

# School of Animal & Comparative Biomedical Sciences

Feature

## ISSUE HIGHLIGHTS

### Research



Postdoctoral Researchers represent the future of ACBS research and education through the new skills and collaborations they bring.

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### Teaching



The UArizona Feedlot, under the direction of Dr. Duarte Diaz, provides a plethora of hands-on cattle handling and management opportunities.

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### Extension



ACBS Extension Specialists create virtual opportunities for Arizona 4-H youth.

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## ACBS Postdoctoral Researcher Receives Esteemed USDA Award

Jennifer Lising Roxas, a postdoctoral fellow, recently received three postdoctoral research grants, including a two-year USDA NIFA Postdoctoral Fellowship. She works in the laboratory of Gayatri Vedantam, professor of immunobiology and animal and comparative biomedical sciences (ACBS). Roxas received her PhD in Microbiology and Pathobiology from the University of Arizona working under the advisement of V.K. Viswanathan, professor in ACBS.



Through the USDA fellowship Roxas will be awarded \$165K over the next two years to purchase research supplies, attend professional development conferences, and supplement her salary. Roxas was also awarded the Sursum Postdoctoral Fellowship, a UArizona Postdoctoral Research Development Grant that fosters independence and advances the career goals of postdoctoral scholars, and the BIO5 Postdoctoral Fellowship, demonstrating her grant writing prowess to the USDA grant reviewers helping to secure her USDA fellowship. Roxas will use the grants to further study *Cryptosporidium*, a microscopic parasite that causes diarrheal disease in humans and other animals.

Infections with *Cryptosporidium*, or Crypto, are the leading cause of water-borne diseases among humans in the US. The parasite is often transmitted at daycare facilities and public swimming pools, and infection leads to severe diarrhea, which can have life-threatening consequences, especially in immunocompromised patients. Crypto is the second leading cause of infectious diarrhea in children, and it is also the leading cause of diarrhea-related death in neonatal calves.

There are currently no vaccines for human infection. According to Michael Riggs, professor of pathology in the College of Medicine-Tucson and ACBS, the current treatment option is both expensive and lacking efficacy, as it minimally reduces length of disease. Crypto is also resilient to environmental insults such as drought and high heat, as well as man made chlorine-based products. Thus, methods to prevent and treat Crypto infections in humans and animals are desperately needed, but tools to study the parasite are sparse.

Bringing a strong background in the mechanisms of Crypto infection from her previous ACBS research, Roxas aims to use her new award to develop tools to prevent infection altogether. By combining her background in proteomics with Vedantam's expertise in probiotics, Roxas plans to create a probiotic strain of bacteria that



# From the Director

Dear Faculty, Staff, Students, Alumni and  
Supporters of ACBS,

I hope this message finds you and your families in good health. We have just started a new academic year under unique and challenging circumstances triggered by the current global pandemic. As you can imagine, getting ready to open our campus required the hard work of many people, including our faculty and staff who have worked throughout the summer to prepare for new modes of teaching and adapt activities to continue delivering excellent research and extension programs.

I want to recognize three faculty members who went above and beyond with their efforts and time for optimizing their courses and maintaining the quality of our teaching as we faced the challenges of remote teaching and learning. Scott Wilbur and Rebecca Kochanoswky developed a “Lab in a Box” toolkit to facilitate teaching the Microbiology labs remotely. Crista Coppola took the lead in the coordination of existing and developing new sections for our Introduction to Animal Science laboratory (ACBS 102) so this course could be delivered in a flex-in-person modality combining remote and in-person activities. This is one of the few classes considered essential for being taught in-person.

Last year, ACBS embarked on a curricular update for each of our academic programs, beginning with the Animal Sciences degree. The Curriculum Task Force Team tasked with revisiting this degree, has resumed its’ activities this semester and will continue to make progress throughout this new academic year. Our goal is to develop a visionary undergraduate curriculum that provides students with courses and the hands-on experience they need to be competitive in tomorrow’s workforce.

Over the past month, we have been fortunate to welcome several new faculty members. These scientists and educators will expand opportunities in our Animal Sciences program and strengthen our connection with public and private sectors. Please join me in welcoming Dr. Chi Zhou, Assistant Professor in Reproductive Physiology, Dr. Duane Wulf, Associate Professor in Animal Science/Food Safety, and Mr. William Milashoski, Assistant Professor of Practice in Livestock Judging. Elaine Norton, DVM, PhD, will soon join Dr. Fiona McCarthy’s team as a postdoctoral associate. Elaine’s research focuses on the contribution of genetics to production traits for livestock and companion animals (page 3). Philip O’Hara, president of P.T. O’Hara, Jr. Services, Inc., was hired as a Professor of Practice in the Racetrack Industry Program. He brings tangible experience from many aspects of the racing industry, and will be a strong addition to the program (page 5).

I sadly announce the departure of Hanh T. Do, Manager of Finance and Administration of ACBS. I want to recognize Hanh’s efforts to bring new standards for the operations of the business office and for the management of our diverse programs and facilities in our School. I wish her good luck in her new career endeavors! A search is currently ongoing to replace her position.

This fall semester is nothing like any of us have experienced before, but I can assure you that we have and are working very hard to plan a semester that will provide the high-quality to which you are accustomed. Thank you for working with us to deliver the best possible outcome as we prepare for the months ahead. As always, do not hesitate to contact me with any questions or suggestions you may have.

*Patricia Stock*

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



## Support ACBS

*Finding Tomorrow’s Solutions, Together.*

Gifts of any size help to propel ACBS closer to its goals and have an immediate and lasting impact on our programs and students. Gifts may be made online at the University of Arizona Foundation website or contact us to discuss more personalized options.

