

School of Animal & Comparative Biomedical Sciences

ISSUE HIGHLIGHTS

Research



Students gain experience and win awards for their research working in ACBS laboratories.
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Teaching



ACBS Faculty came up with creative ways to keep students engaged when classes went online for the remainder of the Spring semester.
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Extension



The 4-H STEM Program held several great events to encourage and inspire youth to pursue STEM careers.
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Feature

ACBS-Made Hand Sanitizer Helps Supply Local Hospitals

Researchers in the School of Animal and Comparative Biomedical Sciences scaled down their work on bacterial infectious diseases to focus on the community's immediate need amid the COVID-19 pandemic. This included helping the hospital workers on the forefront with needed items to keep them safe – masks, gowns and hand sanitizers. The donations and ramping up of medical grade hand sanitizer was organized by ACBS faculty members, professor Gayatri Vedantam and associate professor VK Viswanathan, the project included research scientist Jennifer Roxas; research specialists Shylaja Ramamurthy and Rachel Claus-Walker; graduate students Anusha Harishankar, Farhan Anwar and Shobitha Jillela; and undergraduate researchers Alison Williams and Kayley Manuel.



The project "Bend the Curve" Researchers took extra precautions to develop an end product of the highest quality using formulations recommended by the World Health Organization (WHO).

Using the World Health Organization recommended guidelines, and extra care with sterile technique, the labs ensured that the end product was safe for all medical use. Colleagues in ACBS stepped up and donated (or provided) gallons of chemicals, hundreds of new travel size bottles, and collected Personal Protection Equipment (PPE). Thank you to the ACBS Faculty and staff who participated in collections, creation, donations, and deliveries during this critical time including: Arun Dhar, Sadhana Ravishankar, Kerry Cooper, Michael Riggs, Deborah Schaefer, Zeliann Craig, Connie Carter, Jennifer Teske, and Patricia Stock.

In response to an urgent call for donations to the Navajo Nation, which has been hit especially hard by the pandemic, the project was able to provide a donation of non-perishable food items to accompany the sanitizer delivery with colleagues Dan Engeljohn and Jennifer Roxas acquiring and donating many of the food items.

(Continued on 3)



To ensure the quality of the sanitizers team members wore personal protective equipment (PPE) when preparing product.



From the Director

Dear Faculty, Staff, Students, Alumni and Supporters of our School,

I want to begin this message by voicing my endless gratitude to you for your efforts and the understanding you've shown to the entire campus and community in response to the COVID-19 outbreak. The path the spring semester shifted to was something totally unexpected. We took extremely difficult, unprecedented actions, that may have significantly impacted the academic experience for all involved, however, the overarching goal was you and your safety.

I witnessed the amazing work our faculty members, academic advisors, and staff have done to help our students complete the spring semester. Our graduate students did an outstanding job with their online seminar presentations, as well as, their online theses and dissertations defenses. We also held an online commencement ceremony for the very first time in the history of the University of Arizona. In particular, I thought CALS did an incredible job and want to thank all involved in the compilation of the recording. I want to congratulate the Class of 2020 for your resilience and perseverance. Kudos to all! You did it!!

Bringing our campus back together safely is a gigantic task and also a promising one because it is a key step in the path forward to a post-COVID-19 in our academic world. As we look forward to the fall semester, our goal is to resume learning in-person activities as much as possible, and as long as it is safe to do so. Our faculty and staff are assessing and adapting their research and courses for the next academic year. While planning within such an uncertain environment is stressful, it is also important to keep in mind that the strength and creativity we can bring to that task – working together – is rewarding. It will also lead to imaginative and innovative ways to bring flexible solutions to meet our collective needs.

We will continue to share updates as new information develops. We will also continue to maintain and/or expand opportunities for feedback and find ways to connect virtually. More than ever, we must rely on each other for compassion, care, understanding and support.

Stay well,

Patricia Stock

ACBS Director and Professor
Weiler Endowed Chair for Excellence in
Agriculture and Life Sciences



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Finding Tomorrow's Solutions, Together.

FUNDING

Your gifts matter.



Gifts of any size help to propel ACBS closer to its goals and have an immediate and lasting impact on our programs. Your generosity provides outstanding educational opportunities for our students and helps to attract and retain the brightest faculty.

PARTNERSHIP

Together we change the world.



With your support, ACBS research gives back to the state of Arizona community through our extension programs, as well as the nation and the world, through the discoveries we make and the products we develop.

GIVE ONLINE

www.uafoundation.org/give/cals



Gifts may be made online at the University of Arizona Foundation website. Be sure to designate the funds by selecting other and typing in SACBS. For personalized options, contact us to discuss specific ways your contribution can be made or dispersed.

THANK YOU

Thank you for your commitment to ACBS.



Whether you choose to give to a specific project or program, or simply donate to the school overall, we thank you.

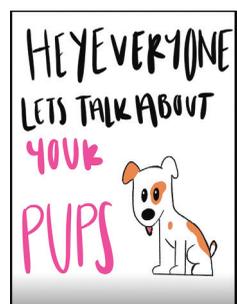
ACBS Faculty Engaged Students in Online Courses

In response to the COVID-19 pandemic, all in-person UArizona classes were transformed into online learning, following spring break. ACBS professors stepped up to the challenge and came up with creative and out of the box ways to keep students engaged.

For Drs. Dieter and Netzin Steklis, who co-teach ACBS 160 Human & Animal Interrelationships and ACBS 484 Applied Captive Primate Behavior in Practice, this included using VoiceThread, a collaborative, multimedia slide show program which allows users to leave comments on slides using voice, text, audio file, or video. They also produced short videos highlighting a topic with a bit of humor. Here's one of their videos focusing on horse warriors <https://www.youtube.com/watch?v=2n4tfGloVQU>.



Dr. Dieter Steklis starring in "A Silly Version of Horse Warriors" video for ACBS 160 Human and Animal Interrelationships course.



