

# School of Animal & Comparative Biomedical Sciences

Feature

## ISSUE HIGHLIGHTS

### Research



Dr. Koenraad Van Doorslaer receives \$1.9 million grant from the National Institute of Allergy and Infectious Disease to investigate “The role of asymmetric protein dimethylation during the human papillomavirus lifecycle”.

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### Teaching



ACBS Graduate Student, Bryanne Waller, spent the summer interning with the Tyson Foods Research and Development team in Chicago, Illinois.

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### Extension



The AZ Ag Extension Association and UArizona Cooperative Extension hosted the 2022 annual Chad Reid NACAA Western Region Professional Improvement Conference

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## International Horse Clinician Helps Tribal Ranchers

Dr. Angelo Telatin, an internationally known horse trainer, competitor, and an Associate Professor at Delaware Valley University, brought his knowledge and experience in “Speaking the Horse’s Language” to horsemanship workshops for San Carlos Apache, Navajo, and Hopi tribal members this past June. Horses are culturally significant for many of the tribes, and are also very important to many livestock operations, especially ranches. Dr. Betsy Greene brought in her national colleague to teach tribal ranchers, youth, and community members about recognizing and utilizing the horse’s natural instincts and behaviors to improve their training techniques and become more effective handlers and riders.

Dr. Telatin explained and demonstrated effective behavior modification techniques for horses who are needle and/or fly spray shy or would not load in a trailer. Riders and handlers were able to put this knowledge to practice and quickly experience a noticeable improvement in their communication with, and response from, their horses.

This series of trainings was funded by a grant from the Native American Agriculture Fund (NAAF) as a part of the University of Arizona Tribal Livestock/Horse Extension Team programming, which was recently awarded the **2022 USDA NIFA Partnership Award for Mission Integration of Research, Education, and Extension.**

(Horse Clinician continued on 3)



Dr. Angelo Telatin works with a young rider at the workshop held in Window Rock, Arizona.



Demonstrating loading a horse in a trailer at the Navajo workshop in Tuba City, Arizona.



An exercise to demonstrate releasing pressure on the rein when the horse responds at the Window Rock, Arizona workshop.

# From the Director



## A Welcome and "Thank You" To Our Students,

Each Fall semester, we welcome a new class of freshman, with many of them taking their first university classes on campus. And many of them enroll in the ACBS160 (Human and Animal Interrelationships), a Gen Ed course that Netzin Steklis and I co-teach, both in person and online. Our first day in class is always exciting and energizing because we are here as a community of learners from diverse backgrounds and cultures and with different interests, and yet all of us drawn to the subject matter of this course. So, together, we embark on this semester-long journey of discovery of the crucial role that domesticated animals have come to play in human lives since the time humans first appeared on Earth. It is a remarkable journey that is not usually recounted in history books, which give the impression that humans alone forged history, that we alone built civilizations, and that empires were conquered or lost through human action alone. Nothing is further from the truth—without an entourage of animals at our side much of this would not have happened, or, at the very least, history would have unfolded in a very different way! Human history, in other words, can and should be told through the eyes of our steady companions-- the dog, the goat, the pig, the cow, the donkey, the camel, the horse, etc.—a co-created menagerie that accompanied us wherever we went. Along the way, we transformed the animals and they transformed us. Had animals not become part of our lives, we would all be a different kind of human being today. Perhaps we would not be here today at all, having gone extinct long before our massive footprint on this Earth had been felt.

For some of our students this version of history is not just new but can even be unnerving in challenging the conventional wisdom of human imperialism, or human dominionship. But that state of uncertainty or discomfort is precisely the opening we seek and through which together we create a new awareness of historical events and how these can be seen through very different lenses. And, more often than not, our students from diverse cultures help us to build that new awareness. As a result, each semester the course unfolds a little differently, sometimes in unanticipated ways. But each time, as we step into the classroom for the first time, we feel a buzz of excitement, and we launch into our collective journey, and a new sense of wonder at how it all began and how it will end. And in the same way that we know human history would have turned out very differently without animals at our side, we know in our hearts that our students, our fellow travelers, surely are the source of our excitement and joy. For that, we thank you and look forward to joining you in the classroom.