LEARN MORE AT [ACBS.ARIZONA.EDU](https://ACBS.ARIZONA.EDU)

The Food Safety Consortium (FSC) hosted a Summer Invited Speaker Series to expand the knowledge of members, and foster further research collaborations. The summer months are typically slower for the group, however, with many members working virtually this year, FSC Chair, Dr. Sadhana Ravishankar, felt it provided a great opportunity to offer various presentations and continued networking for consortium members.

Speakers included Dr. Chuck Gerba with the UArizona WEST Center, Dr. Vijay Juneja speaking on predictive microbiology, Drs. Sam Garcia and Duane Wulf with the UArizona Food Product and Safety Lab, and Dr. Jean McLain speaking on antibiotic resistance.

FSC membership is free and open to anyone with an interest in food safety. For more information go to <https://safefood.arizona.edu>.



Invited Speaker - Dr. Vijay Juneja



Invited Speaker - Dr. Jean McLain



Invited Speaker - Dr. Sam Garcia and Dr. Duane Wulf



Invited Speaker Dr. Charles Gerba

(Continued from 1)

## USDA Fellowship

inhabits the same intestinal niche as *Crypto*. Given as a supplement to the newborn calf, the probiotic is expected to out compete *Crypto* for the same space in the gut, thereby preventing infection.

Roxas also hypothesizes that the probiotic could be used like a vaccine, and if given to pregnant cows, might be able to produce hyperimmune colostrum - the antibody-rich mammary gland secretion following birth - for passive immunity in the newborn calves.

Roxas says her work is a collaborative effort, "I am truly grateful to our ACBS family for the support I have been fortunate to experience throughout these years. My career achievements, including this grant award, was made possible by the positive learning and working environment in our department and the University."

This collaboration not only draws upon the techniques she learned from both Vedantam and Viswanathan, but also to the methods to study *Crypto* from her third mentor, Riggs. According to Roxas, Riggs is a "world-renowned expert in *Crypto* research" and has pioneered many of the research tools and infection models used to study the parasite.

In addition to studying *Crypto*, Roxas directs the production of hand sanitizer for Arizona health care workers amid the COVID-19 pandemic. According to Vedantam, Roxas' leadership has enabled the team to scale up from producing just 100 bottles of sanitizer in March, to now more than 30,000 bottles.

Roxas plans to build a career determining the ways in which different intestinal pathogens cause life-threatening illnesses as an independent university research professor.

- Adapted from *BIO5 Newsletter* 8/25/20

Read Full article:

<https://bio5.org/news/bio5-postdoctoral-fellowship-serves-catalyst-esteemed-usda-award>

## New ACBS Postdoctoral Awards

**Dr. Surya Saha** is experienced in genomics, previously working on plant pathogens at Cornell University and leading the bioinformatics team for a USDA funded multi-institutional citrus greening project involving vector biology, insect multi-omics and biological databases, at the Boyce Thompson Institute. At the beginning of this year Surya was funded via a USDA contract to develop and provide workflows for functional annotation of genomes. This project focuses specifically on agricultural pests, providing resources to ensure that researchers are better able to translate genomics data into actionable insights for agricultural pest and disease management in addition to human health Surya is working in Dr. Fiona McCarthy's laboratory.



**Dr. Elaine Norton** completed her DVM at Colorado State and her residency at Auburn University, achieving her board certification in large animal internal medicine in 2013. Elaine did her PhD at the University of Minnesota, using modern genetics approaches to identify genetic loci underlying equine metabolic syndrome and laminitis risk for different horse breeds. An Arizona native, Elaine is joining ACBS having obtained a USDA Postdoctoral Research Fellowship. She will expand her research to investigate how complex genotype data can be integrated with phenotype or traits used to measure production and performance in animals working in Dr. Fiona McCarthy's laboratory.



# Donation by Ballena Vista Farm Brings Thoroughbreds to Tucson

*UArizona touts ongoing mission of providing hands-on opportunities for students involved in the Equine and Race Track Industry Programs.*

This fall, ACBS's Equine Program received a very generous gift from Ballena Vista Farm of Ramona, California, thanks to the efforts of RTIP Director, Wendy Davis. The donation includes in-foal mares, 2020 weanlings, and a stallion (Eddington) who has been successful in both his own race career and in siring winners on the racetrack.

Eddington was a very successful G1 winning racehorse with earnings on the track of \$1,216,760. His offspring have enjoyed similar success and have earned over \$22,000,000. Eddington's most successful son, Secret Circle, stands out as he is a two-time winner in the Breeders' Cup sprint division and winner of the Dubai Golden Shaheen, all Grade 1 stakes races. He retired with earnings of \$3,670,790.

The mares and weanlings will provide the opportunity for students to experience preparing and selling Thoroughbreds at auction, while at the same time, supporting the Equine Program as the proceeds of the sales are reinvested to support the program.

All of the mares are in foal to and four of the weanlings are sired by, the stallion, I'll Have Another, the earner of over \$2.6 million during his racing career. As the 2012 winner of both the Kentucky Derby and the Preakness Stakes, I'll Have Another looked to have a strong chance to earn Triple Crown honors until a tendon injury just days before the Belmont Stakes forced him into retirement. Recently repatriated from standing at stud at Big Red Farm in Hokkaido, Japan, his first U.S. bred foals arrived in 2020 and our UArizona students will be working with some of these foals as a part of their curriculum.



Eddington, a successful Thoroughbred stallion was donated to UArizona's Equine program by Ballena Vista Farms.



