

Science at HSU

COLLEGE OF NATURAL RESOURCES & SCIENCES QUARTERLY NEWSLETTER



Students analyzing samples in Dr. Susan Edinger Marshall Soils lab, Fall 2020.

Student Achievements

Madison Lalica (Botany) was awarded first place in Plant Sciences/Botany category at the 2020 national Society for the Advancement of Chicano/Hispanics and Native Americans in Science (SACNAS) conference for her work “Early Devonian Glomeromycotan Spores in the Battery Point Formation (Quebec, Canada).” Madison is mentored by Dr. Mihai Tomescu.

Christian Trujillo (Environmental Science & Management) was invited to speak at the University of Minnesota, Twin Cities’ Earth and Environmental Science Department colloquium on October 19. Christian spoke about Ciencia Para Todos, a student organization he co-founded to teach Environmental Science in Spanish. This student-run organization aspires to uplift bilingual students by implementing culture in science programs.

SNEAK PEEK OF WHAT'S INSIDE:

Message from the Deans

Protecting Golden Eagles

CNRS Faculty Receive Leadership and Innovation Award

Andrew Kinziger and James Hearsey appear in Science magazine

Message from the Deans

From Dr. Dale Oliver & Dr. Rick Zechman

Words are not adequate to describe the honor that is ours to serve the faculty, staff, and students of the College of Natural Resources and Sciences (CNRS) during the pandemic. We are humbled by the dedication, skill, and hard work of our faculty who made a quick switch from in-person instruction to virtual instruction last March, many of whom then dedicated their summer to prepare for a mostly virtual Fall 2020 semester, and by our administrative and technical staff who have been asked to work with newly constructed virtual processes and to serve across multiple departments. We are proud of our students who have demonstrated perseverance and resilience from a distance in pursuit of their educational goals, even though they tell us how much they miss being in Arcata, and would much rather be learning by doing in laboratories and on field trips. In Fall 2020 we conducted limited lab/field-based instruction for some advanced techniques courses, as we expect to do again in Spring 2021. We are grateful that there were very few COVID cases associated with the university (none that resulted from instruction) thanks to widespread adherence to strict COVID safety protocols.

Speaking of learning by doing, perhaps you happened upon a recent press release regarding Humboldt State's invitation to engage in a self-study process to become California's third Polytechnic University. HSU has long been known for its outstanding programs in pure and applied science, natural resources, and environmental resources engineering. We were invited by the California State University Chancellor because of these outstanding programs, an existing hands-on curriculum, a campus emphasis on social and environmental justice, and our location, among other reasons. Here are some fun facts that demonstrate that HSU is well-positioned for consideration as a polytechnic university:

- HSU offers the highest percentage of classes with a hands-on learning experience (~25%) in the California State University.
- HSU has the third-highest percentage of STEM (Science, Technology, Engineering, Mathematics) majors in the California State University. The other polytechnic institutions (SLO, Pomona) are first and second.
- HSU has the eighth-highest per capita rate of bachelor's-level graduates who go on to earn a Ph.D. in STEM among all 660 master's degree institutions in the nation, and the highest in the California State University.

We are very excited about the possibilities that a polytechnic designation would bring to our campus. Look for more information as this process unfolds.

We continue to be grateful for the generosity of our alumni and our university community who partner with us to support the education of the next generation of scientists and natural resource managers. For example, a group of alumni and friends of the Department of Wildlife raised almost \$22,000 over the summer to support the purchase and distribution of binoculars to ensure that students who did not have this key observational tool at home could participate in home-based field trips during the semester. Please click [here](#) if you would like to support our students through CNRS or through one of our departments.

Wishing for peace to all during this holiday season, and for the new year to be the beginning of the end of the pandemic.



"HSU has long been known for its outstanding programs in pure and applied science, natural resources, and environmental resources engineering."

New Faculty in CNRS

Dr. Ho Yi Wan

Assistant Professor, Wildlife Management, Wildfire
Spatial Ecology

Ho Yi Wan is a landscape ecologist and conservation biologist who is passionate about studying the linkages between landscape patterns and ecological processes across spatial and temporal scales. Researching in the fields of landscape ecology, remote-sensing, wildlife biology, and landscape genomics to evaluate biodiversity and ecosystem responses to drivers such as climate change, fire, and human activities.



Dr. Tesfa Yacob

Assistant Professor, Environmental Resources Engineering,
Environmental Engineering



Tesfayohanes Yacob is an environmental engineer who is passionate about access to clean water and hygienic living environment for all communities regardless of economic status. In his research and service work, he has focused on innovative point of use drinking water treatment technologies, and wastewater treatment from various sources. He has researched various technologies including filtration, adsorption, coagulation/precipitation, ligand complexation, biological, and thermo-chemical. The source of the wastewater ranged from mine waste rock, flow back from hydraulic fracturing activity, and domestic sources.

