Department of

BIOLOGY

Newsletter Fall 2019 Vol 1 Issue 1

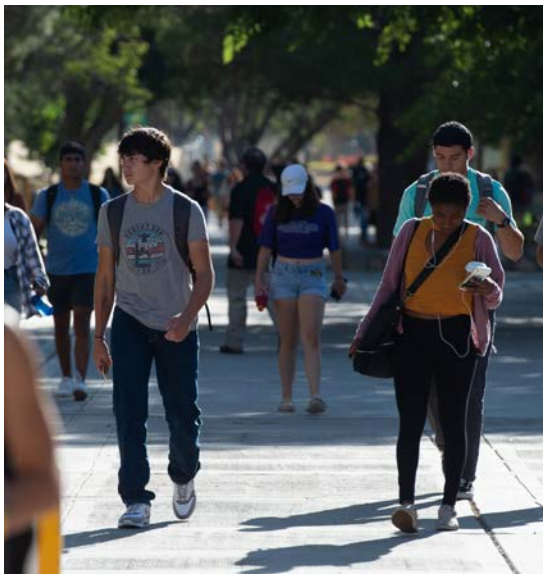
Inside the Issue

A NEW SCHOOL YEAR

The Department of Biology at New Mexico State University is excited to be introducing a semesterly newsletter to update and highlight the achievements of the Department throughout the semester.

Throughout this newsletter, expect to find news regarding the department, learn about the research that our professors and graduate students are doing, and more.

A "semester-in-review," this newsletter serves to keep and facilitate connections between the Department and you, the reader. With the help of a new media aid, hired over the summer, Biology intends to elevate the Department in more ways than one, starting with this newsletter.

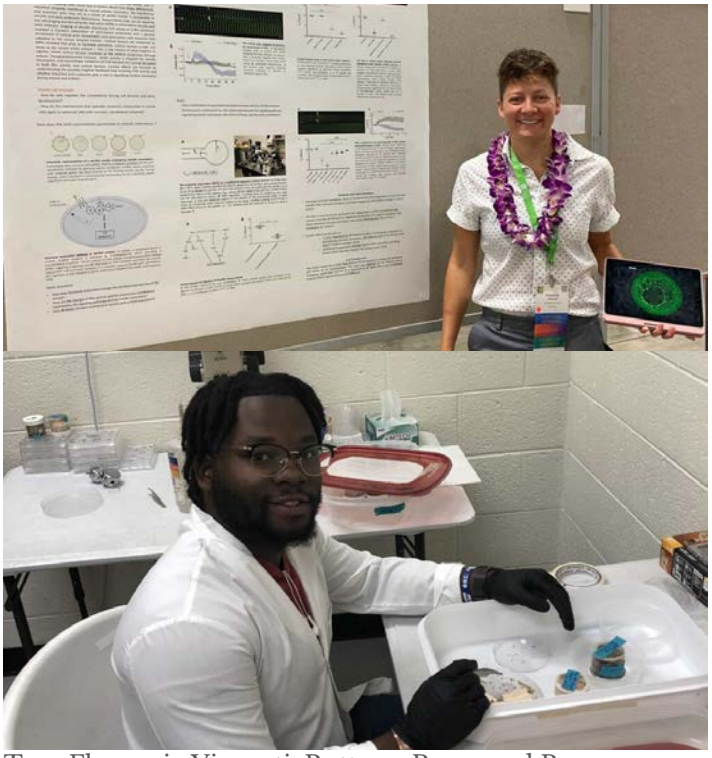


RISE PROGRAM AT NMSU IN 5TH GRANT CYCLE

The NMSU RISE program is now in its fifth grant cycle and since 2000 has been funded by the National Institutes of Health.

The program supports graduate students in their pursuit of biomedical and biobehavioral degrees and research careers. Committed to research that will improve human health and reduce illnesses, the goal of the RISE program is to increase the number of doctoral degrees in biomedical, biobehavioral or bioengineering disciplines among underrepresented students.

The RISE program supports graduate students and seeks to address the issue of "underrepresented groups in degree attainment from bachelors to masters and doctoral degrees" (rise.nmsu.edu/history/).



Top: Florencia Visconti. Bottom: Raymond Berry

Since 2000, NMSU RISE has supported over 301 scholars and 305 degrees. The program boasts a 90% degree completion rate by RISE Scholars, and over 147 student-authored publications.