## H. Dieter Steklis

Director Interim and Professor, ACBS  
Affiliate Faculty, Psychology and Family Studies & Human Development  
Co-Director, Human-Animal Interaction Research Initiative (HAIRI)  
University of Arizona  
Emeritus Professor of Primatology  
Rutgers University

## Open Positions

SACBS is searching for a **Manager of the Food Products and Safety Lab**. Applications can be submitted by clicking on this link: <https://arizona.csod.com/ux/ats/careersite/4/home/requisition/12374?c=arizona>

or go to <https://talent.arizona.edu> and search for posting number: req12374



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Page 1 - All horse clinician photos - Dr. Betsy Greene  
Page 3 - Food Safety - Joshua Reed Photography  
Page 4 - ALIRT - Dr. Betsy Greene  
Page 5 - All photos - RTIP  
Page 6 - All FPSL photos - Byranne Waller  
Page 7 - All photos - Dr. Betsy Greene  
Page 8 - Ravishankar Lab - Dr. Sadhana Ravishankar;  
APL - Dr. Arun K. Dhar

# 2022 UArizona Food Safety Conference

The 2022 UArizona Food Safety Conference, hosted by the Food Safety Consortium (FSC), provided attendees an exciting hybrid conference experience with virtual presentations and in-person networking and poster sessions. The virtual meeting, held Oct 26th, included nearly 100 attendees from around the world to participate in a wide variety of presentations covering topics relevant to food safety research and various food industry sectors, as well as a panel session on irrigation water quality and safety.

Each year, since 2019, the conference has been dedicated to an individual who has provided valuable service to the Food Safety Consortium. The 2022 conference was dedicated to Hank Giclas, formerly of Western Growers Association. Hank was passionate about facilitating the connection between academia and producers. He served on the Consortium's advisory committee and provided invaluable support. Unfortunately, Hank passed away on Aug 5, 2022. A conference dedication award was presented to, and accepted by, his family, including Kathleen Giclas (wife), Henry Giclas Jr. (father), and Patric Giclas (brother), as well as, his Western Growers colleague, Sonia Salas.

With the return to in-person programming, the Consortium also presented plaques to the 2019, 2020, and 2021 awardees. These included the Dr. Lynn Joens Family, the Dr. John Marchello Family, and Dr. Ron Allen, respectively. Without their service and support, the Food Safety Consortium would not be what it is today.

The in-person networking and poster sessions, along with the dedication plaque ceremony, were held in Tucson, AZ on Oct 27th. Following the poster presentations, awards were presented to the top three student posters, Richard Park, Janell Kartoz, and Miely Suarez, each of whom received \$500 prizes. Additionally, student Kirat Bains, received the Yuma Center of Excellence in Desert Agriculture (YCEDA) award and the Dr. Dan Engeljohn Crowd Favorite award each with a \$100 prize. The 2022 conference for the first time included the Top Staff Poster award (\$500 travel/research grant) given to Dr. Bibiana Law. Congratulations to the 2022 poster award winners!

Thank you to all of the 2022 conference sponsors for making this conference possible!



From top:  
2022 UArizona Food Safety Conference Student and Staff Poster Session Award winners.

Dr. Sadhana Ravishankar with family members and colleague of Hank Giclas.

Members of the Joens family with Dr. Sadhana Ravishankar, FSC Chair.

(Continued from 1)

## Horse Clinician

As for Dr. Telatin, he said that our "Rez Roadshow" compacted clinics (4 half-day clinics in three days!), was a trip of a lifetime. He thoroughly enjoyed working with tribal members and learning about the different tribal cultures, seeing the beautiful Arizona country, and helping participants become better partners with their horses.

Drs. Telatin and Greene even had a late-night adventure after the Tuba City evening clinic, traveling to the home to one of the demonstration horses who wouldn't load in a trailer. If you want to see the raw footage of the behavioral modification (by headlights) with a bit of an explanatory narrative for the owner, check out <https://youtu.be/XXUqxUFzr8M>.



Workshop participants at the Hopi workshop in Kykotsmovi, AZ.

## 2022 NIFA Partnership Award

Congratulations to UArizona Cooperative Extension's Tribal Livestock/Horse Extension Team for being selected as the 2022 National Institute of Food and Agriculture Partnership Award winner in Category I: Mission Integration or Research, Education, or Extension.

This team has developed and worked together on a multifaceted Tribal Extension program to care for horses and livestock utilizing good stewardship methods for animals, land, and even humans to meet the needs of tribal ranchers, families, and youth. Extension and outreach efforts were formed from traditional learning and knowledge bases established from participating tribes. Culture and tradition are incredibly important for tribal members to communicate and share their knowledge within their communities. Being aware of traditional learning methods, our team was able to blend scientific information with the tribal traditions. We created several workshop opportunities for tribal producers. Our "Summer Cattlemen's" series covered all basics of Beef Quality and Sheep Safety and Quality Assurance, horse health and biosecurity, along with proper animal nutrition during drought. For more program detail: <https://tinyurl.com/NIFATribal>.