In Dr. Crista Coppola's courses, ACBS 311 Applied Companion Animal Behavior and ACBS 482/582 Applied Companion Animal Behavior in Practice, she and her preceptors worked together to come up with creative ways to engage students. For her graduate student course this involved creating a Public Service Announcement about risk factors associated with the COVID-19 stay at order home and dogs.

Natalie Kimble, a grad student in Applied Companion Animal Behavior, produced this public service announcement focused on what to do now to make dogs more comfortable when their owners return to work or school. <https://www.facebook.com/ua.acbs/videos/1619950264835912/>.

Learn more about the online transition in this ACBS article <https://acbs.arizona.edu/news/2020/04/uarizona-classes-go-online>

Cooperative Extension Helping Out

Betsy Greene, in coordination with Trent Teegerstrom, made a special delivery from Animal and Comparative Biomedical Sciences and Cooperative Extension to FRTEP agent Grey Farrell on April 24th to help Tuba City, AZ first responders deal with COVID-19 cases on the Navajo Nation. With the third highest rate of coronavirus infection in the U.S., the Navajo Nation has been severely impacted and is in need of supplies. The donation included 50 "Informed Arizona Equestrian" thermometers and 6 boxes each of Tyvek suits and medical gloves. Grey Farrell was able to deliver the supplies directly to Tasheena Nez the Western Agency Incident Command Manager for immediate use in the community. Additional deliveries of PPE, gloves, thermometers, and water along with the "Bend the Curve" hand sanitizer have been coordinated to tribes including Navajo, Apache, Hopi, and Tohoho Oodom. More deliveries are planned.



Photo: Betsy Greene

(l-r) Tasheena Nez the Western Agency Incident Command Manager accepts supply donations from Grey Farrell for use on the Navajo Nation.

(Continued from 1)

Hand Sanitizer

"Our faculty's dedication to ensuring the resilience and health of our communities, people, environment and economies is exemplary," said Shane Burgess, UArizona vice president of agriculture, life and veterinary sciences and Cooperative Extension. "Dr. Vedantam and Dr. Viswanathan have shown selfless commitment addressing an urgent need as we all work to 'flatten the curve' during this crisis."

As of April 14, 2020, the hand sanitizer project prepared approximately 500 liters and dispensed over 1,500 bottles and sprays!

Personal-use and spray bottles have been donated to:

- Carondelet Marana Hospital
- Banner - University Medical Center
- Northwest Hospital, Tucson

- The Navajo Area Indian Health Service (NAIHS)
- The Tohono O'odham Community Health Services
- The El Rio Community Health Centers
- University of Arizona Campus Health
- Desert Pediatrics, Tucson
- Circle the City, Maricopa County
- Hopi Tribe, Hotevilla Village
- The San Juan Southern Paiute Tribe
- Eloy Dairy

The "Bend the Curve Hand Sanitizer Project" was awarded a \$10,000 CALS COVID19 Pilot Projects grant funded through the UArizona College of Agriculture in late April 2020. The grant will allow further development and distribution of hand sanitizer.

Link to UA News Article

<https://uanews.arizona.edu/story/uarizona-research-labs-produce-hand-sanitizer-area-health-care-workers>



Above: Individual bottles of hand sanitizer ready for distribution.

Below: Shylaja Ramamurthy, a research specialist in ACBS, prepares hand sanitizer in a lab that typically works on bacterial infectious diseases.

Photos: ACBS



New ACBS Faculty in Meat Production and Livestock Judging



Duane Wulf, PhD

Duane Wulf, born in Morris, MN, received his BS and MS from South Dakota State University (SDSU) and his PhD from Colorado State University, all in Animal Science. Dr. Wulf held faculty positions at The Ohio State University (3 yrs) and SDSU (11 yrs), where he attained the rank of full professor. His university research focused on ante- and post-mortem factors

affecting beef and pork quality, attracted numerous graduate students, and resulted in 43 refereed journal articles.

Dr. Wulf was honored several times for his teaching excellence, highlighted by the Distinguished Teaching Award from the American Meat Science Association. For the past ten years, Dr. Wulf has served as a missionary businessman in Sonora, Mexico, where he started a meat processing plant, a cattle ranch, and a restaurant, all with the purpose of providing training and career opportunities to the fatherless and underprivileged. In addition to these positions, Dr. Wulf has worked across all production and processing phases of the meat industry and has been hired as a consultant both domestically and internationally by both small and large companies.

Dr. Wulf's position at the UArizona will be 40/40/20 Research/Teaching/Service. His research will focus on improving meat quality and safety and his teaching responsibilities will include ACBS 210 Introduction to Live Animal and Carcass Evaluation and ACBS 420 Meat Production. Dr. Wulf is fascinated with the Sonoran Desert ecosystem and has grown very fond of the culture and environment living in this unique section of earth for the past 10 years. He is excited to be back in academia and part of the land-grant mission at the University of Arizona.

Contact Dr. Wulf at dmwulf@email.arizona.edu.

William Milashoski, MS

Newly appointed Assistant Professor of Practice - Livestock and Livestock Judging Coach, William "Will" Milashoski, grew up in central Illinois. He hails from an agricultural background having grown up on a diversified grain operation raising corn, soybeans, wheat, and alfalfa. Will received his BS in Animal Science and his MS in Agricultural Education from the University of Illinois Urbana-Champaign.



In his new position he will be teaching Applied Animal Nutrition, Beef Capstone, and Calving Management. Additionally, he will be leading the judging team, which involves teaching Introduction to Livestock Judging and coaching the Junior and Senior Livestock Judging Teams. The teams typically travel to anywhere between 6 to 10 national livestock judging contests a year.

About joining the University of Arizona Will says, "I look forward to the chance to do my dream job of coaching a livestock judging team. I look forward to the opportunity to develop the UArizona team and help support the youth involved in agriculture within the state."

Will would also like everyone to know that he is always looking for students to try out for the judging team. It is a great opportunity to build decision making, reasoning, and public speaking skills. Students who choose to continue past the introductory course are very much like athletes. They practice multiple nights during the week, most weekends and compete in multiple national contests.

Contact Will at wmilashoski@arizona.edu.



