offered as part of the Math-CS place-based learning community (coming Fall 2020).*

Academic  
Achievement

Skills &  
Attitudes

Belonging,  
Community,  
Engagement

Retention &  
Graduation

## EVIDENCE PBLC STUDENTS HAVE IMPROVED SENSE OF BELONGING & ACADEMIC ACHIEVEMENT

Analysis of three Klamath Connection cohorts involved comparison of 250 KC students to 450 matched non-KC students (matched on STEM major, high school GPA, Hispanic, First-Gen, Math preparedness, and AP units). What follows specifically compares outcomes for Hispanic KC students and Hispanic non-KC students; similar patterns exist for all students of color and for all students overall:

- Stronger sense of belonging (composite Mapworks score of 10 factors of 'belonging & community'; 5.46 vs. 5.07)
- Higher 1st year GPAs (2.65 vs. 2.50)
- Higher rates of Gateway course completion (especially in Bot, Chem, and Math 113)
- Higher 1st year retention at HSU (80% vs. 69%)
- Eliminated gap in STEM retention between Hispanic students and their non-Hispanic counterparts in KC

# GEOLOGY DEPARTMENT SPOTLIGHT

Humboldt State University Department of Geology has a long-standing tradition of field-based learning. It is the northernmost geology department and the only one within the CSU that is located along the active Cascadia subduction zone, an active fault that extends from Cape Mendocino to British Columbia. The university's location within a region of active tectonics creates an incredibly complex and diverse geology found nowhere else in the US. Our major enrollment is one of the largest in the CSU system, and, in part, due to its rigorous curriculum the program is recognized across the country.

## Faculty Research

**Dr. Melanie Michalak** and emeritus professor **Dr. Susan Cashman** have been awarded a 3-year, multi-institutional National Science Foundation grant, with colleagues at Oregon State University and Penn State, to study geologic deformation in the Klamath Mountains. Their research addresses both mountain building (long term deformation) and crustal strain associated with megathrust earthquakes on Cascadia's subduction zone (short term deformation).



Atop the 8,091ft Granite Peak on a field reconnaissance trip to the Trinity Alps in the Klamath National forest.

**Dr. Mark Hemphill-Haley** is conducting collaborative research with colleagues in New Zealand to understand the earthquake history of the Kekerengu fault in the northeastern South Island. It was one of 20 faults that ruptured during the 2016 M7.8 Kaikoura earthquake. This includes detailed reconnaissance fault mapping of the surface rupture and trenching across a part of the fault that had over 9 m of right-lateral displacement.



Survey of trench excavated across the Kekerengu fault NZ after 9 m right lateral offset during 2016 M7.8 earthquake.

**Dr. William Miller** is working with colleagues in North Carolina, to document early Cambrian trace fossils from the Chilhowee Group in northeastern Tennessee-southwestern Virginia. They are working on the first appearance of the "normal" Paleozoic marine ichnofauna in the Murray Shale.

**Dr. Brandon Browne** studies magmatic and eruptive processes of active volcanoes. He recently co-authored a paper about lava flow morphologies and lava emplacement mechanics on Earth and Mars with colleagues at JPL and UCLA in Earth and Planetary Science Letters. He teaches field and lab-based "rock and mineral" classes while overseeing a petrology laboratory where undergraduate and graduate students can engage in petrographic examination of volcanic rocks and melt volcanic rocks for geochemical analysis.



Atop the 12.5 ka Giant Crater near Medicine Lake Volcano while on the South Coast Geological Society annual field trip

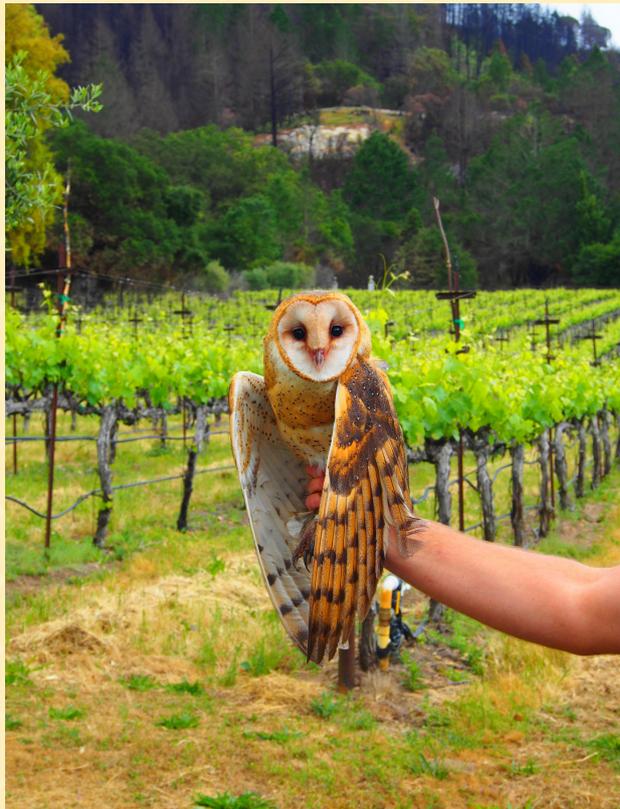
**Dr. Laura Levy** studies past climates using sediments from glaciers. She is developing new research projects in the Trinity Alps where she will be using lake sediments to decipher the climate of the region since the end of the last ice age. She is currently creating a sedimentology lab in Founders Hall. Her sedimentology class (GEOL 332) recently spent a sunny afternoon coring the Mad River Slough- looking for buried soil horizons related to large earthquakes that occurred in the region.