Team Members: Betsy Greene, Juan Arias, Grey Farrell, Elisabeth Alden, Susan Sepkatewpa, Kristy Kinlicheenie, Alex Carlisle, Nathan Notah, Don Alamban, Madelyn Melchiors, Ashley Wright, Nate Brawley, Trent Teegerstrom, Debbie Reed, Jennifer Gardner Smith, and Joslyn Beard.

# Recent ACBS Grant Funding Highlights



## Dr. Koenraad Van Doorslaer

**Title:** The role of asymmetric protein dimethylation during the human papillomavirus lifecycle

**Funding Agency:** National Institute of Allergy and Infectious Disease (\$1,901,557)

**Project Objective:** Persistent infection with human papillomaviruses (HPVs) is the primary risk factor for cervical cancer development. Yet, the mechanisms that

HPVs use to optimize the cellular environment and establish a persistent infection are not understood. These studies will remove this knowledge gap by providing mechanistic insights into how these viruses establish persistent infections and furthering our understanding of potential therapeutic targets for HPV-cancers.

**Title:** Interplay of the cGAS/STING Immune Pathway and Oncogenic Papillomaviruses

**Funding Agency:** American Cancer Society (\$792,000)

**Project Objective:** Human papilloma viruses (HPVs) cause persistent infections that are responsible for an estimated 5% of cancers worldwide. The mechanisms through which these viruses cause persistent infections are currently unknown. These studies will establish the role of the anti-viral response pathway known as cGAS/STING on the ability of HPVs to overcome cellular defenses and establish persistent infections that lead to cancer.

## Dr. Benjamin Renquist

**Title:** Role of the hepatic GABA shunt in insulin resistance and hyperinsulinemia

**Funding Agency:** National Institutes of Health (\$1,918,750)

**Co-Investigator:** Frank Duca, ACBS

**Project Objective:** The severity and incidence of type 2 diabetes is positively related to liver fat concentration. As fat accumulates in the liver, the liver produces and releases more GABA, an inhibitory neurotransmitter. This project aims to understand how liver GABA production and release, can be manipulated to affect insulin sensitivity.

**Title:** Pre-clinical tests of novel GABA transaminase inhibitors to treat obesity induced hyperglycemia, hyperinsulinemia, and insulin resistance.

**Funding Agency:** Flinn Foundation (\$100,000)

**Co-Investigator:** May Khanna, New York University

**Project Objective:** Liver GABA production is catalyzed by GABA transaminase and is positively associated with the severity of insulin resistance and elevations in blood insulin concentration. GABA transaminase inhibition or knockdown improves insulin sensitivity and lowers serum insulin. Available GABA transaminase inhibitors were developed to treat epilepsy and cross into the brain resulting in unacceptable side effects for a medication to treat diabetes. From 14 lead molecules, we aim to optimize novel GABA transaminase inhibitors with improved efficacy and specificity, and limited blood brain barrier penetration.



# Arizona Livestock Incident Response Team Workshop

The Arizona Livestock Incident Response Team (ALIRT) gathered in Tucson July 28-29, 2022, to conduct their annual first responder training. The event, coordinated by Debbie Reed, Dr. Betsy Greene, and Dr. Joslyn Beard, included presentations on the ALIRT process, On-Farm Biosecurity, ICS/FEMA training, cattle diseases, and more. ALIRT responders also observed the necropsy sample collection process in a field setting including how to establish a working contaminated area and a clean area to maintain biosecurity.

ALIRT is a cooperative effort between Arizona Cattlemen's Association, Arizona Department of Agriculture, USDA, and University of Arizona Cooperative Extension. ALIRT First Responders are ALIRT trained private veterinarians and cooperative extension personnel who can respond to unusual livestock disease events around Arizona.

To learn more about ALIRT: <https://extension.arizona.edu/alirt>



Clockwise from top right:

- Dr. Brandy Burgess, University of Georgia, discusses On-Farm Biosecurity best practices.
- ALIRT First Responders observe a field necropsy and sample collection.
- Dr. David Byerly, Assistant State Veterinarian, Arizona Department of Agriculture, places necropsy samples in a collection bag.





## 2022 Global Symposium on Racing to Welcome Back RTIP Alumni

The Race Track Industry Program (RTIP) will host the 48th Annual Global Symposium on Racing at Loews Ventana Canyon from December 5 – December 7, 2022. The event is a principal funding source for the RTIP, with anticipated revenue of over \$400,000. Given its importance to both the racing industry and to the RTIP, Program Chair Robert Hartman, said this event will build on last year’s success.”

“Our 2021 Symposium saw a double-digit percentage in attendees and we hope to continue our upward trajectory,” said Hartman. “This year, we made a strong push to reconnect with our alumni base by offering free Symposium registration and alumni-specific events.” For example, after the Tuesday’s Symposium panel sessions, RTIP graduates will be invited to the historic Mountain Oyster Club for an alumni mixer.