UArizona received mares in-foal to, and four 2020 foals by, I'll Have Another (shown here winning the Kentucky Derby) for use in the Equine Sales Prep Class.

## UArizona Al-Marah Horse Auction a Success!

*First annual production sale of Al-Marah-bred Arabian horses.*



**Dianne And-Phil Howes** ▶  
**Al-Marah Arabians**

2h · 🧑🏻‍🤝‍🧑🏻

Enjoying this guy so much! He's everything I hoped for...so grateful to have him! #amsniparstar

👍❤️ 20

3 Comments



AM Sniper Star's owners express their enthusiasm on Facebook for their new equine partner purchased through the auction.

AM Lord Lucius UA was the sale topper, bringing \$8,200 at the 1st Annual University of Arizona Equine Program Production Sale conducted on July 28, 2020 by Addis Live Online Auctions. Fourteen University of Arizona Al-Marah bred horses, raised and handled by UArizona students, were sold bringing an average price of \$2,575. Sires represented included Bremervale Andronicus++++//, AM Good Oldboy+, AM Chance Command++++//, Almarah Twelfth Night, and AM Powerto Gofree++.

The Al-Marah legacy left by Bazy Tankersley, affectionately known as Mrs. T, and generous support by the Ruth McCormick Tankersley Charitable Trust, provides support of the UArizona land grant mission with the goal of educating students through practical application of knowledge to gain skills beneficial to their future careers in the horse industry. The funds raised by the sale are intended to return to the equine program to help support the cost of maintaining the teaching herd.



Al-Marah Arabians is known for breeding and raising champion Arabian horses. The Al-Marah Arabian property were donated to the UArizona by the Ruth McCormick Tankersley Charitable Trust to continue this legacy.



AM Lord Lucius UA, the top seller at the 1st Annual University of Arizona Equine Production Sale.

# UArizona Feedlot Keeps Up With Demand Through Pandemic

*Facility provides valuable cattle handling and feedlot experience to students.*



Morning feeding time at the UArizona feedlot.

The facility, currently located at the West Campus Agriculture Center off of I-10 between Prince Rd. and Miracle Mile in Tucson, includes a full working feedlot, pastures for the 38 head breeding herd, and a feed mill. In addition to the breeding herd, the feedlot maintains an inventory of 75 head of cattle throughout the year to provide teaching opportunities, support research projects, and fulfill the needs of the UArizona Food Product and Safety Lab (FPSL). Amber Hubbell, feedlot manager explains, “We are able to be the center of the life cycle of cattle. We have the mama cows that are bred here, then we birth their babies. We wean the calves at 4-6 months of age and start backgrounding them. The calves finish out at a weight of 1,200 pounds and are then harvested at the FPSL. The beef is then used to help students gain experience in the meat side of the industry, and in the end provide food to consumers and other by products.”

The cattle in the feedlot are typically a mix of calves bred at the feedlot and from the UArizona V-V Ranch located in Camp Verde, Arizona. The calves coming to the feedlot from the Tucson facility provide opportunities for students to gain hands-on experience with “backgrounding” or taking fresh weaned calves and starting them on feed. This stage has shown to be very important for cattle to be successful in the feedlot. It involves introducing calves to eating out of a bunk, starting them on a grain diet, and acclimating them to the pens and facilities. Students help monitor cattle growth by weighing the cattle individually each month. These animals provide the hands-on component to what is being taught in the classroom including use of



A calf enjoys a nap in the sunshine.

flight zone, acclimation, nutrition, growth, health monitoring and veterinary care. Additionally, once harvested, they are used in carcass evaluation and meat course teachings prior to the meat being sold in the Wildcat Market.

Students are introduced to the feedlot through ACBS 102L, an introductory laboratory course that rotates them through various production practices and procedures in the animal industry. Students learn about cow-calf operations and feedlot management and gain hands-on experience in the use of flight zones and proper movement of cattle, chute handling skills, mixing rations, managing feed bunks and acclimation.

For students who are interested in gaining a full understanding of cattle management and feedlots, there are two student worker positions at the facility, as well as the option for internships and independent studies.



Student workers evaluate breeding herd cattle.

## Phil O’Hara Joins the UArizona Race Track Industry Program

The Race Track Industry Program announced the addition of Phil O’Hara to the faculty of the University of Arizona.

“Phil, an RTIP alum, is incredibly well-versed in all areas of racing and brings a wealth of knowledge to the students; we could not be more pleased to welcome him back to the program,” said Wendy Davis, Director of the Race Track Industry Program.

O’Hara was most recently the president of P.T. O’Hara, Jr. Services, Inc. a consulting, strategic planning, and project management organization. Previous positions held include President and CEO of Equibase and Executive Vice President, Pari-Mutuel Operations for Penn National Gaming, Inc. among others.

“I’m really excited to be returning to the UArizona where my dreams of a career in the racing industry began. I look forward to assisting the next generation of racing’s leaders pursue theirs,” said O’Hara.

Students were welcomed back August 24th with a combination of online and in-person courses.



# Building Future STEM Leaders with Coding

*AZ 4-H STEM YOUiversity delivers 2nd Annual Robotics Summer Camp.*

AZ 4-H STEM YOUiversity rolled up their sleeves and went virtual this summer to deliver the 2nd Annual Robotics Summer Camp. The program began by conducting a two-week train-the-trainer workshop for 20 youth and adults from across Arizona which included four Federally Recognized Tribal Extension Programs (FRTEP). The trainers-in-training rose to the challenge of learning how to code through twenty hours of zoom meetings and approximately twenty hours outside of class working on the coding missions to become STEM counselors.