Prior to joining HSU, Dr. Yacob taught for four years at Messiah College and Saint Francis University. His teaching experience includes water and wastewater treatment, hazardous waste and air pollution management, environmental transport processes, fluid mechanics, appropriate technology for developing communities, senior capstone design, physics I and II, and engineering dynamics. He enjoys hiking, taking long walks, listening to audiobooks, and yoga.

Dr. Oscar M. Vargas-Hernandez

Assistant Professor, Biological Sciences, Plant
Systematics

Dr. Vargas-Hernandez' research focuses on understating spatio-temporal patterns of plant evolution in hot spots of plant diversity by incorporating phylogenomics, comparative phylogenetics, and biogeography. The systematics and evolution of the genera *Diplostegium* and *Licnochilus* were the focus of his M.S. and my Ph.D. dissertations.

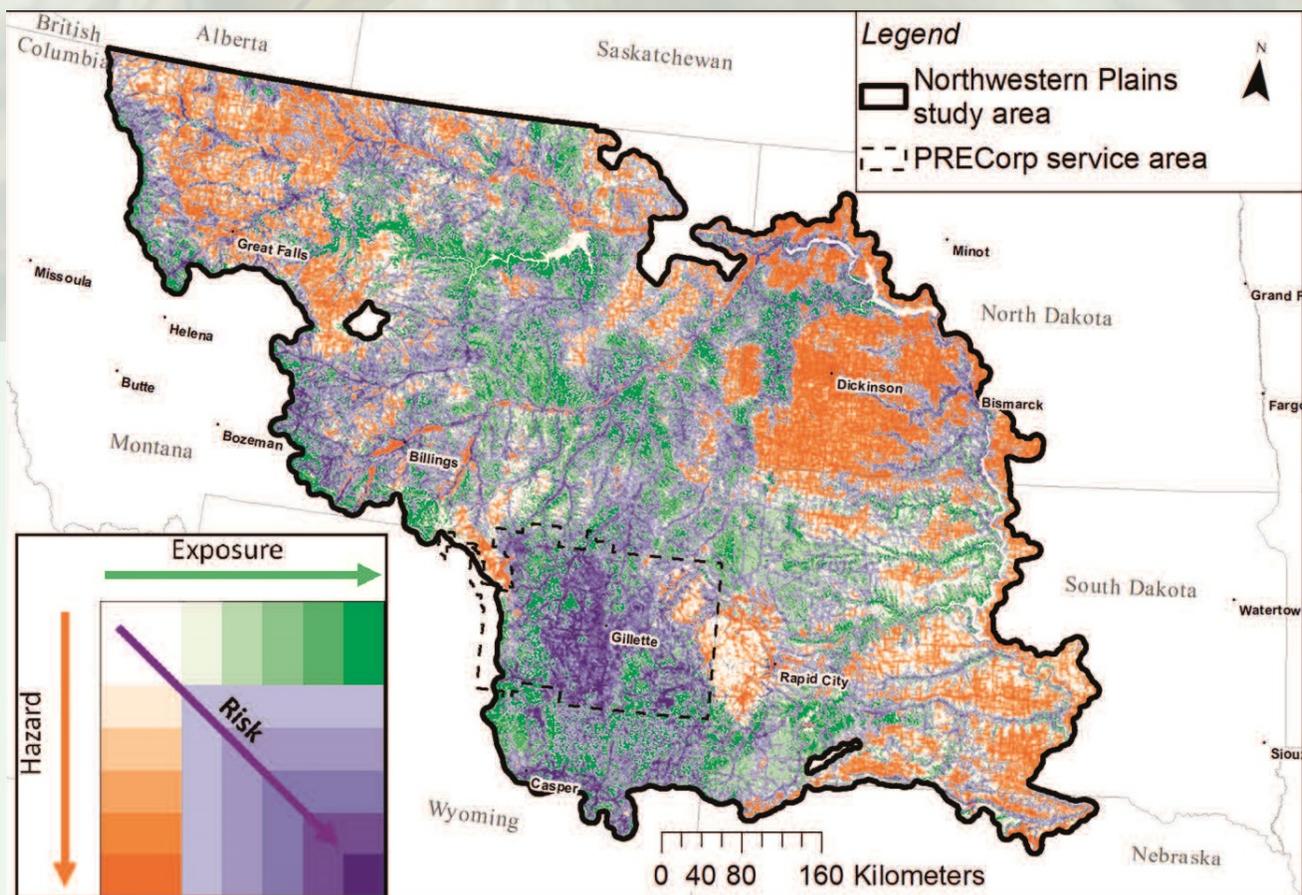


Protecting Golden Eagles

HSU's Jeff Dunk helps identify overhead power poles in need of retrofitting.