“The RTIP network is vast and bringing our alumni back together, some who haven’t attended the Symposium in over 30 years, will be a special moment for our Program,” said Hartman. “RTIP graduates include three of the top five leading US thoroughbred trainers and senior managers in every racing state in the country.”

Additionally, the RTIP will be hosting adjunct meetings that extended the conference an additional day, which will be helpful in attracting many first-time attendees. The Association of Racing Commissioners International (ARCI) will be holding their Winter meetings on Monday morning, December 5. These meetings attract state commissioners to discuss racing regulatory issues.

Central to this year’s agenda will be the Horseracing Integrity and Safety Authority’s (HISA) federally mandated race track safety and medication rules. HISA CEO, Lisa Lazarus, will

provide an update on the safety protocols that went into effect on July 1, 2022 and preview the new anti-doping and medication regulations that are scheduled to go into effect on January 1, 2023. Other key Symposium panel sessions include “Capitalizing on Racing’s Global Footprint”, “Advancing Equine Safety through Technology”, “Life After the Track – Second Careers and Retirement” and “Expanding Reaching’s Reach: Strategies for Diversity and Inclusion”.

The RTIP mentor luncheon is back on the schedule in 2022. RTIP students will be paired with industry leaders in a one-on-one interaction over lunch. This opportunity offers students rare industry insight, and in many cases, have led to long-term relationships with industry leaders throughout the racing industry.

CALS faculty and staff will receive FREE Symposium registration by visiting <https://rtip.arizona.edu/2022-symposium>. Click on the REGISTER NOW button and select the alumni option. Also, be sure to use your “arizona.edu” address in the email field.

The 48th Global Symposium on Racing is expected to be the largest racing conference held in the world this year. We hope to see you there!



Highlights and photos from the 2021 Annual Global Symposium on Racing.



# American Meat Science Association Reciprocal Meat Conference



(l-r) Dr. Samuel Garcia, Bryanne Waller, and Dr. Duane Wulf at the American Meat Science Association Reciprocal Meat Conference.

UA Arizona Food Product and Safety Lab members, Dr. Samuel Garcia, Dr. Duane Wulf, and graduate student, Bryanne Waller, attended the American Meat Science Association's (AMSA) Annual Meeting, the Reciprocal Meat Conference (RMC), in Des Moines, Iowa, on June 12-15, 2022.

Bryanne submitted an abstract that was accepted and chosen to be presented at RMC titled, "Utilizing the F94L Myostatin Gene Mutation to Improve Carcass Characteristics and Cutout in Beef X Dairy Crossbred Cattle." Additionally, she competed in the Master Student ePoster Research Competition, where competitors had 5 minutes to present their research and then answer questions from a panel of judges. She also competed in the AMSA Student Iron Chef competition where her team's charcuterie board placed second overall.

Key conference presentations included "New Approaches to Reducing Salmonellosis Across the Food Industry", "Modern Application of Classic Processed Meat Ingredients", and "Beef X Dairy: An Emerging Segment", where Dr. Wulf, was part of a guest panel of speakers.

# Tyson Foods Research and Development Internship

ACBS Graduate Student, Bryanne Waller, spent the summer interning with the Tyson Foods Research and Development team in Chicago, Illinois. The opportunity included working on brands like Hillshire Farm, Ballpark, and Jimmy Dean.

The summer began with the assignment of two projects that Bryanne worked on over the course of the summer. These included, evaluating sodium reduction technologies in co-extruded sausage and phosphate degradation regarding meat blend stability. She also attended two national conferences, the American Meat Science Association Reciprocal Meat Conference in Des Moines, Iowa and the Institute of Food Technologists first Annual event and expo in Chicago, Illinois. At the conclusion of the summer, she gave a final presentation to Tyson R&D scientists, discussing the details of her project and the research she conducted during her internship.

Photo right: Bryanne Waller (second from right) with other Tyson Foods interns in Chicago, Illinois.

Photo below: Bryanne Waller (left) at the Institute of Food Technologists Expo in Chicago, Illinois.



# Introducing the 2022-2023 CALS Ambassadors

We are excited to announce the 2022 – 2023 CALS Student Ambassadors from ACBS!

The CALS Ambassador Program is one of three prestigious leadership programs in the College of Agriculture and Life Sciences available to students. As the face of the College, Ambassadors volunteer their time to connect prospective students to academic opportunities in CALS and at the university.