NATIONAL SCIENCE FOUNDATION HUB GRANT CREATES A NETWORK FOR STEM EDUCATION AMONG HISPANIC SERVING INSTITUTIONS

The National Science Foundation announced last year that New Mexico State University will receive a $2.6 million, five-year grant that will fund an HSI Resource Hub.

With the HSI Resource Hub, NMSU will create a network of the best practices among 450 hispanic-serving institutions and universities to improve STEM education. The Hub seeks to help Hispanic-serving institutions and empower students by sharing knowledge to improve grant writing, teaching practices, and other strategies and resources needed to improve the quality and retention of STEM education in undergraduates.

Regents Professor, Elba Serrano, is the principal investigator for NMSU. "Our institution is incredibly honored to be given this opportunity to be the national leader for this project," Serrano said. "But I want to emphasize that this is a team effort and that we were awarded this grant because of New Mexico State and CSUN's leadership as HSI research institutions and universities that have supported STEM research training and education, especially for underrepresented minorities, as part of their mission for decades."

BIOLOGY PROFESSORS RESEARCH SQUID AND BACTERIA FOR $800,000 NASA GRANT

NMSU Regents Professor Dr. Michele Nishiguchi and Associate Professor Maria Castillo were awarded a near $800,000 three-year NASA grant to research how changes in bacteria affect complex organisms.

The pair will conduct their research by studying how altered Vibrio bacteria affect host squids. “Vibrio bacteria are important microbes to squids because the bacteria colonizes the squid and produces bioluminescence, which the squid utilizes as a form of counterillumination and uses it for hunting and preventing detection by predators,” Castillo told the Las Cruces Sun News.

The researchers are able to mimic conditions of early Earth or today’s changing climate, by manipulating the Vibrio bacteria by changing the salinity, temperature, pH, or ultra-violet radiation. After the bacteria are altered, Nishiguchi and Castillo introduce the bacteria to newly hatched squids to see how it interacts with the squids’ immune systems. “If the altered bacteria are beneficial for the squids, they’ll retain it,” Castillo told the Sun News. “If the bacteria aren’t good for them or are harmful, the squids will reject the bacteria.”

Above: Dr. Nishiguchi collecting squids in Botany Bay, Australia.


Above: *Euprymna tasmanica*, the dumpling squid from Australia

Nishiguchi and Castillo will be collecting bobtailed squid from Sydney, Australia as well as congener species from Hawaii, and are kept in the squid lab in Foster Hall. Nishiguchi said they collect both Australian and Hawaiian species of squid for their research because they are robust and can be raised in artificial conditions in a laboratory more easily than other species.

“With this research, we’ll be able to determine how bacteria and animals evolved together when the first multicellular organisms appeared on Earth, and whether specific changes were necessary due to the evolution of this beneficial relationship,” Nishiguchi told the Sun News. “And we’ll be able to get an idea of what we can do to help keep beneficial associations healthy, like our gut microbiota under changing environmental conditions."
"The world’s climate is rapidly changing, and it’s important to study associations such as those between animals and bacteria in order to maintain this diversity and the existence of all multicellular life that depends on microbes.”

REGENTS PROFESSOR DR. KATHRYN HANLEY RECEIVES GRANT

Dr. Kathryn Hanley, of the Hanley Lab and a Regents Professor in the Department of Biology, received funding from the USDA Agriculture Research Service, the principal intramural scientific research agency, to research and develop an early warning system for the emergence of vesicular stomatitis virus.

Dr. Hanley heads the Virus Evolutionary Ecology Laboratory at NMSU, otherwise known as the Hanley Lab. It is here that she will continue to research vesicular stomatitis virus.

Above: Dr. Hanley of the Hanley Lab at New Mexico State University.