American golden eagles, one of the better-known North American birds of prey and featured on the Mexican coat of arms have been subject to electrocution by overhead power poles. Retrofitting electrical transmission components to minimize this risk to the eagle population has been recommended by the US Fish and Wildlife Service. Humboldt State Professor Jeff Dunk and his colleagues recently completed a comprehensive study to determine where retrofitting should occur to be most effective.

Because populations of Golden Eagles and power pole locations are varied, a model that predicts relative risk of eagle electrocution based on the overlap between spatial models of Golden Eagle nest-site density and power pole density within the Northwestern Plains ecoregion was developed. This model should be useful in ongoing efforts at golden eagle conservation, and the approach has the potential to offer insight into conservation of other species of wildlife in the future.



Relative risk of electrocution for Golden Eagles in the Northwestern Plains. Map colors correspond with relative risk categories shown in the risk matrix



Dr. Amy Sprowles and Dr. Matt Johnson named 2020-21 awardees in the CSU Faculty Innovation and Leadership Award Program

Faculty Innovation and Leadership Award Program recognizes CSU faculty accomplishments associated with the implementation of innovative practices that improve student outcomes or eliminate equity gaps.

Matthew Johnson, Ph.D., professor of wildlife, and Amy Sprowles, Ph.D., associate professor of biological sciences, have been recognized for their transformative work in creating supportive and welcoming environments for traditionally unrepresented students through place-based learning communities.

Johnson and Sprowles organized a collaborative network of faculty across HSU to deliver cohesive and linked curriculum within each learning community, from chemistry to Native American studies to communication. With the goal of implementing high-impact practices to support the success of first-year STEM students, Johnson and Sprowles developed several learning communities for students in the College of Natural Resources and Sciences and divided students into cohorts: The Klamath Connection serves students majoring in wildlife, forestry and environmental science; Stars to Rocks serves students majoring in physics and astronomy, chemistry and geology; Rising Tides serves students majoring in marine biology and oceanography; Among Giants serves students majoring in biology, botany and zoology; and Representing Realities serves students majoring in mathematics and computer science.

Place-based learning communities show significant increases in students' sense of belonging and in academic performance when participants were matched with comparable non-participants. As a result, the learning communities reduce equity gaps in gateway science courses, help close the equity gap in first-year retention, increase credit hours earned in the first year and produce small gains in student GPA.

"Through their place-based learning communities, Drs. Johnson and Sprowles have cultivated a sense of belonging in our rural, isolated location, connecting students to the rich natural resources and cultures of California's North Coast," said Tom Jackson Jr., Ph.D., president of HSU.

Atlantic Fisheries Commission adopts ecological reference points for menhaden based on science

Andre Buchheister of Fisheries Biology helps bring about a significant shift in fisheries management.

The Atlantic States Marine Fisheries Commission's Atlantic Menhaden Advisory Board has adopted an ecological reference point for menhaden, thanks in large part to the ecosystem modeling work of Fisheries Biology Professor Andre Buchheister. Instead of managing menhaden as a single species based upon population and death rates, these new reference points will take into account the important role menhaden play within the broader marine ecosystem.

This could mean changes in catch limits in the future, to better reflect the role menhaden play as a significant food source for other fish. Ecosystem models better account for predator needs, and therefore can ensure not only that menhaden stocks remain healthy, but those of other species that rely on them for food, such as the striped bass.



A complex phenotype in salmon found to be controlled by a simple change in migratory timing

Professor Andrew Kinziger and Graduate Student James Hearsey appear in Science magazine.

Chinook salmon are known to return to spawn at two distinct times of the year: Spring and Fall. These salmon have generally been referred to as parts of distinct groups with specific traits, and the differences between them attributed to the lack of interbreeding. By looking at genomes across fish from both spawning groups, Professor of Fisheries Biology Andrew Kinziger, graduate student James Hearsey, and their collaborators found that a single section of the salmon's genome was nearly perfectly associated with run timing but not with other traits such as maturity and fat reserves. Further, they concluded that the section of DNA operates as a dominant and recessive, or Mendelian trait, which dictates run timing and the associated observable differences are caused by the migration environment rather than genetics. Their findings will facilitate conservation and restoration of this iconic fish.

End of Year Giving

Student Adversity Fund

One way to make an immediate positive difference in a student's life this year is to give to the Student Adversity Fund. Many of our students have demonstrated resilience through wildfires and COVID-19, but are struggling to stay enrolled into the spring 2021 semester. Gifts to the Student Adversity Fund address critical needs, providing students with funds to increase data plans, to access wi-fi, and more that will help them succeed in online learning. Other students are being aided with funds to cover basic living expenses as they, or their families, have unexpectedly lost their jobs.

Give today to support HSU students.