- Astrid Cambuston – Microbiology
- Shaakshi Dubey – Veterinary Sciences
- Abril Fimbres – Veterinary Sciences
- Maya Kwiedacz – Veterinary Sciences
- Alexa Sell – Veterinary Science
- Olivea Spencer – Animal Sciences – Science/Pre-Professional Emphasis

# Heart of Extension

Debbie Reed, program coordinator in ACBS, was recognized as one of the recipients of the 2022 Heart of Extension Awards at a ceremony held Oct 12, 2022. The heart of extension awards, presented during the annual Arizona Cooperative Extension Conference, recognize extension staff and faculty who put their hearts into their work and are passionate about cooperative extension.



Congratulations Debbie on this well deserved award!

# 2022 State 4-H Horse Show: Back In-Person

Arizona 4-H youth got their first chance in three years to demonstrate their horsemanship abilities in “real time” at a state level competition at the end of September. Navajo County Fairgrounds Fair and 4-H leaders and volunteers stepped up big for Arizona 4-H! They hosted the show, played key roles in the show management, provided volunteers and volunteered in all aspects, and were welcoming to all of our 4-H families. Special thanks to Rusty DeSpain and Michelle Spurlock (and their families), and the Navajo County Chamber of Commerce who hosted a hot dog and movie night for all of the families. Kerry Officer, the volunteer show manager for 10 years, was recognized with a champion buckle of her own. All in all, it was a great event, and we were blessed with fantastic weather.

Clockwise from top left:

4-H youth competitor shows off her new t-shirt at the hot dog and movie night.

Proud horse and rider on English day.

Each morning 4-H riders present the colors while the National Anthem was played.

Dr. Betsy Greene presents Kerry Officer with a champion buckle for her 10 years of keeping the show running as show manager.

A team of 4-H youth participate in Ranch Sorting.



## Save The Date - Horse Health

### 7th Annual Southern Arizona Equine Health Symposium

This annual one-day event features equine health lectures and demonstrations for all horse owners delivered by local veterinarians, University of Arizona Cooperative Extension, and industry leaders.

#### New for 2023

- Myth Busters sessions on Medical Treatments and Supplements
- Recognizing Lameness in Your Horse
- Snotty Noses: Do I really need a vet?
- Hor\$e Care on a Budget: Where to Cut -or- Not
- PPID and Lameness: What's the Connection?

#### Plan to join us January 21, 2023

UArizona Campus Ag Center in Tucson

7:30am - 4:00pm

Registration information can be found at: [extension.arizona.edu/southern-arizona-equine-health-symposium](https://extension.arizona.edu/southern-arizona-equine-health-symposium)

## AAEA Chad Reid Western Regional Conference

Arizona Agriculture Extension Association (AAEA) recently hosted the Chad Reid Western Regional Professional Improvement Conference in Tucson in October. The meeting consisted of Animal Science and Horticulture presentations and posters, and plenary sessions for the whole group. Participants had the choice of an Ag and Natural Resource or Horticulture tour to learn about Arizona Agriculture. With 22 oral presentations and 11 poster from as far as OK and MI, AAEA provided an excellent learning opportunity for extension agents and specialists across the region and country.



Left: Juan Arias and Dr. Betsy Greene present their poster on “Tribal Livestock/Horse Programs in Arizona”.

Below (l-r): AAEA Officers, Josh Sherman, Betsy Greene, and Hattie Braun



# Ravishankar Lab News

## Outreach Activities

### SaferFoodCats - June 10, 2022

High school students participating in the SaferFoodCats summer program, toured Dr. Ravishankar's lab. Ravishankar team members demonstrated the ongoing food safety work in the lab and helped the students understand the importance of food safety.

### USDA-Ag Discovery Camp - June 20, 2022

Members from Dr. Ravishankar's lab demonstrated the food safety aspects of various projects to a group of 30 high school students and their mentors from across the United States and its territories, as a part of the USDA-Ag Discovery Camp. This event was organized by the USDA-APHIS and UA-Yuma Campus, and mainly focused on agriculture related research and helping students understand the importance of agriculture and safe food production in our lives.

### Melon Research and Outreach Workshop - July 21, 2022

The Melon Research and Outreach Workshop brought together more than 50 attendees from across the United States. This workshop, hosted by Dr. Ravishankar and her team, included laboratory tours and demonstrations of current research projects, as well as speakers from both the University of Arizona, Yuma Center for Excellence in Desert Agriculture, and Texas A&M. Additionally, there were live demonstrations on washing melons, cutting melons safely, and creating melon smoothies.

### Tech Launch Arizona (TLA) - July 19, 2022

Tech Launch Arizona (TLA) interviewed Dr. Ravishankar regarding her research and entrepreneurship for a video series to honor TLA's 10th Anniversary. The interview was done for a series of video comments from TLA's most prominent UArizona and ecosystem leaders and advocates.