Once they completed their STEM counselor training, the seven youth counselors led a month long summer camp teaching Robotics CoderZ to twenty-two youth from several counties and FRTEP's. Each youth STEM counselor taught two virtual lessons to the entire cohort for the Robotics CoderZ Cyber 101 lessons and then each led their own team with the help of two adult STEM counselors in Zoom breakout sessions.

The robotics summer program was made possible by Amazon providing free licenses for educators to use the online CoderZ platform to deliver virtual STEM education during the COVID-19 health crisis. Through a partnership with the AZ 4-H Foundation and many generous donations from across the state, the program was able to purchase licenses to continue



to provide Robotics CoderZ programming through the late fall and early spring 2021.

The success of the 2nd Annual Robotics Summer Camp was truly a collective effort. Building a robust statewide STEM program takes a collaborative effort from across the state's counties and FRTEP 4-H programs. Thank you to all our adult and youth counselors, AmeriCorps members, 4-H and Cooperative Extension members, and the AZ 4-H Foundation for your efforts and support.

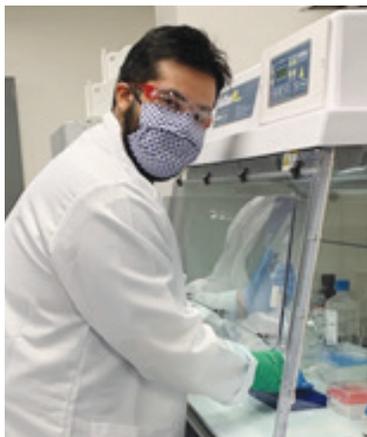
## BLAISER and McNair Scholars Programs

*STEM majors experience research opportunities in Dr. Jerry Lopez's laboratory.*

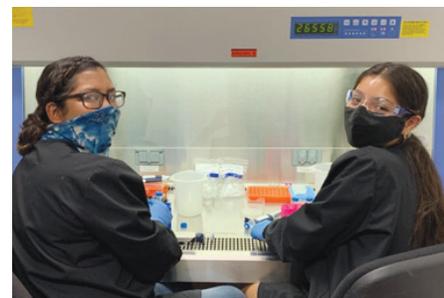
Undergraduate students, Jonah Reyes, a biology major and Cesily Cirerol, a microbiology major, conducted foodborne research in the Lopez laboratory on *Cyclospora cayetanensis*, a parasitic pathogen associated with fresh produce outbreaks.

Both Jonah and Cesily worked closely with Elina Landeros, an animal science major, undergraduate research assistant and with Dr. Gerardo (Jerry) Lopez. After the completion of the summer long research experience, the students presented their posters at a Virtual Research Conference.

Jonah was one of twenty undergraduate students who participated in the University of Arizona Health Sciences (UAHS); Border Latino & American Indian Summer Exposure to Research (BLAISER) program. The BLAISER program is designed to empower undergraduates majoring in the biomedical fields to participate in cutting-



Jonah Reyes gains lab experience as part of the BLAISER program.



Cesily Cirerol and Elina Landeros working in Dr. Gerardo Lopez's lab.

edge research while preparing for a translational career in medicine or biomedical research.

Cesily was one of twenty-seven scholars in the Ronald E. McNair Achievement Program (McNair). The McNair program is a year-round undergraduate research and mentoring program that provides UArizona students with opportunities and activities to develop the skills necessary to excel in their academic studies and assistance in admission into a graduate program.



The 2020 Arizona 4-H Hippology Contest, Horse Judging Contest, and Horse Show are going virtual.

## 2020: The Year of Virtual 4-H Horse Contests

Arizona 4-H hosted virtual State Horse Judging and Hippology Contests on September 19, 2020. This was a great chance for Junior and Senior 4-Hers interested in horses to compete in state level contests.

For the Horse Judging Contest youth judged 6 classes including 3 halter classes, 1 Hunter under Saddle class, 1 Western Pleasure class and 1 Ranch Riding class.

For the Hippology Contest youth virtually worked through 25 slides with multiple choice questions, 10 stations with matching problems, an exam with multiple choice questions, and answered judging questions on 1 video halter class and 1 video performance class.

### Horse Judging Results

#### Junior Placings

- 1 Madison Kenny
- 2 Paden Dillard
- 3 Greta Zimmerman
- 4 Josephine Hunt
- 5 Joelle Orr
- 6 Rebecca Dillard

#### Senior Placings

- 1 Corey Jones

### Hippology Results

#### Junior Placings

- 1 Alexandria Campbell
- 2 Madison Kenny
- 3 Josephine Hunt
- 4 Greta Zimmerman
- 5 Paden Dillard
- 6 Emily Bredimus
- 7 Rebecca Dillard

#### Senior Placings

- 1 Hailey Weese
- 2 Corey Jones

## AZ Equine Extension Videos

In this newest installment UArizona Cooperative Extension Tribal Extension Agent, Grey Farrell, shares the stories of what the horse signifies for Navajo people.

- The Significance of Horses to the Navajo People <https://youtu.be/EeYf9OVXMb8>
- Find more Informed Arizona Equestrian videos at <https://extension.arizona.edu/horse-publications-videos>

## AZ 4-H Science in Ag Week

Dr. Betsy Greene and Dr. Duarte Diaz represented ACBS very well in the virtual AZ 4-H Science in Ag Week hosted by the UArizona State 4-H office. They each gave a presentation incorporating science behind practical issues affecting horses and dairy cattle in Arizona. Both were well received by the 4-H youth.