**Dr. Jasper Oshun's** recent faculty research can be seen on page 3 of this newsletter

**Amanda Admire's** area of research and interest revolves around natural disasters, focusing on earthquake hazards and tsunami currents near coastlines and within ports. She is a co-principal investigator on NOAA's Physical Oceanographic Real-Time System (PORTS) in Humboldt Bay, and she works with HSU students and community members to increase regional awareness to natural disasters.

# CNRS Faculty and Graduate Student Present at Agricultural Research Institute

Agricultural Research Institute (ARI) is a diversified, multi-campus applied research program focused on high-priority issues facing California agriculture. Humboldt State University serves as an Associate Campus in this initiative and receives \$250,000 per year to support research with a strong link to agriculture, including forestry and fish aquaculture.



At the 2018 ARI Annual PI Meeting, **Wildlife Graduate Student, Alison Huysman**, presented research her work in collaboration with professor Matt Johnson on her study entitled *Impact of Wildfires on Barn Owl Habitat Selection in a Vineyard Agroecosystem in Napa Valley*.

For several years, this research has been focused on nest boxes that vineyard owners install to attract barn owls, which may minimize rodent crop damage. Allison presented her preliminary data on how barn owl nest box occupancy and habitat selection may have changed as a result of the fall 2017 wine country wildfires.

This study included nest box occupancy surveys and GPS telemetry to learn how barn owls may have changed their nesting and hunting habitat selection after the fires.

Preliminary data indicate that barn owls were found breeding in recently burned areas that were not previously occupied, suggesting that wildfires may change the landscape in a way that encourages nest box occupancy. As more data is analyzed, we will gain a better understanding of how wildfires affected the hunting behavior for this population. These results have implications for the potential of barn owls to provide rodent pest control as vineyard owners increasingly install nest boxes and the western United States experiences increasing threats from wildfires.



**ARI 2019/2020  
proposals are due  
Nov. 29 at 5:00pm**

Dr. Harold Zald gave an oral presentation at the meeting on "Integrating Multi-Temporal Landsat Imagery and Tree-Rings to Map Climate Driven Changes in Forest Productivity in Northern California"

# Check out what's new!



Thanks to funding through HSU Loyalty Grants, the Department of Biology purchased a high-resolution camera and projection system for SCIA 456.

"This new system has made it easy for us (i.e., lab instructors) to move seamlessly between showing Powerpoint slides, projecting images from microscope slides, and even projecting images of dissection specimens in real time. It has really improved our ability to communicate information to our students. It has already been a tremendous asset for teaching lab."

- Sharyn Marks, Professor of Biology

Thanks to a donation from Fisheries Biology alumnus, Michael Morishima, Dr. Rafael Cuevas Uribe was able to purchase an EchoSphere ultrasonic imaging machine.

The machine is used for directed studies of undergraduate Fisheries students and, recently, for a study to assess the gonadal maturation of steelhead cutthroat trout in the hatchery. These results were presented at the **HSU Ideafest** and the **Cal-Neva Chapter of the American Fisheries Society 52nd Annual Meeting**. Dr. Cuevas-Urbe is beginning a new study, along with undergraduate students Jasmine Iniguez and Katiana Galdon Ramos, where they will assess the minimum size a trout can be sexed by ultrasound.



## FORESTRY GRAD STUDENT RECEIVES \$25,000 AWARD



Forestry Graduate Student, Alexis Bernal, wrote a grant and was awarded \$25,000 from the Joint Fire Science Program Graduate Research Innovation for her research on California tree mortality caused by the 2012-2015 drought. "This is an impressive accomplishment for a masters student", says her advisor, Jeff Kane.

The funding from GRIN will enable Alexis to conduct research that discerns the within-stand forest structures that promote and inhibit resistance to disturbances. The findings from the study will provide insight on how managers can effectively manipulate structural elements to create resilient forests in the face of climate change.

# Give to CNRS

We can help you find the best way to make your gift, and perhaps find a gift option that you might not have otherwise thought was possible.

[Give Now](#)

If you'd like to setup a gift through an estate plan, please contact our Philanthropy Advisor, Maria Forrest, 707.826.5038

# In Memoriam

*Ken Aalto*  
*Emeritus Professor, Geology*

*Bob Lorensen*  
*Alumnus, Chemistry*

*Patty Siering*  
*Professor, Biological Sciences*

## Visit us in FOR 101

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**WE'RE HERE  
TO HELP!**

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