Diaz Receives Richard Ruiz Diversity Leadership Faculty Award

Dr. Duarte Diaz, associate professor and associate extension specialist, embodies the spirit of the Richard Ruiz Diversity Leadership Award in his significant efforts to embed diversity and

inclusiveness into his work at the University of Arizona.

Diaz's nominators cite his work on the Arizona Dairy Farm Training program, which delivers training materials to Arizona's largely Hispanic dairy farm workforce and offers training opportunities in Mexico for people interested in working in the U.S. dairy industry.

"His efforts to address the safety and training of the Hispanic workforce in Arizona are truly stellar and carry the University of Arizona's efforts to improve diversity and inclusiveness beyond the campus boundaries and into the communities our land grant mission requires that we serve," said one nominator.

Another noted, "Duarte understands the challenges facing women and minorities in science, particularly agricultural sciences in Arizona. His own minority status gives him great insight relative to what others experience, and he recognizes that women/minorities are often "not invited to the table". He takes an active role to inform and engage excluded colleagues."

Promotions

Congratulations to all of our promoted ACBS faculty. Your hard work, dedication, and contributions to ACBS are integral to the success of our programs and our students.

Promotion to Professor

- V.K. Viswanathan

Promotion to Associate Professor of Practice

- Samuel Garcia
- Netzin Steklis
- John Scott Wilbur



ACBS Spring 2020 Outstanding Seniors

Award recipients credit hard work and perseverance in attaining their degrees.

Each semester, the College of Agriculture and Life Sciences (CALs), recognizes eighteen undergraduates and one graduate student earning their degrees from CALs with the Outstanding Senior Awards. Students are selected, one per major, and honored for their extraordinary accomplishments, both on and off campus, during their time at the UArizona.

Meet the ACBS Spring 2020 Outstanding Seniors

Giovanni Ryan Comella

Outstanding Senior | Animal Sciences

Ryan, initially chose his animal science major as it was the closest degree to a food studies/food systems undergraduate degree that was available at UArizona. He found that the course work has been extremely relevant and applicable to his food systems passion. He feels his degree gives him a unique edge as he understands the details behind the animal industry, a big part of the food system, in a way that he would not have with a different degree path. After graduation, Ryan will pursue a Master of Arts in Food Studies from Chatham University, where he will also serve as a graduate pedagogy research assistant. His goal is to become a professor and teach food studies/food history/food systems at the university level. Ryan would like to pass on this piece of advice to incoming students, “So many doors are opened once you give it your best, though it may not always equate to an A or a high GPA or accolades, the reward at the end of the day is the contentedness and satisfaction that you gave it everything you had.”



Katrien De Belder

Outstanding Senior | Microbiology

With an interest in pathogens and their ability to cause disease, a degree in microbiology was a natural fit for Katrien. After graduation, she plans to pursue a master’s degree in microbiology and has been accepted in the Accelerated MS Program in Microbiology in the School of Animal and Comparative Biomedical Sciences. Upon completion of her master’s degree, she hopes to find a position at the Center for Disease Control (CDC) in Atlanta, Georgia and work on projects that have socio-economic implications in the US and beyond. About receiving this award Katrien says, “I’m the first in my family to attend college, so everything about college was relatively unknown when I started my degree. At first, there was a bit of an adjustment period to college, but I was determined to set goals for myself in order to earn my degree and attend graduate school. This award represents the culmination of the hard work I put in throughout college to earn my degree and gain acceptance to graduate school.”



Vimarys Oliveras Miranda

Outstanding Senior | Veterinary Science

Vimarys, who goes by Vee, was born in Ciales, Puerto Rico. As a military child she has lived in many states including North Dakota, Georgia, Texas, Nevada, and Arizona. Serving the community is important to Vee, who through a CONSERVE Summer internship opportunity in the Ravishankar lab, investigated the effectiveness of ozone against *Salmonella entericain* recycled and non-recycled spinach wash water. Through her courses and independent studies, Vee has found a passion for science and laboratory work and plans to continue working in the Ravishankar Food Safety and Microbiology Lab and at the Prosenze Consumer Research Center, in Tucson as a lab technician. This work experience will help her to continue expanding her laboratory techniques and gain familiarity with research projects as she explores her career options. Her ultimate goal is to pursue a research position at a USDA laboratory and continue to apply her knowledge of microbiology, food safety, and sensory analysis towards improving public health. Vee’s advice to incoming freshman is to “Never give up on your academic career. In the end, all your hard work will be recognized.”



ALPHA (2018) Movie Event

Drs. Dieter and Netzin Steklis arranged for a showing of ALPHA, at the UArizona Gallagher Theater on February 27th. The movie depicts how the dog-human relationship might have begun. Nearly 75 students and friends attended the showing and stayed for a post-movie Q&A discussion with Dr. Crista Coppola (ACBS, UArizona) and Dr. Pat Shipman (Anthropology, Penn State, retired).

Drs. Dieter and Netzin Steklis moderated the session and encouraged student engagement by using a Catchbox throwable microphone to reach all corners of the room and providing “positive reinforcement” for participation by giving out toy dog figurines to students who asked a question. Highlights of the session included Dr. Coppola pointing out the real meaning of “Alpha” in a wolf pack (i.e., movie spoiler alert: it’s the designation for the breeding pair) and talking about the human-dog bond, while Dr. Pat Shipman, answered many questions via Zoom about Ice Age life.

Many thanks to all of our attendees and to Lorin Drake of the Student Union/Gallagher Theater for providing free admission, popcorn, and beverages!