### Frosty and Flaming Horses

How in the world can a horse survive and adapt in a natural environment that can range from 115 degrees Fahrenheit (FLAMING hot!) to minus 22 degrees Fahrenheit (K-K-K-K...Cold!)? Dr. Betsy Greene taught 4-Hers some of the science behind how horses are able to thrive in both extremes and looked at some research studies done on how horses use shade when it is hot outside, including shade use research done at UArizona.

### The Arizona Dairy Industry and Beyond

Dr. Duarte Diaz walked 4-Hers through a very important ag industry in Arizona, the Dairy industry. He asked them, "Have you thought about how your ice cream is made?" Then he helped them explore the Dairy industry in Arizona and beyond and learn how delicious products get made through a virtual trip through the process of getting milk from the farm to your plate.

## Translational Animal Science Journal Article

A journal article in Translational Animal Science describing the fast actions taken to create and disseminate COVID-19 related educational information to horse clientele by the national group of extension specialists and colleagues (Extension Horses) has been published.

Dr. Jeanne Rankin, Foreign Animal Disease Diagnostician and Specialist at Montana State University, expressed it very nicely, "Congratulations! There were many wonderful pieces of information for horse owners and you all did a terrific job in collaboration, publishing and distribution of this critical information. Way to Go Extension!"

<https://academic.oup.com/tas/article/4/3/txaa085/5862360>

# Recent ACBS Graduates

7 Graduate and 132 Undergraduate Degrees awarded across four majors.

## Summer 2019

### Animal Sciences

Melisa A Davis, PhD  
Caroline Elyse Geisler, PhD  
Rosa Icela Luna Ramirez, MS  
Leslie Denise Martinez, BS  
Nichole Laine Maurice, BS  
Lindsay Marie Rasmussen, PhD

### Microbiology

John Patrick Beauchamp, BS  
Jasper Bloodsworth, BS  
Oscar Castillo Jr, BS  
David Alejandro Garcia-Gonzalez, BS  
Rian Gregory Herczeg, BS  
Taylor Elizabeth McQueen, BS  
Marilyn A Mews, BS  
Valeria Alexandra Padilla, BS  
Abigail Weber Purdy, BS

### Veterinary Science

Arianna Nashae Adams, BS  
Ana Karina Avila, BS  
Hannah Noel Baker, BS  
Emely Maria Castelo, BS  
Caitlin Renee Glaze, BS  
Abrial Sage Handrahan, BS  
Haylee Alana McBride, BS  
Elizabeth Tatum Rodriguez, BS  
Max William Shiver, BS  
Mariana Valenzuela, BS  
Emily Anne Willis, BS  
Jill Katherine Woods, BS

## Fall 2019

### Animal Sciences

Mitchell Allen Gerson, BS  
Andrew P Kurth, BS  
Zaid Omar Ramirez, BS  
Osvaldo Smokey Rivera, BS  
Isabella Foresman Small, BS  
Abel Stephen Zander, BS

### Microbiology

Hesham Alnasser, BS  
Kelly Leigh Barnacastle, BS  
Arielle Joey De La Cruz, BS  
Scott Michael Decker, BS  
Crystal Justina Laney, BS  
Monica Mastrud, BS  
Divesh Sachdev, BS

### Veterinary Science

Kayla Terri Amstutz, BS  
Emily Elizabeth Campbell, BS

Guadalupe Castillejo, BS  
Christian Taylor Frazier, BS  
Elizabeth Jimenez, BS  
Isabella Christianna Marino, BS  
Adrienne McCullough, BS  
Mary Elizabeth Mirizio, BS  
Kelsea Noelle Moore, BS  
Stephanie Guadalupe Rodriguez, BS  
Kaila Rae Sereg, BS  
Leah Deering Wilson, BS

## Spring 2020

### Animal Sciences

Manuel Armand Carbajal, BS  
Martha Juarez Chavez, BS  
Haley Love Collins, BS  
Giovanni Ryan Comella, BS  
Sukanniya Kaneshamoorthy, MS  
Griffyn Grace Krause, BS  
Allison Beth Osowski, BS  
Brianna Marie Robles, BS  
Arika Dawn Shreeve, BS  
Ashleigh Dominique Small, BS  
Caroline Nicole Voss, BS  
Haley Morgan Weiss, BS

### Food Safety

Phuong Mai Lea Nguyen, BS

### Microbiology

Ayham Firass Abdull-Hadi, BS  
Daniel James Acosta, BS  
Liz Danielle Ortega Alolod, BS  
Robert Marion Villasol Ballance III, BS  
Kayleigh Ann Berthiaume, BS  
Matthew Allan Christofferson, BS  
Danny Contreras, BS  
Katrien De Belder, BS  
Angelina Kelly Diaz, BS  
Brandan Patrick Douglas, BS  
Wiley Scott Faron, BS  
Isabel Marie Forlastro, BS  
Sade Marie Gigante, BS  
Kylie Christine Heckman, BS  
Nicole Lee Jerome, BS  
Maia Adrasteia Koliopoulos, BS  
Aaron Joel Leor, BS  
Jazlyn Ariana Lopez, BS  
Karla Yaneth Machado, BS  
Kayley Ann Manuel, BS  
Heidi Sharee Markel, BS  
Victor Gerardo Miranda, BS  
Natalie Corina Munguia, BS

Phuong Mai Lea Nguyen, BS  
Lauren Marie Ochoa, MS  
Alice Meemo Rabert, BS  
Quinn Evelyn Reilly, BS  
Lauren Kayla Ress, BS  
Salah Riyadh Salah, BS  
Tanna Marissa Sanders, BS  
Halina Miroslawa Siewiora, MS  
Patrick Casey Stevens, BS  
Faith Marie Warner, BS