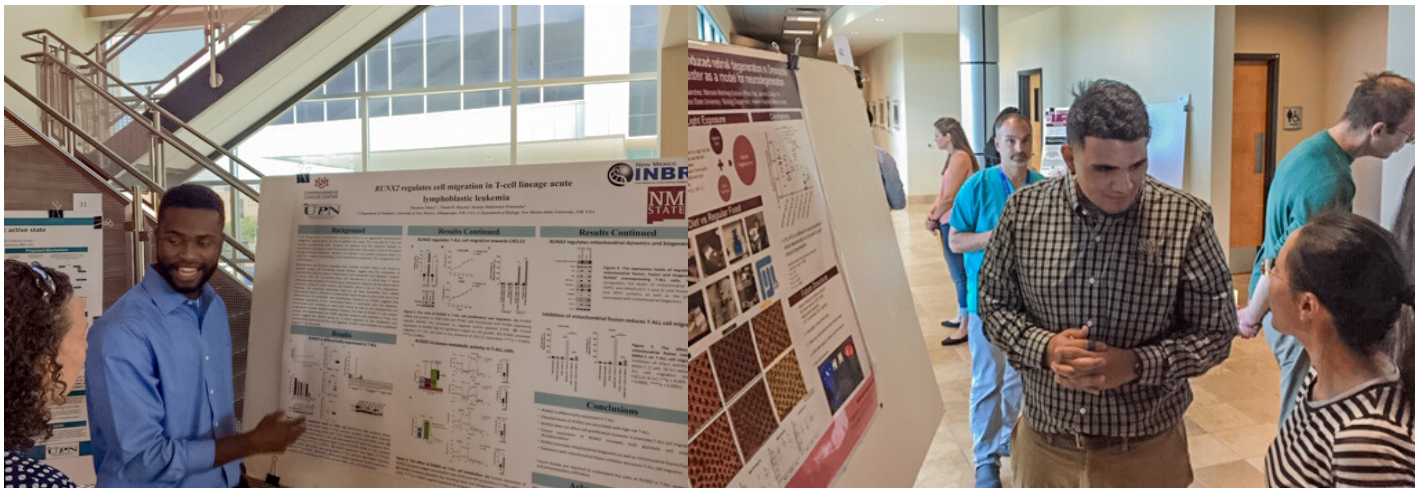
UNDERGRADUATES WIN BEST POSTERS IN ALBURQUERQUE

In August, two undergraduate biology majors, Theodore Muka and Luke Sanchez, presented at the UNM Health Sciences Center Summer Undergraduate Research Symposium.

Muka won best poster for his research examining the role of RUNX2 in acute lymphoblastic leukemia at the symposium as an NM INBRE Scholar.

Luke Sanchez won for his research that examined the effects of dietary stress on eye development. Sanchez is a HMMI Research Scholar in Dr. Jen Curtiss' research lab at NMSU.

Eight other posters were presented at UNM in the symposium by NMSU students.



Left: Theodore Muke presenting winning poster displaying his research on the role of RUNX2 in acute lymphoblastic leukemia.
Right: Luke Sanchez discussing his research on the effects of dietary stress on eye development shown on his winning poster.

GRADUATE STUDENTS PRESENT RESEARCH AT MICROBIOLOGY SOCIETY

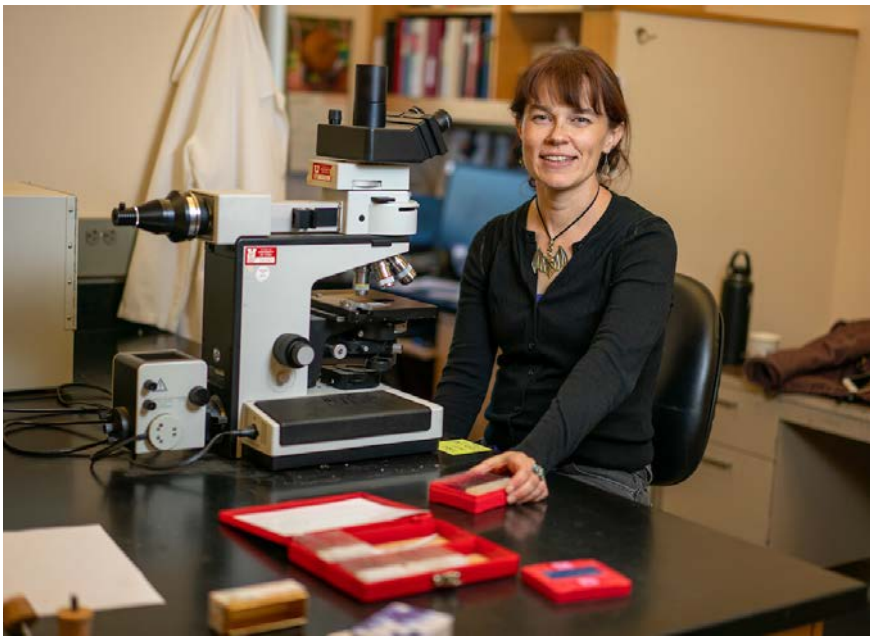
by Megan Mollett

The Hanley Lab, including PI Kathryn Hanley, post-doc Stacey Scroggs and Adam Hendy, Ph.D. students Katie Young and Eduardo Hernandez Acosta, and HHMI undergraduate scholar Jordan Gass attended the International Meeting on Arboviruses and Their Vectors.