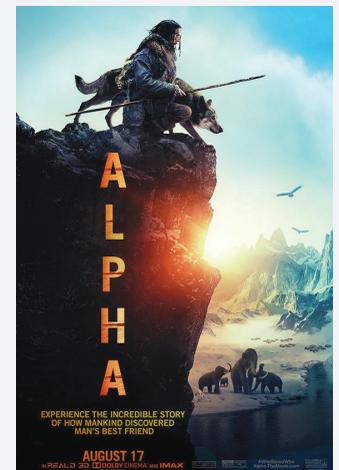


Photo: Official Movie Poster

Students in Renquist Lab Receive Awards and Honors

Jason Kronenfeld

Jason received several awards this semester including the **2020 Chemistry Outstanding Junior award**, which is awarded to one Chemistry and Biochemistry (CBC) student from each class standing per year to recognize academic and professional achievement, the **Excellence in Biological Sciences Scholarship**, which is awarded to an outstanding student performing research in a biological topic, and the **Michael A. Wells Research in Biological Sciences Scholarship**, which recognizes CBC students who are doing research in a biological topic with hopes of presenting the research at a conference. In addition he placed **first in the Student Showcase Undergraduate Researcher Environmental Impact Division** with his presentation on *A Mouse Model of Heat Stress, Hypophagia and Hypogalactia* as it applies to environmental impact, specifically through agriculture.

Jason is a junior in the Honors College pursuing a BS in chemistry with minors in french and math. He is currently leading work on two projects, the first focuses on understanding the mechanism by which heat suppresses food intake as an effect of global warming. Increasing heat-stressed food intake is proposed to increase milk production in lactating mammals, increase animal efficiency, and decrease milk production costs. This project is more biology based. The second project is working to create a novel approach to address glycemic control for treatment of type two diabetes mellitus. This second project is more chemistry based and will be the main part of Jason's honors thesis.

After graduating in 2021, Jason intends to immediately enter a PhD program in chemistry, followed with a post-doctoral fellowship with the ultimate goal of acting as a principal investigator in academia.

Stephanie Bruggink

Stephanie is a 3rd year PhD candidate in Physiological Sciences. She is interested in obesity related diseases and her current research focuses on understanding the underlying mechanism linking excess hepatic lipids with hypertension and decreased pulmonary function. Her goal, once she receives her degree, is to run her own laboratory at a large university. Stephanie was awarded the **National Heart, Lung, and Blood Institute T32 HL 007249** a **T32 Ruth L. Kirschstein Institutional National Research Service Award** from the National Institutes of Health (NIH). The goal of this award is to prepare trainees for a career in a health-related field. With this award Stephanie's PhD research will be fully funded for a year. About receiving this award she says, "I am incredibly honored, excited, and motivated. Not only to be able to continue my project, but also for the opportunities the award provides to network, grow as a professional, and share my research with others."



Photo: Anastasia Vasileva, MD

Susma Ghimire

Student Showcase Graduate Student Human Health Category; 2nd Place

The Graduate Student Poster Showcase is an opportunity for graduate students to share and present their current research through a poster and short 5 minute presentation. This helps students hone their public speaking abilities and to learn how to make their research understandable to the lay person.

Susma is a first year, Physiological Science Masters Student. She is currently working on two research projects. Her first project is focused on figuring out the mechanism by which obesity increases liver GABA production and release to affect type 2 diabetes. Her second project is focused on peripheral neuropathy. Peripheral neuropathy is a severe pathophysiology common to obesity and Type 2 diabetes. The project aims to assess the effect of diet induced obesity and the associated hyperglycemia on pain threshold in mice. After completing her Master's program, Susma plans to attend medical school and pursue a career as a physician.

Analisa Del Grosso

Co-Mentored by Dr. Benjamin Renquist and Dr. Luise King

The **Student Innovation Challenge Award** encourages students to design or develop a solution to a real-world problem. The award is sponsored by Tech Launch Arizona (TLA) and provides the necessary funds to complete the study which will be the basis for Analisa's honors thesis. Guidance is provided on the potential licensing of the invention with particularly promising outcomes receiving continued support from TLA to advance the technology for licensing to an existing company or as the basis for a startup. <https://techlaunch.arizona.edu/student-innovation-challenge-2020>.

For her thesis, Analisa is focusing on fighting pet obesity and addressing owner guilt when pets are placed on a diet. Pet obesity is a widespread issue with over 50% of dogs and cats in the US being either overweight or obese. This is in part due to pet owners showing affection towards their pets through food which can lead to overfeeding. Analisa proposes that by puffing air into dog food each piece of kibble will occupy a larger amount of space in the dog bowl without altering the amount of calories per piece of kibble. This way owners will be able to fill up their dog's bowl while actually reducing their calorie intake and not feel guilty for putting their pet on a diet.

Analisa will work alongside Dr. Luise King who will select the participants of the study. Study participants will be divided into two groups with instructions to restrict the amount of food they provide their dogs. One group will be given normal dry dog food while the other will be given the air puffed dog food.

Analisa is a junior in the Honors College studying veterinary science with a minor in spanish. Learn more about Analisa and the outcome of her research in our next newsletter.



Photo: Anastasia Vasileva, MD



Photo: Anastasia Vasileva, MD

Behind the Scenes with the Budweiser Clydesdales

The Budweiser Clydesdale Hitch is one of most iconic equine images in America and people from all backgrounds and interests flock to see the horses, and pageantry, when it is in their town; to see them in person is a very special occasion. Thanks to ACBS graduate Morghan Sonderer (December 2017), students in ACBS 370, Form and Function of the Equine Athlete, were able to study the horses up close and get a behind the scenes perspective of what it's like to travel with the team.

Even before graduation, Morghan started dreaming about being a part of the Budweiser team. She started in a seasonal part time position and worked her way up to a full-time position training the young Clydesdales, destined to join the famous hitch, at the farm in Missouri.

Morghan's dedication and talent did not go unnoticed and she was asked to join the West Coast traveling hitch. She now spends most of the year on the road with the Clydesdales. From cleaning the harness and shining the brass (which takes hours after each show), to caring for the horses, driving the semi, and being the liaison with the public, Morghan does it all. She shared this with the UArizona students who can now identify the ideal conformation and coloring of horses on the hitch as well as all the work it takes behind the scenes to keep the show on the road!

Right (l-r): Giselle Lugo, Taylor Owens, and Bryanna Rodda, students in ACBS 370, meet one of the Budweiser Clydesdales.