### Veterinary Science

Amariah Faith Almquist, BS  
Abigail Faith Berry, BS  
Amanda Riley Boyer, BS  
Belen Burrola, BS  
Nicole Michelle Chasey, BS  
Ashlynn Marie Cluck, BS  
Alexandra Leslie Cox, BS  
Ariel Shannah Davis, BS  
Isabel Marie Forlastro, BS  
Veronica Ives Garcia, BS  
Alexandra Mae Gilbert, BS  
Yuan He, BS  
Kyle Patrick Hickey, BS  
Victoria Ann Hoaglin, BS  
Monica Michelle Hunt, BS  
Katie Deanna Huntzinger, BS  
Bailey Lee Ann Laursen, BS  
Madison Renae Maxwell, BS  
Kerrissa Denea McDavis, BS  
Morgan Elizabeth McMullen, BS  
Sabrina Cabrera Moreno, BS  
Rebekah Marie Morgan, BS  
Megan Marie Murphy, BS  
Alexander Jacob Myers, BS  
Vimarys Oliveras Miranda, BS  
Karla V Oregel, BS  
Aaron Taylor Ortiz, BS  
Madison Rhae Rawls, BS  
Tyler Bruce Rodriguez, BS  
Nicole Marie Scherrer, BS  
Terese Ilese Seidel, BS  
Valeria Selene Solorio, BS  
Alyssa Paige Stewart, BS  
Stevie Cheyenne Studer, BS  
Joe Canonry Tang, BS  
Cristobal Israel Torres, BS  
Katherine Nicole Trepanier, BS  
Mikkel G Turley, BS  
Samantha Bauer Urquidez, BS  
Tara Naomi Vlcek, BS  
Travis Rae Williams, BS

# Ravishankar Lab Awards & Recognition

## National Council of Entrepreneurial Tech Transfer (NCET2) Virtual Conference

Technology using plant-based antimicrobials and ozone designed by the Ravishankar Team was selected to be presented at the National Council of Entrepreneurial Tech Transfer (NCET2) virtual conference. The online showcase featured a theme of “COVID-19 Innovations Today and Beyond”. The Ravishankar technology was selected to present from over 100 submissions from various institutions and was the only submission selected to present from the UArizona.

## Novel Microbes & Newer Threats Webinar Series

Dr. Ravishankar gave an International Webinar presentation “Emerging Foodborne Microbial Threats: Challenges & Control Strategies” at the Webinar Series “Novel Microbes & Newer Threats” on May 1, 2020 via Zoom. The virtual series attracted 1,983 participants, from 82 institutions, from 8 different countries. The webinar series was organized and sponsored by the Sathyabama Institute of Science & Technology-India, Indian Association of Applied Microbiologists, and California University of Science & Medicine.

## Awards

Vimarys Oliveras, an undergraduate student member of the Ravishankar Lab, was selected as a finalist at the 2020 Annual Meeting of the International Association for Food Protection Student Poster Competition.

Dr. Sadhana Ravishankar was nominated for the Indian Association of Applied Microbiologists – 2020 Lifetime Achievement Award.

Dr. Sadhana Ravishankar was nominated for the Elmer Marth Educator Award of the International Association for Food Protection (IAFP) for 2020. The Elmer Marth Educator Award recognizes an active IAFP Member for dedicated and exceptional contributions to the profession of the Educator.



Vimarys Oliveras, an undergraduate student member of the Ravishankar Lab, was selected as a finalist at the 2020 Annual Meeting of the International Association for Food Protection Student Poster Competition.



Dr. Ravishankar gave an International Webinar presentation, “Emerging Foodborne Microbial Threats: Challenges & Control Strategies” at the Webinar Series “Novel Microbes & Newer Threats” on May 1, 2020 via Zoom.

## Updates from the Stock Lab



Patricia Stock was selected as Vice President of the Society for Invertebrate Pathology. Her term started this past August and will continue until August 2022, when she will become the president of this society.

Dr. Stock participated in an Insect Science and Agriculture Workshop and Round Table August 27-28. The workshop was organized by INIA Chile and hosted over 200 international participants and 20 speakers.



Marilyn Mews (middle left) completed her Accelerated Master’s degree in Microbiology this summer. Marilyn investigated the insecticidal activity of *Vibrio parahaemolyticus* Pir-like toxins and defended her thesis August 20th. Congratulations Marilyn Mews!



Natalie Campbell (bottom left), a senior in the Microbiology Program recently joined the lab. Natalie will be assisting postdoctoral associate Emilie Lefoulon in the study of *Xenorhabdus* phages.

## 2020 ALVSCE Outstanding Staff in Research Award

Please join us in congratulating Brenda Noble for receiving the 2020 ALVSCE Outstanding Staff in Research Award.

Brenda joined the University of Arizona Aquaculture Pathology Laboratory (APL) in 1991. Over an illustrious career spanning three decades she has contributed enormously to the success of the APL and the worldwide shrimp industry. Brenda has dedicated her career to ensuring that the APL has provided uninterrupted and unparalleled service to supporting the industry. In addition to overseeing animal maintenance and care, she has significantly advanced shrimp disease diagnosis and cures by conducting key experiments that have identified causes of diseases that have crippled the shrimp industry. She is also developing critical challenge models for a number of microbial shrimp diseases.

Brenda is known worldwide for her quality of work, dedication, ethics and integrity, and has brought worldwide renown to the APL and the University of Arizona. With more than 40 peer reviewed publications, she is one of the most recognized names in the field of shrimp research. Brenda has also trained a small army of students, technicians and scientists that are a major part of today’s shrimp industry workforce.