The meeting, hosted by the European Microbiology Society, was at the University of Glasgow in September. Here, the Hanley Lab presented their research as oral presentations or posters for those who attended the event.

The meeting provided an opportunity to discuss arboviruses (viral infections passed to humans from insects known as arthropods), and their vectors - an area of research in biology that is becoming increasingly more important.

Left: The Hanley Lab representing New Mexico State University and The Department of Biology at the European Microbiology Society.



Above: Teri Orr

NEW FACES IN THE BIOLOGY DEPARTMENT

by Megan Mollett

The Department of Biology is excited to have new faculty joining next semester. Of the new faces joining the Department, there is Dr. Teri Orr, an evolutionary ecologist who is interested in how small mammals allocate resources towards reproduction in terms of time and energy as well as mating decisions. Orr will head a new Reproductive Ecology Lab at NMSU, where the lab will examine the evolution of diverse reproductive strategies used by small mammals.

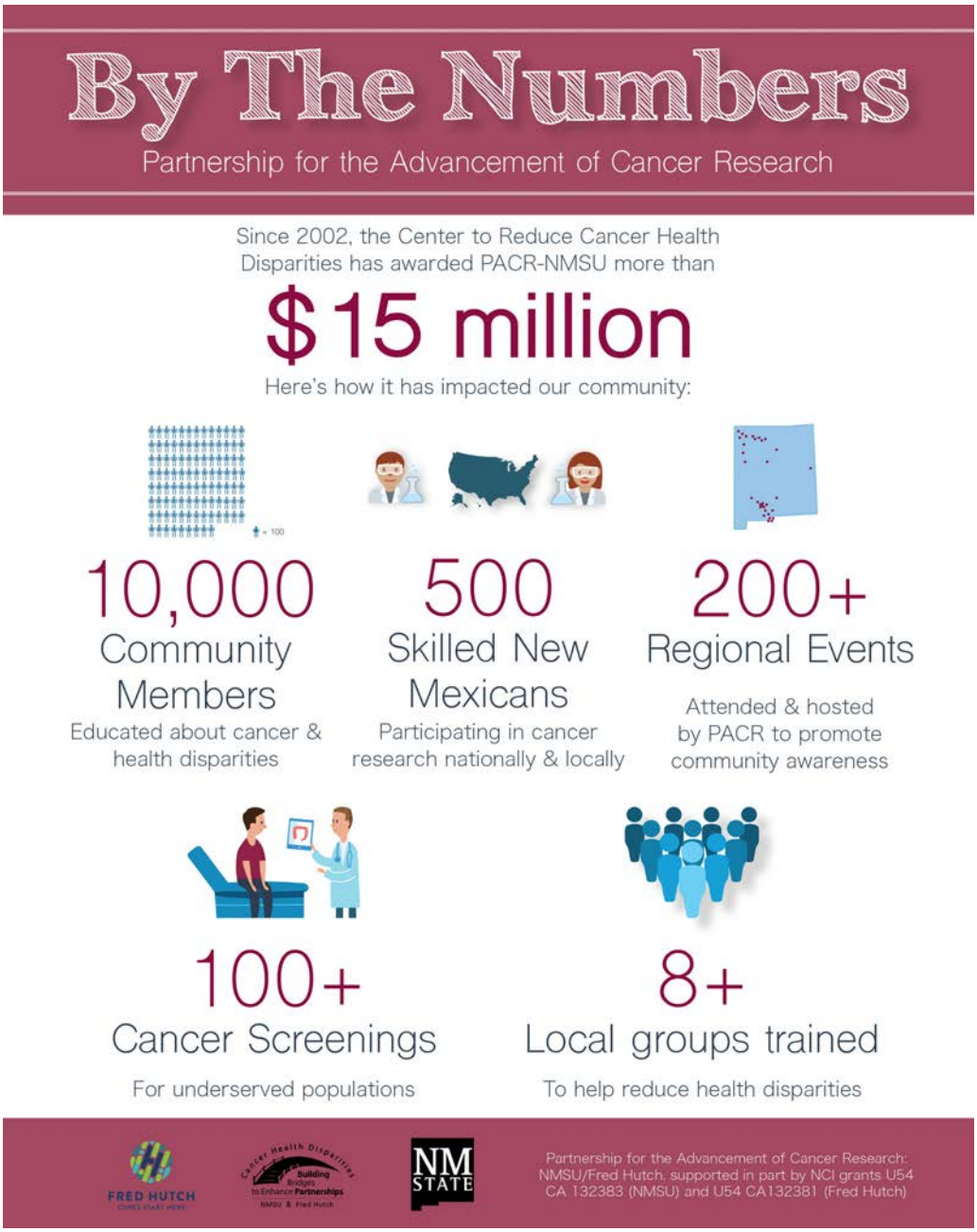
Orr will be teaching Animal and Human Physiology as an Assistant Professor once she arrives at NMSU next semester.