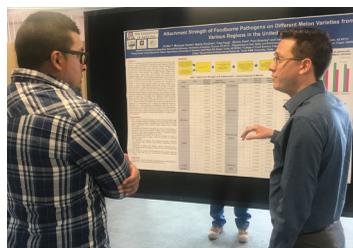
Below: ACBS 370 students in front of the Budweiser Clydesdales semi and trailer.



Photos provided by: RTIP

Student Food Safety Poster Session at the 2020 Southwest Ag Summit

Vicki-Lynne Scott (UArizona Microbiology alumni) of the Yuma Fresh Produce Council, was so impressed with the quality of the student work at the 2019 Food Safety Conference Poster Session, she invited all of the students to present their work at the inaugural Student Food Safety Poster Session at the 2020 Southwest Ag Summit, held February 27 in Yuma, AZ. Most of the student presenters were able to attend this great opportunity to network and connect with growers to share their food safety research findings. The event was also sponsored and supported by the Yuma Fresh Vegetable Association, Southwest Ag Summit Conference Organizers, and the Victor P. Smith Endowed Chair in Food Safety Education.



Revishankar lab member, David Rowlands (l), presents his research poster "Attachment Strength of Foodborne Pathogens on Different Melon Varieties from Various Regions in the United States" at the Southwest Ag Summit. Photo: Sadhana Ravishankar



Dr. Ravishankar's team (pictured (l-r) Libin Zhu, Richard Park, David Rowlands, Sadhana Ravishankar, Vimarys Oliveras, and Stephanie Arellano and (not shown) Bibiana Law) attended the Southwest Ag Summit and also visited with produce growers in Yuma to provide research updates and discuss research collaborations. Photo: Sadhana Ravishankar

Food Safety SARSEF Award

A team of students, staff, and faculty with food safety expertise, was assembled by Dr. Margarethe Cooper and Dr. Sadhana Ravishankar, to judge and place the Food Safety Award entries at the 65th annual SARSEF Science and Engineering Fair. Categories included Elementary, Middle, and High School Science Fair projects with 1st, 2nd, 3rd, and Honorable Mention being awarded in each of the 3 categories. The Victor P. Smith Endowed Chair in Food Safety Education, sponsored the new award for project submissions related to food safety. Due to the COVID-19 pandemic SARSEF was unable to hold in-person awards, but winners and a video awards ceremony were posted on the SARSEF YouTube Channel. <https://sarsef.org/8907-sarsef-2020-winners/>. The Southern Arizona Research, Science and Engineering Foundation (SARSEF), works to create Arizona's future critical thinkers and problem solvers through science and engineering and hosts one of the largest science fairs in the world, in Tucson, Arizona, each year.



The judging team for the Food Safety Awards, sponsored by the Victor P. Smith Endowed Chair in Food Safety Education, at the 2020 Southern Arizona Research, Science and Engineering Foundation (SARSEF) Fair held on March 12, 2020 in Tucson, AZ. Photo: Margarethe Cooper

UArizona 4-H STEM Program Encourages and Inspires Youth

The UArizona 4-H STEM (Science, Technology, Engineering, Mathematics) program collaborates with 4-H state leadership, county agents, volunteers, schools, and AmeriCorp members to bring hands-on problem-based learning activities to Arizona youth. Led by Dr. Gerardo “Jerry” Lopez, assistant professor and extension specialist, 4-H STEM activities aim to encourage and inspire youth to excel in their studies and pursue STEM careers. Activities include lego robotics, building circuits, exploring alternative fuels, solving foodborne outbreaks and more. Each activity is selected for the age of the audience and is culturally sensitive. Here’s a look at some of the activities and events held during the first part of 2020.

Circuits Program at Hopi Day School

On March 12th, 26 elementary students in the Gifted and Talented (GATE) program at the Hopi Day School, explored how electricity travels and how circuits work. The program was made available through a partnership with the Kykotsmovi Village in Second Mesa, Arizona on the Hopi Reservation. Susan Sekaquaptewa, a UArizona Cooperative Extension federally recognized Tribal Extension Program (FRTEP) Agent and her team collaborated with Mr. Kevin Loughran Hopi Day School GATE Teacher and Jerry Lopez to offer the circuitry STEM activity.



Students at the Hopi Day School explore how circuits work.

Family Science Night at Banks Elementary School

Banks Elementary School in Tucson, Arizona hosted a family science night for their pupils and their families to participate in different activities. One activity, hosted by Elina Rivas (undergraduate research assistant and animal science major), Dr. Fiona McCarthy (ACBS professor) and Dr. Gerardo Lopez showed students, parents and grandparents how removing “germs” with handwashing isn’t as easy as it looks. They demonstrated this using Glow Germ and helped participants view Gram-stained bacteria under a microscope.



Children at Banks Elementary learn the importance of hand washing with Elina Rivas (l) and Dr. Fiona McCarthy.

Wade Carpenter Middle School Leadership Club

Forty-seven 8th grade students from Wade Carpenter Middle School’s Leadership Club in Nogales, Arizona part of the C-CREO (College and Career Readiness & Educational Opportunities) Gear Up Program, toured the UArizona campus and participated in STEM activities at ACBS. Youth alternated between Gram-staining in the Lopez Lab with Monique Torres (research specialist), Shaira Perez (accelerated MCB Masters student) and Mai Nguyen (accelerated Microbiology

Masters student) and making Guar Gum Bubbles outside with Undergraduate Research Assistants Elina Rivas (Animal Science) and Breanna Salt (Veterinary Science).

8th Annual 2020 UA Health Professions Health Sciences High School Expo

Approximately 80 High School students from local Tucson high schools, Sunnyside, Desert View, Pueblo, Cholla, Tucson, and Amphi, participating in the TRIO Education Talent Search (ETS) and Upward Bound programs were exposed to rotations in; Public Health, Nursing, and Food Safety at the UArizona Health Science Campus. Monique Torres 4-H program coordinator and research specialist and Dr. Jerry Lopez provided Food Safety hands-on engaging activities, foodborne outbreak collaboration efforts and career opportunities to peak students’ interest in pursuing STEM careers.