# Aquaculture Pathology Laboratory Updates

*Lab reaches milestone with ISO accreditation in proficiency testing.*

## The World Organization for Animal Health (OIE, Paris, France) adopts Reference Laboratory Status for APL

Dr. Arun K. Dhar was recognized by The World Organization for Animal Health (OIE, Paris, France) as an expert on three economically important diseases in shrimp, and Dr. Luis Fernando Aranguren Caro as an expert on one disease in shrimp. The resolutions to recognize Drs. Dhar and Aranguren Caro as new experts were endorsed by the Aquatic Commission of the OIE and adopted in the Annual Meeting of the OIE World Assembly of the Delegates representing 182 member countries. With this new recognition, APL became the only laboratory in the world to carry OIE Reference Laboratory Status for five infectious diseases, with Dr. Dhar being the only scientist currently in the world to be recognized by the OIE to have the distinction of being an expert on multiple infectious diseases in crustaceans.

## APL received ISO 17043 accreditation

The APL has received International Organization for Standardization (ISO) 17043 accreditation to conduct proficiency testing for shrimp disease diagnostic laboratories around the world. Proficiency Testing provides an inter-laboratory comparison for determining the performance of individual laboratories for specific tests. Participation in proficiency testing programs provides laboratories with an objective means of assessing and demonstrating the reliability of the data they are producing. The APL will serve as a vanguard of global standard in infectious disease diagnostics through providing this critical service to the worldwide shrimp industry.

This accreditation is an important milestone for the laboratory. As a Reference Laboratory of Crustacean Diseases for The World Organization for Animal Health (OIE, Paris, France), APL is already an ISO 17025 accredited Laboratory which deems the lab technically competent to produce calibration and testing results. However, this is the first time the laboratory has received ISO 17043 accreditation.

Since 2017, 145 laboratories from 23 countries have participated in proficiency testing. As shrimp farming expands globally and disease continues to remain a threat to the sustainability of the industry, proficiency testing will only become more important.

## Congratulations New Graduates

Four MS students from the APL successfully defended their theses and graduated this spring. This is the first cohort of graduate students from the APL since Dr. Arun K. Dhar took over the leadership of the laboratory in January 2017.

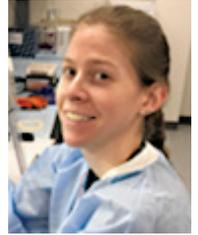
## Halina M. Siewiora - Microbiology

Halina's research focused on molecular characterization of a novel parvovirus in shrimp that does not cause any characteristic pathology but can be detected by molecular diagnostics.



## Lauren Ochoa - Microbiology

Lauren's work focused on developing molecular tools in detecting an RNA virus from paraffin embedded in 15 year-old shrimp tissue. Her work has opened a new horizon in pathogen discovery and evolutionary studies in viruses infecting shrimp and potentially other aquaculture species. Until now, this sort of work has not been performed in studying infectious diseases of aquaculture species. In recognition of the novelty of her work, she was awarded a travel award from the World Aquaculture Society (WAS) to attend the WAS-America Chapter Meeting in Honolulu, Hawaii, held Feb 10-12, 2020. Additionally, she received second place in the Graduate Student's Research Competition held during the meeting.



## Sukanniya Kaneshamoorthy - Animal Science

Sukanniya's research focused on developing a natural extract-based therapy against a deadly disease caused by a bacterium, *Vibrio parahaemolyticus*, that the shrimp industry is currently facing. Overuse of antibiotics in aquaculture, especially in developing countries, in treating this bacterium has led to the rejection of frozen shrimp consignment originating in Asia by many countries in Europe and America for the presence of antibiotic residues in commodity shrimp. In addition, the development of antimicrobial resistance (AMR) from the overuse of antibiotics is a major concern globally. A provisional patent application covering the use of natural extracts in controlling bacterial disease in shrimp aquaculture has been filed by Tech Launch Arizona.



## Quinn M. Powers - Environmental Sciences

Quinn used a metagenomics approach to determine if *Vibrio parahaemolyticus*, a deadly bacterial disease in shrimp, was present in the soil of shrimp ponds in Texas three years after a disease outbreak. She also looked into the susceptibility of crayfish to *V. parahaemolyticus*. Over the past three years, the crayfish industry in Louisiana has been badly affected by white spot disease, a disease found in shrimp. There was a concern that the crayfish might also be susceptible to *Vibrio parahaemolyticus*. Her work revealed that crayfish appear to be resistant to *V. parahaemolyticus* and the disease may not pose a threat to crayfish farming.



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Photos: Dr. Arun K. Dhar

# Join the ACBS Team!

## Assistant/Associate Livestock Extension Specialist

This faculty position is a 12-month continuing/continuing-eligible appointment with 70% Extension and 30% research responsibilities. Candidates must have a Ph.D. in animal sciences or related field (e.g., DVM). It is expected that the successful applicant will conduct collaborative research with an emphasis on beef cattle but also on small ruminants and deliver statewide Extension programming that is industry-responsive, proactive, and related to management of livestock.

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## Assistant Professor of Practice in Animal Science and Food Safety

This is a year-to-year, nontenure eligible faculty position with a total Full Time Equivalency (FTE) of 1.0, Instruction (90%) and Service (10%) Candidates must have a Ph.D. in animal sciences, nutritional sciences or a related field. The successful candidate for this appointment will teach 24 credit hours per fiscal year in courses related to animal science as well as food safety. Additionally, they will develop, revise and deliver three to four continuing education (non degree seeking) certificate courses, equivalent to 1 credit each. These courses will be taught twice a year, during the summer and winter semesters.