### Curry Farms and Chile Processing Facility Visit - July 25, 2022

Dr. Ravishankar and Dr. Margarethe Cooper, along with Alex Strong of the CALS Development Office, visited with Ed Curry



## Fighting Foodborne Illness

Arizona Public Media highlighted Dr. Ravishankar and the food safety research her and her team are working on in a short documentary. The episode aired in October on PBS 6 as well as Arizona Illustrated's social media pages.

Youtube:

<https://www.youtube.com/watch?v=1CmkyF3ITfQ>

at Curry Farms and Chile processing facilities in Wilcox, to learn about their company and to discuss collaborations with ACBS, the food safety major, and possible involvement in the Food Safety Consortium.

### Desalinization Conference - Aug 26, 2022

Dr. Bibiana Law, along with Dr. Mark Witten of Phoenix Biometrics, participated in the desalinization conference held at the UArizona, to discuss research collaborations in the area of microbial removal from salt water.

### International Pepper Conference - Sep 28, 2022

Dr. Ravishankar attended the International Pepper Conference in Tucson, AZ to discuss research collaborations and testing services with conference attendees.

### Dr. Bhimu Patil Lab Visit - Sep 29, 2022

Dr. Bhimu Patil, Regents Professor and Director of the Fruit & Vegetable Improvement Center and the USDA National Center of Excellence on Melons at Texas A&M University, visited Dr. Ravishankar's labs on September 29th and met with the team to discuss research collaborations.

# Aquaculture Pathology Lab Updates

## Shrimp Pathology Short Course

The 31st session of "Shrimp Pathology Short Course" was conducted on June 13-18, 2022. A total of 10 participants from six countries including Brazil, Colombia, Ecuador, India, Norway and USA participated in the training.



## Additional ACBS Grants

### Sponsor: USDA-NIFA

Title: Development of PCR-based diagnostic assays in support of disease free attestations of shrimp feed for international export

PI: **Arun K. Dhar** Co-PI: **Hung N. Mai**

Project amount: **\$269,000**

### Sponsor: USDA-NIFA

Title: Nematicidal and Phytotoxic Efficacy of *Photorhabdus* Metabolites for Control of Plant Parasites

PI: **Ayako Kusakabe**

Project amount: **\$225,000**

### Sponsor: Camara Nacional de Acuicultura (Ecuador)

Title: Infection with Infectious Hypodermal and Haematopoietic Necrosis Virus (Ihhnv) and Hepatopancreatic Microsporidiosis (Hpm) in the Ecuadorian Shrimp Industry

PI: **Luis Fernando Aranguren Caro** Co-PI: **Hung N. Mai**

Project amount: **\$99,437**

### Sponsor: University of Arizona, CALS- iViP Program

Title: Engineering a Viral Vaccine Platform to Develop Oral Vaccines for Fish

PI: **Arun K. Dhar**

Project amount: **\$89,000**

## Presentations and Symposia

Arellano S, **Law B**, **Ravishankar S**. “Plant-based Microemulsions Inactivate *Escherichia coli* O157:H7 and *Pseudomonas fluorescens* on Iceberg Lettuce and Improve Visual Quality During 28-day storage”. Poster presentation at the Annual Food Safety Conference, Tucson, AZ, October 27, 2022.

**Bains K**, Sargent E. “Food Testing Services- University of Arizona”. Oral presentation at the Startup Tucson Food Accelerator Training: Recipes for Success- Food Science and Labeling panel in Tucson, October 17, 2022. Students also answered questions from the startup food companies.

**Bains K**. “Attachment Strength of *Salmonella enterica* serovar Newport and *Listeria monocytogenes* on Melon Hybrids from Five Growing Regions in the United States”. Oral presentation at the Melon Research & Outreach Workshop, Tucson, AZ, July 21, 2022.

**Beard JK**, Thompson AB, **Greene EA**. “ALIRT BOLO: A New Rapid Communication Tool for Livestock Owners About Emerging Diseases and Toxic Plants Threatening the Health and Safety of Their Animals”. Chad Reid Western Regional Professional Improvement Conference. Tucson, AZ. Oct 11-13, 2022.

**Greene EA**, Telatin A. 2022. “Speaking the Horses’ Language: Improving Horsemanship on the Ground and Mounted Horse Workshop/Clinic”. Presented at Peridot, AZ (6/28), Window Rock, AZ (6/29), Kykotsmovi, AZ (6/30 AM), and Tuba City, AZ (6/30 PM).

**Greene EA**, Arias J. “Tribal Livestock/Horse Extension Programs in Arizona: (Navajo, San Carlos, Hualapai, CRIT, and Hopi Tribes)”. AZ State Cooperative Extension Meetings. Tucson, AZ. Aug 10-12, 2022.