The Tucson weather provided the perfect day for students from Wade Carpenter Middle School to work with Guar Gum bubbles.



Dr. Jerry Lopez leads students through a foodborne outbreak activity.

2020 Southwest Ag Summit at Arizona Western College, Yuma Arizona

Over 100 students from local High Schools in Yuma, Arizona attended the annual Southwest Ag Summit. One presentation, provided by Dr. Gerardo Lopez, included a Food Safety activity where students worked in groups to try to determine the cause of a foodborne outbreak. The activity demonstrated the complexity and collaborative nature involved in solving foodborne problems and explored the different types of careers a response could encompass.

CALS Open House Recruitment Night

ACBS showcased department majors and provided breakout sessions on Food Safety to almost 100 prospective students and their parents on February 7th. Hosted by CALS Recruitment and Academic Services, students and parents rotated between activities from three departments in CALS. Shaira Perez, working with Dr. Gerardo Lopez, delivered a hands-on microscope activity. Students learned how to view Gram-stained bacteria slides, while learning the importance of Food Safety and related career opportunities.



Future UArizona students and their parents work with microscopes and learn about the ACBS Food Safety major at the CALS recruitment event.

Photos: Jerry Lopez

COVID-19 Educational Resources for Horse Owners and Businesses

The COVID-19 pandemic and resulting stay-at-home directives, adopted out of necessity to protect human health, introduced significant challenges for horse owners and small equine businesses locally and nationally. Restricted access, and in many cases closure of barns, resulted in a multitude of questions and concerns within the equine community which needed to be addressed rapidly. Our national working group of State Extension Horse Specialists, [Extension Horses, Inc. \(EH\)](#), coordinated the development and delivery of a variety of educational resources utilizing a combination of online formats and dissemination through social media and EH member contact lists. A series of infographics, webinars, and podcasts (three in each category) were created to provide guidance on essential care of horses, emergency preparedness, financial assistance, legal concerns, and biosecurity during the crucial, initial weeks of the pandemic (March-April 2020). An article outlining the efforts and responses has been accepted for publication by the Translational Animal Science journal.

2020 Range Livestock Nutrition Workshops

The 2020 Range Livestock Nutrition Workshops were held March 10th in Benson, March 11th in Prescott, and March 12th in Holbrook. The workshop provided a full day of research based information to Arizona livestock producers delivered by Arizona Cooperative Extension personnel and our great sponsors. The workshop, organized by Dr. Duarte Diaz (ACBS) and Ashely Wright (Cochise County), is traditionally held in multiple locations around the state to accommodate as many producers as possible to help them improve the care and profitability of their animals and operations. Topics included Market & Economic Trends, the Role of Trace Minerals, Record Keeping Apps and Technology, and Ranch Horse Economics (given by ACBS's Dr. Betsy Greene). The workshop also included a Beef Quality Assurance course so that producers could receive or update their certification.

Many thanks to our Cochise county, Yavapai county, and Navajo county extension colleagues for assisting with logistics, hosting the group and making it possible to offer these workshops statewide.

AZ 4-H AG at Home

When COVID-19 derailed all of the face to face agricultural extension programming, Dr. Betsy Greene worked with her colleagues to create AZ 4-H AG at Home. AZ 4-H AG at Home provides some fun ways to share knowledge and give youth an opportunity to learn about and then try out some of the skills and projects demonstrated in the videos during quarantine and beyond.

- The Informed Arizona Equestrian – Grooming Your Horse <https://youtu.be/whEMRFwUdpQ>
- The Informed Arizona Equestrian – Tying a Quick Release Knot <https://youtu.be/lbRwWMrtM4o>
- How to Make a Nipple Drinker for the Chick Brooder <https://youtu.be/iWX-L0Z1o9o>
- Making Your Own Hand Sanitizer at Home <https://youtu.be/bU1vHvazOY8>
- Deworming Your Horse <https://youtu.be/iCh7m6TZiRM>
- Haltering Your Horse – Training Tips for Developing Trust <https://youtu.be/Q1IKXvTFbS4>
- DIY Watering Container <https://youtu.be/SzNk-8fZ7Y4>



Tack Box Talk

COVID Tales Part 2: The Story of how veterinarians are coping

APRIL 12, 2020 KRIS HINEY SEASON 2 EPISODE 12



Betsy Greene worked as a part of Extension Horses, Inc. to develop COVID-19 resources for horse owners and small equine business owners.

Podcasts:

- [COVID Tales Part 3: The Stories of How Barns Stay Safe Successfully - Tack Box Talk 2:13](#)
- [COVID Tales Part 2: The Story of How Veterinarians are Coping - Tack Box Talk 2:12](#)



Ashley Wright, Cathy, Josh Grace, Nate Brawley, Duarte Diaz, Betsy Greene, Russ Tronstad, and Nathan Notah represented campus (statewide) and 6 other counties at Day 3 of the Range Livestock Nutrition Workshop series in Holbrook, AZ.

Photo: Betsy Greene

UA Arizona Horse programs and publications are recognized nationally

National Finalist, National Association of County Agricultural Agents Search for Excellence in Livestock Production. **E.A. Greene**, and A.D. Wright. 2020. "Southern Arizona Equine Health Symposium: Meeting the Educational Needs of Arizona Horse Owners Through Cooperative Extension and Veterinary Partnerships". (to be presented Sept. 2020, Virginia Beach, VA).

National Finalist, National Association of County Agricultural Agents Communications Award-Publication. **E.A. Greene**, and C. Grimbleby. 2020. "The Informed Arizona Equestrian: Preventing Sand Colic". (to be presented Sept. 2020, Virginia Beach, VA).

Regional Finalist, National Association of County Agricultural Agents Communications Award-Program Promotional Package. **E.A. Greene**, and A.D. Wright. 2020. "Multiple Tactics for Reaching a Very Diverse Audience for the Annual Southern Arizona Equine Health Symposium. (to be presented Sept. 2020, Virginia Beach, VA).