Dr. Orr is a fantastic addition to the already decorated faculty in the Department of Biology.

NMSU AND PACR GET A $5.8 MILLION GRANT RENEWAL FROM NATIONAL CANCER INSTITUTE

NMSU and its Partnership for the Advancement of Cancer Research (PACR) received a $5.8 million grant renewal from the National Cancer Institute.

NMSU and PACR received the grant to continue to bridge cancer health differences and disparities in underrepresented communities. The partnership seeks to diversify the community of scientists in cancer research and biomedical research by supporting students and faculty through the program.



Graciela Unguez is a Regents Professor and PACR's Lead Program Director, and has been in the program for the last 15 years. She told the NMSU News Center, "In this new cycle, we plan to continue improving the training of our students and junior faculty, while also building on our past success with community outreach to increase cancer screening - especially among the underserved in this region. This is a great opportunity for NMSU to be bold."

In the new five-year cycle, NMSU and PACR will take on two new pilot projects and two full research projects. The projects will run for three years and concentrate on health disparity issues in underserved populations. The topics the project will address include diagnostic biases in predicting breast cancer risk, understanding social determinants of health, and promoting healthy eating habits.

The partnership impacts the borderlands region and is designed specifically for Hispanic and Native American populations.

NMSU AND NMDOH STUDY FINDS INSECTICIDE-RESISTANT MOSQUITOES ACROSS NEW MEXICO

A recent study published by NMSU researchers in collaboration with the New Mexico Department of Health indicates that in one type of mosquito, *Aedes aegypti* or the yellow fever mosquito, there is widespread resistance to insecticides.

Biology professors Kathryn Hanley, Jiannong Xu, and Immo Hansen along with geography professor Michaela Buenemann, completed their research as a part of the SouthWest Aedes Research and Mapping project funded by NMDOH.

Yellow fever mosquitoes, as part of the SWARM project, were collected from all across the state, and tested in Hansen's Molecular Vector Physiology Lab at NMSU. "It's very easy, you take a bottle, put a certain amount of insecticide in there and let it dry," said Hansen to the NMSU News Center. "Then you put mosquitoes inside and record the time it takes them to die. A resistant strain takes maybe an hour until all of them are dead. If you have a susceptible strain they die in the first 5 minutes."

The study demonstrated significant and widespread resistance to pyrethroid insecticides, and permethrin and deltamethrin. Alamogordo however, is the exception as the city does not use pyrethroids or chemical pesticides, and instead uses Vectobac a bacterial larvicide.

NMSU PROFESSOR AND ALUMNUS DISCOVER LINK BETWEEN HUMANS AND HUMMINGBIRDS

Professor Timothy Wright and Marcelo Araya Salas, a doctoral graduate from NMSU, discovered a link between the vocal learning of hummingbirds and humans when researching hummingbirds utilization of vocal and visual behaviors in attracting a mate.

Salas said, to NMSU News Center, "We scientists have known for a while that hummingbirds are able to socially learn their songs and that was a clear indicator of vocal learning."

Researching vocal learning in hummingbirds and parrots was motivated by an attempt to understand both how and why humans develop vocal learning, Wright says. Hummingbirds and other birds are a good way to research this phenomenon because chimpanzees, our closest relatives exhibit very little examples of learned vocalizations.

Salas and Wright were able to determine that "some aspects of visual displays vary at a small geographic scale. This strongly suggests those aspects are socially learned," said Salas. This further indicates that there are similarities in how the human brain and the bird brain are arranged for vocal and visual learning.

Salas is continuing his hummingbird research in Costa Rica.

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CONCLUSION

The Department of Biology is proud of its achievements that staff, faculty and students have earned. It is these achievements that push the Department and New Mexico State University forward, in a positive direction, all while representing the Aggies in a national and international setting. #AggieUp