**Greene EA**, Arias J. “Reaching Ranchers with Practical/Applicable Information and Hands-On Skills: Arizona Tribal Livestock/Horse Extension Programs and Partnerships”. Chad Reid Western Regional Professional Improvement Conference. Tucson, AZ . Oct 11-13, 2022.

**Greene EA**, **Reed DL**. “Arizona Livestock Incident Response Team (ALIRT): A Partnership Between the AZ Department of Agriculture, Veterinarians, UArizona Cooperative Extension, and the AZ Livestock Industry”. Chad Reid Western Regional

Professional Improvement Conference. Tucson, AZ. Oct 11-13, 2022. And AZ State Cooperative Extension Meetings. Tucson, AZ. Aug 10-12, 2022.

**Mai HN** and **Dhar AK**. “Complete genome sequence of *Penaeus vannamei* singly enveloped nuclear polyhedrosis virus (PvSNPV) (also known as Baculovirus Penaei) revealed it is similar to Nudiviruses than baculoviruses”. Society of Invertebrate Pathology, Nelson Mandela Bay, South Africa, August 1-4, 2022.

**Park R**. “Prevalence of Foodborne Pathogens and Indicator Microorganisms on Arizona and California Commercial Cantaloupe Melons and Environmental Samples”. Oral presentation at the Melon Research & Outreach Workshop, Tucson, AZ, July 21, 2022.

**Park R**. “Understanding Cross-Contamination of Melons via Environmental Matrices Under Field Conditions”. Oral presentation at the Melon Research & Outreach Workshop, Tucson, AZ, July 21, 2022.

**Park R**. “University of Arizona Outreach Activities”. Oral presentation at the Melon Research & Outreach Workshop, Tucson, AZ, July 21, 2022.

**Park R**. “Why We Peel Melons: A Peek into the Prevalence of Foodborne Pathogens Among Field-Grown Melons in Arizona and Environmental Risk Factors for Cross-Contamination”. Virtual oral presentation at the International Microorganism Day – 2022 as part of an International Webinar on ‘The Importance of Microorganisms in Food Safety’, hosted by the Sathyabama Institute of Science & Technology, India, September 23, 2022.

**Park R**, **Rowlands D**, **Porchas M**, Brierley P, Crosby K, **Patil B**, **Ravishankar S**. “Cross-Contamination from Environmental Matrices: A Vehicle for Transfer of Foodborne Pathogens to Melons Grown in Various Regions of the United States”. Poster presentation at the Annual Meeting of the International Association for Food Protection, Pittsburgh, PA, August 1, 2022.

**Park R**, **Zhu L**, Dev Kumar G, **Ravishankar S**. “Efficacy of Ozone Against *Salmonella* Newport and *Escherichia coli* O157:H7 in Non-Traditional Sources of Irrigation Water at Room and Refrigeration Temperatures”. Poster presentation at the Annual Meeting of the International Association for Food Protection, Pittsburgh, PA, August 1, 2022.

**Park R**, **Zhu L**, Dev Kumar G, **Ravishankar S**. “Efficacy of Ozone Against *Salmonella* Newport and *Escherichia coli* O157:H7 in Non-Traditional Sources of Irrigation Water at Room and Refrigeration Temperatures”. Poster presentation at the Annual Food Safety Conference, Tucson, AZ, October 27, 2022.

**Ravishankar S**. “Introduction and Food Testing Services Provided by the Ravishankar Lab”. Oral presentation at the Melon Research & Outreach Workshop, Tucson, AZ, July 21, 2022.

**Ravishankar S**. “Emerging Foodborne Microbial Threats: Challenges and Control Strategies”. Virtual oral presentation at the International Microorganism Day – 2022 as part of an International Webinar on ‘The Importance of Microorganisms in Food Safety’, hosted by the Sathyabama Institute of Science & Technology, India, September 23, 2022. And Oral Presentation at the 2022 Arizona Virtual Annual Sanitarians’ Conference, November 2, 2022.

**Ravishankar S**, Cambuston A, Sargent E. “Food Testing Services- University of Arizona”. Oral presentation in English with Spanish translation at the Sazon Empresarial City of Tucson Training Workshop held at the UA on August 8, 2022.

**Rowlands D**, **Raygoza K**, **Bains K**, **Porchas M**, Brierley P, Crosby K, **Patil B**, **Ravishankar S**. “Attachment Strength of *Salmonella enterica* serovar Newport and *Listeria monocytogenes* on Melon Hybrids from Five Growing Regions in the United States”.

(Pubs continued on 10)

Poster presentation at the Annual Meeting of the International Association for Food Protection, Pittsburgh, PA, August 1, 2022. And Poster presentation at the Annual Food Safety Conference, Tucson, AZ, October 27, 2022.