News from the Stock Laboratory

The Stock laboratory welcomed new member Emilie Lefoulon, who will serve as a Postdoctoral Research Associate II and is investigating the symbiosis between *Steinernema* nematodes and *Xenorhabdus* bacteria considering an omics approach.



Members of the Stock Lab with Dr. Patricia Stock (seated left).

Additional new undergraduate student members include Shianna Stuart, a plant science major and fellow of the University of Arizona Undergraduate Biology Research program (UBRP), and Jee Lee, a physiology major and member of the University of Arizona Honors College who will be conducting her Honor Thesis in the lab.

Congratulations to Ayako Kusabae, PhD candidate in the Entomology and Insect Science GIDP who passed her written oral exams. Ayako also received a Center for Insect Science Award for her research on “The antihelmintic activity of secondary metabolites from *Photorhabdus* bacteria”.



Graduating lab member, Isabel Forlastro.

We congratulate and bid farewell to Isabel Forlastro, who graduated with a double major in veterinary science and microbiology and was a member of the lab for 5 years. She completed her Honors thesis on “*Galleria mellonella* as a model host for studying Type 3 Secretion System in enteropathogenic *E. coli*”. She will be joining Cornell University’s Biomedical & Biological Sciences (BBS) PhD program housed in the College of Veterinary Medicine.

Presentations and Symposia

Arellano S and **Ravishankar S**. “Green Sanitizers: Improved Safety and Shelf-life of Iceberg Lettuce Washed with Plant-based Antimicrobial Microemulsions”. Poster presented by **Stephanie Arellano** at the SW Ag Summit. Yuma, AZ, February 27, 2020.

Nguyen M and **Ravishankar S**. “Antibiotic Resistance and Susceptibility of Bacterial Isolates from Various Irrigation Water Sources”. Poster presented by **Sadhana Ravishankar** at the SW Ag Summit. Yuma, AZ, February 27, 2020.

Oliveras V, Park, R and **Ravishankar, S**. “Efficacy of ozone against *Salmonella* Newport in recycled and non-recycled spinach wash water”. Poster presented by **Vimarays Oliveras** at the SW Ag Summit. Yuma, AZ, February 27, 2020.

Park R. “Research Opportunities: Food Safety Lab- Creating a Safer Farm to Fork Journey”. Oral presentation given at the Faculty Data Blitz on behalf of Dr. Ravishankar at the University of Arizona, Tucson, AZ on February 28, 2020.

Park R, Rao A, Porchas M, Patil B, Brierley P and **Ravishankar S**. “Understanding the Cross-Contamination of Melons via Environmental Matrices Simulating Field Conditions”. Poster presented by **Richard Park** at the SW Ag Summit. Yuma, AZ, February 27, 2020.

Rao A, Park R, Porchas M, Patil B, Brierley P and **Ravishankar S**. “Microbial Quality During Storage, Prevalence of Foodborne Pathogens and *Salmonella* Colonization Based on Variances in

Netting Densities of Melons Grown in Different Regions of the United States”. Poster presented by **Sadhana Ravishankar** at the SW Ag Summit. Yuma, AZ, February 27, 2020.

Ravishankar S. “Food Safety- Identify Critical Control Points and Develop Pre- & Post-harvest Strategies to Minimize Microbial Contamination”. Oral Presentation given at the Annual PI Meeting USDA-SCRI Melons project via zoom at the University of Arizona. Tucson, AZ on January 24, 2020.

Wei Q, Rowlands D, Torres M, Porchas M, Fang T, Patil B, Brierley P and **Ravishankar S**. “Attachment Strength of Foodborne Pathogens on Different Melon Varieties from Various Regions in the United States”. Poster presented by **David Rowlands** at the SW Ag Summit. Yuma, AZ, February 27, 2020.

Zhu L, Olsen C, McHugh T, Friedman M, Jaroni D, and **Ravishankar S**. “Apple, Carrot, and Hibiscus Edible Films Containing Plant Antimicrobials Inactivate *Salmonella* Newport in Packaged Organic Leafy Greens”. Poster presented by **Bibiana Law** at the SW Ag Summit. Yuma, AZ, February 27, 2020.

Zhu L and **Ravishankar S**. “Incidence of Fecal Indicator and Pathogenic Bacteria in Reclaimed and Return Flow Waters in Arizona, USA”. Poster presented by **Libin Zhu** at the SW Ag Summit. Yuma, AZ, February 27, 2020.

Publications

Anderson KP, Pulec KE, Skelly CD, Wright AD, and **Greene EA**. (2020). Reach Versus Impact: Comparing Webinars and Online Short Courses for Educational Outcomes. Journal of Extension, 58(1). (<https://joe.org/joe/2020february/rb4.php>)

Aranguren Caro LF, Mai HN, Nunan L, Lin J and **Dhar, AK**. (2019). Assessment of transmission risk in WSSV-infected shrimp *Penaeus vannamei* upon cooking. Journal of Fish Diseases. <https://doi.org/10.1111/jfd.13128>.

Mai HN, Cruz-Flores R, Aranguren Caro LF, Noble White B, and **Dhar AK**. (2020). A comparative study of *Enterocytozoon hepatopenaei* (EHP) challenge methods in *Penaeus vannamei*. Journal of Invertebrate Pathology. In Press.

Sullivan TJ, **Dhar AK, Cruz-Florez R,** and Bodnar AG. (2019). Rapid, CRISPR-based, field-deployable detection of white spot syndrome virus in shrimp. Scientific Reports, 9: 19702.

Vitha S and **Ravishankar S**. (2020). Surface texture analysis of melon rind using 3D reconstruction from SEM stereo images. Texas Journal of Microscopy. 51(1):24.

Zhu L, Olsen C, McHugh T, Friedman M, Levin C, Jaroni D and **Ravishankar S**. (2020). Edible films containing carvacrol and cinnamaldehyde inactivate *Escherichia coli* O157:H7 on organic leafy greens in sealed plastic bags. Journal of Food Safety. 2020;e12758. <https://doi.org/10.1111/jfs.12758>.