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## Presentations and Symposia

Arnold S, Conrad T, McNamara C, Love M, Chi V, Woods A, Joseph S, **Riggs M, Schaefer D, Perry Betzer D**, Barrett L, Van Voorhis W, Tam P, Hermann D. Predicting the impact of infectious diarrhea pathophysiology on drug disposition. Presented at Experimental Biology 2020, San Diego, California.

**Lopez G.** 2020. "Cyclospora Prevalence in Irrigation Water in Fresh Produce Growing Regions in Arizona". Presented at the Virtual Center for Produce Safety Symposium, Session III. July 7, 2020. <https://www.centerforproducesafety.org/webinars.php>.

**Lopez G.** 2020. "Cyclospora Prevalence in Irrigation Water in Fresh Produce Growing Regions in Arizona". Presented at the Western Growers Association Board of Directors Food Safety Committee Meeting. July 17, 2020.

**Ravishankar S.** 2020. "Emerging Foodborne Microbial Threats: Challenges & Control Strategies". Presented at the "Novel Microbes & Newer Threats" virtual webinar series. Sponsored by the Sathyabama Institute of Science & Technology-India, Indian Association of Applied Microbiologists, and California University of Science & Medicine. May 1, 2020.

**Ravishankar S.** 2020. "Green and Clean Sanitizers". Presented at the National Council of Entrepreneurial Tech Transfer (NCET2) virtual conference - online showcase of "COVID-19 Innovations Today and Beyond". July 30, 2020.

## Publications

**Aranguren Caro LF, Mai HN, Noble B, and Dhar AK.** 2020. Acute hepatopancreatic necrosis disease (VPAHPND), a chronic disease in *Penaeus vannamei* population raised in Latin America. *Journal of Invertebrate Pathology*, 174, 107424.

Burge CA, Reece KS, **Dhar AK**, Kirkland P, Morga B, Dégremont L, Faury N, Wippel B, MacIntyre A, and Friedman CS. 2020. A first comparison of French and Australian OsHV-1  $\mu$ vars by bath exposure. *Diseases of Aquatic Organisms*, 138: 137-144.

**Davis MA, Camacho LE, Anderson MJ, Steffens NR, Pendleton AL, Kelly AC, Limesand SW.** 2020. Chronically elevated norepinephrine concentrations lower glucose uptake in fetal sheep. *Am J Physiol Regul Integr Comp Physiol*. 2020 Sep 1;319(3):R255-R263.

Dev Kumar G, Patel J, and **Ravishankar S.** 2020. Contamination of Spinach at Germination: A Route to Persistence and Environmental Reintroduction by Salmonella. *International Journal of Food Microbiology*. 326(2020)108646. <https://doi.org/10.1016/j.ijfoodmicro.2020.108646>

Friedman CS, Reece KS, Wippel B, Agnew MV, Dégremont L, **Dhar AK**, Kirkland P, MacIntyre A, Morga B, Robison C and Burge CA. 2020. Unraveling concordant and varying response of oyster species to Ostreid Herpesvirus 1 variants. *Science of the Total Environment*, 739: 139752.

**Greene EA**, Hein W, Wickens CL, Smarsh DN. 2020. Extension Horses, Inc. experts act fast to create online resources to assist the horse industry during COVID-19. *Translational Animal Science*, Volume 4, Issue 3, July 2020, txaa085. <https://doi.org/10.1093/tas/txaa085>.

Jackson IJ, Puttabyatappa M, **Anderson M**, Muralidharan M, Veiga-Lopez A, Gregg B, **Limesand S**, Padmanabhan V. 2020. Developmental programming: Prenatal testosterone excess disrupts pancreatic islet developmental trajectory in female sheep. *Mol Cell Endocrinol*. 2020 Jul 26;110950.

O'Connor R, Nepveux F, Abenoja J, Bowden G, Reis P, Beaushaw J, Relat R, Driskell I, Gimenez F, **Riggs M, Schaefer D**, Schmidt E, Lin Z, Distel D, Clardy J, Ramadhar T, Allred D, Fritz H, Rathod P, Chery L, White J. 2020. A symbiotic bacterium of shipworms produces a compound with broad spectrum anti-apicomplexan activity. *PLOS Pathogens*, 1-21. <https://doi.org/10.1371/journal.ppat.1008600>

Pendleton AL, **Antolic AT, Kelly AC, Davis MA, Camacho LE, Doubleday K, Anderson MJ**, Langlais PR, Lynch RM, **Limesand SW.** 2020. Lower oxygen consumption and Complex I activity in mitochondria isolated from skeletal muscle of fetal sheep with intrauterine growth restriction. *Am J Physiol Endocrinol Metab*. 2020 Jul 1;319(1):E67-E80.

**Mai HN, Cruz-Flores R, and Dhar AK.** 2020. Development of an indirect Enzyme Linked Immunoassay (iELISA) using monoclonal antibodies against *Photobacterium* insect related toxins, PirA and PirB released from *Vibrio* spp. *Journal of Microbiological Methods*. In Press.



**STAY SAFE,  
WEAR  
YOUR MASK**

## Bear Down & Mask Up!

Face coverings, when worn by the majority of people in a community, can help prevent the transmission of viral particles into the air and onto common surfaces, thereby reducing potential exposures and rates of transmission in the community.

With face coverings required by employees, students, and visitors at all UArizona locations you may be wondering how to keep your masks clean.

Check out this National Geographic article with tips on keeping your face covering sanitary including tips from ACBS's own Dr. Jerry Lopez.

<https://www.nationalgeographic.com/science/2020/05/coronavirus-best-way-to-clean-your-face-mask-cvd/>

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