Sherman J, **Greene EA**. "2022 Chad Reid Western NACAA PIC: A Reflection for NACAA State President's Town Hall". Virtual Meeting. Nov 7, 2022.

**Zhu L**. "Plant-Based Antimicrobials Inactivate *Salmonella enterica* and *Listeria monocytogenes* on Melon Rinds". Oral presentation at the Melon Research & Outreach Workshop, Tucson, AZ, July 21, 2022.

**Zhu L**, Zierzghi H, Betancourt WQ, Sharma M, Micallef SA, Gerba C, Sapkota AR, Sapkota A, Parveen S, Hashem F, May E, Kniel K, Pop M, **Ravishankar S**. "Isolation of Indicator and Foodborne Pathogenic Bacteria from Rainwater and Reverse Osmosis Reject Water Samples in Arizona". Poster presentation at the Annual Meeting of the International Association for Food Protection, Pittsburgh, PA, August 1, 2022.

### Invited Lectures

**Dhar AK**. 2022. "Emergent Diseases and efforts toward developing antiviral therapy in shrimp". Indian Council of Agricultural Research Lecture Series on the occasion of 75th Years of Independence of India, organized by Central Institute of Brackishwater Aquaculture, Chennai, India, July 29, 2022.

**Dhar AK**. 2022. "Discovering Pathogens and Developing Antiviral Therapies in Marine Shrimp Using a Reverse Genetic Approach", West Bengal University of Fishery & Animal Sciences, Kolkata, West Bengal, India, July 14, 2022.

**Dhar AK**. 2022. "Precision Control of Aquatic Animal Diseases". National Chengkung University, Taipei, Taiwan, July 13, 2022.

**Aranguren Caro LF, Mai HN**. "Updated information on White feces syndrome in shrimp". Vietuc Seafood Corporation, Vietnam, September 09, 2022.

**Alenton RRR, Maningas MBB**. "Diagnostics and RNAi based therapeutics for the shrimp industry". National Cheng Kung University, Taipei, Taiwan, July 14, 2022.

**Alenton RRR**. "Antiviral therapies for shrimp aquaculture". Ensenada Center for Scientific Research and Higher Education (CISESE), Ensenada, Mexico. August 08, 2022.

### Patents

**Aranguren Caro LF, Dhar AK, Cruz Flores R**. Patent 11225692. Shrimp disease detection assays and uses thereof.

**Dhar A**, Kanrar S. Patent #11434529. PCR Assays For Specific Detection Of Enterocytozoon Hepatopenaei.

Calabotta D, Chapman J, **Collier R**, Forsberg N, Hall L, Puntney S. Patent #11419888. Composition and Method for Promoting Stress Reduction of Heat Stress in Animals.

### Publications

Arellano S, **Zhu L**, Dev Kumar G, **Law B**, Friedman M, **Ravishankar S**. 2022. Essential Oil Microemulsions Inactivate Antibiotic-Resistant Bacteria on Iceberg Lettuce during 28-Day Storage at 4° C. *Molecules*, 27(19), p.6699.

**López-Carvallo JA, Cruz-Flores R, Dhar AK**. 2022. The emerging pathogen *Enterocytozoon hepatopenaei* drives a degenerative cyclic pattern in the hepatopancreas microbiome of the shrimp *Penaeus vannamei*. *Scientific Reports*, 12: 14766. <https://doi.org/10.1038/s41598-022-19127-2>.

**Aranguren Caro LF, Gomez-Sanchez M, Piedrahita Y, Mai HN, Cruz-Flores R, Alenton RRR, Dhar AK**. 2022. Current status of infection with infectious hypodermal and hematopoietic necrosis virus (IHHNV) in the Peruvian and Ecuadorian shrimp industry. *PLoS ONE*, 17(8): e0272456, <https://doi.org/10.1371/journal.pone.0272456>.

**Cruz-Flores R, López-Carvallo A, Cáceres-Martínez J, Dhar AK**. 2022. Microbiome analysis from formalin-fixed paraffin-embedded tissues: current challenges and future perspectives. *Journal of Microbiological methods*, 196: 106476.

### Local, National, & Global Media

**Aranguren Caro L, Gomez-Sanchez M, Piedrahita Y, Mai H, Cruz-Flores R, Alenton R, Dhar A**. 2022. Current status of IHHNV infection in Peru's and Ecuador's shrimp industries. Global Seafood Alliance, 22 August, 2022.

**Aranguren Caro L, De Belder F, Lin J, Mai H, Millabas J, Alrehaili Y, Alazwari A, Algetham S, Dhar A**. 2022. How salinity levels impact EHP infection rates in Pacific white shrimp. Global Seafood Alliance, 15 August, 2022.

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