Extension

Greene EA and Wright AD. (2020). “Barn Smarts for Biosecurity: Tips for Keeping Your Horse Safe and Healthy” *Updated February 2020. <https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1709-2020.pdf>.

Greene EA and Wright AD. (2020). “Tips for Keeping Your Horse Healthy” Poster (English). <https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/horse-biosecurity-poster-english.pdf>. (Spanish). <https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/horse-biosecurity-poster-spanish.pdf>. (Apache with Arias, J.). <https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/horse-biosecurity-poster-apache.pdf>.

Greene, EA. (2020). “Tips for Desert Riding” Infographic. <https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1816-2020.pdf>.

Aquaculture Pathology Laboratory Updates

2nd International Conference of Shrimp Aquaculture January 23 - 24, 2020 Obregon, Mexico

Dr. Luis Fernando Aranguren Caro was invited by “Reunión Científica y Tecnológica sobre el Cultivo de Camarón, to give a talk on “Emerging Diseases in Shrimp Aquaculture in Mexico”.



Dr. Luis Fernando Aranguren Caro presents at the second International Conference on Shrimp Aquaculture.



Dr. Luis Fernando Aranguren Caro presents at AQUAINDIA-2020.

AQUAINDIA-2020 January 31 - February 2, 2020 Kochi, India

Dr. Luis F Aranguren Caro, was invited to give a talk on “EHP and White Feces Syndrome: Lessons from what we have learned in Latin America, Indonesia and India” and lead a panel discussion on “Shrimp Diseases: Status, Challenges and Way Forward”. The two day conference was attended by academia and industry leaders from the Americas, Europe, Asia, Africa and Australia. Currently, India is the second largest shrimp producer in the world.

Aquaculture America 2020 February 10 - 12, 2020 Honolulu, Hawaii

Dr. Arun K. Dhar, chaired a Session on “Shrimp Health & Diseases” at this World Aquaculture Society (WAS) conference. He also presented a paper on the recent outbreaks of an economically important shrimp virus in the US. Additionally, Dr. Luis Fernando Aranguren Caro, gave two talks, one on “Assessing infectivity of fecal string obtained from EHP infected *Penaeus vannamei* shrimp at different salinities” and on “Assessment of transmission risk in WSSV-infected shrimp *Penaeus vannamei* upon cooking”.

Lauren Ochoa, an Aquaculture Pathology Laboratory microbiology graduate student received a second place student award for her MS Thesis project work. Lauren is trained by Dr. Roberto Cruz Flores and mentored by Dr. Arun K. Dhar. <https://www.was.org/Meeting/Program/PaperDetail/156502>



(l-r) Lauren Ochoa, Dr. Aruhn K. Dhar and Dr. Luis Fernando Aranguren Caro at the Aquaculture America 2020 conference.



ACBS MS student Lauren Ochoa receives a second place student award at the Aquaculture America conference in Honolulu, Hawaii.

New Animal Anti-Viral Treatment

Dr. Arun K. Dhar has led the development of a new treatment for preventing the spread of viral pathogens in animals, including shrimp farm populations, using genome editing tools. Initially the technology was developed to target white spot syndrome virus (WSSV), a widespread and lethal shrimp virus which causes white spot disease.



Photo: Anne Spieth/Tech Launch Arizona

From left: Arun Dhar of the UArizona Aquaculture Pathology Lab and Craig Mosman of Cibus Biotechnologies.

“White spot disease is a threat to sustainable shrimp aquaculture globally,” Dhar said, “In addition to shrimp, the virus infects a wide array of aquatic invertebrates and poses a threat to aquatic ecosystems.”

According to Dhar, there is no commercially available therapy against WSSV.

For WSSV, the UArizona-developed viral treatment is delivered to the shrimp via feed. The treatment doesn’t genetically change the shrimp in any way. When the pathogen attacks the treated shrimp, pathogenesis of the virus is cut off, rendering it harmless and unable to create an infection.

Through Tech Launch Arizona (TLA), the UArizona office that commercializes inventions stemming from research, the university has protected the intellectual property for the invention and licensed it to Utah-based Cibus Biotechnologies for further development.

“We are pleased to be working with Dr. Dhar and the University of Arizona on this important project,” said Cibus Biotechnologies C.E.O. Jared Bauer. “While our initial focus is to develop a treatment for African Swine Fever (ASF) and WSSV, we see potential for broad application in animal health.”

Originally published by Tech Launch Arizona. Read the full article at <https://techlaunch.arizona.edu/news/uarizona-licenses-anti-viral-treatment-animal-disease>.

UArizona Student Showcase January 29, 2020

Undergraduate students working in the Aquaculture Pathology Laboratory, Tiffany Bledsoe and Grant Malinowski won **first place in the Innovation and Technology category** for their work on the development and implementation of a new digital workflow and database system for accessioning, sample tracking, and reporting of results on shrimp disease diagnostics to clients.



(l-r) Grant Malinowski and Tiffany Bledsoe present their work at the UArizona Student Showcase.



Tessa Brown

New Additions

We welcomed Contessa “Tessa” Brown to APL as our new Histology Laboratory aide as of January 2020!



Congratulations Class of 2020!

University of Arizona President Robert C. Robbins conferred more than 11,000 degrees at the university's first-ever virtual Commencement on May 15 which featured speeches from campus leaders, students and others.

An in-person ceremony is planned during Homecoming Weekend on Oct. 30.

Watch the UArizona Commencement

<https://commencement.arizona.edu/>

Watch the CALS Commencement

<https://www.facebook.com/uarizonaCALS/videos/2361328257493883/>

Upcoming Events

July 12

IFT20 Virtual Experience
The Institute of Food Technologists
iftevent.org/register/ift20updates

July 16 - 18

Summer Convention
Arizona Cattle Growers' Association
McDowell, Arizona
azcattlegrowers.org/summer-convention

July 19 - 23

2020 ASAS-CSAS-WS ASAS
American Society of Animal Science
Virtual Meeting
asas.org/CSAS/Meetings

August 24

Fall Classes Begin
The University of Arizona
Tucson, Arizona
arizona.edu

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