

School of Animal & Comparative Biomedical Sciences

Feature

ISSUE HIGHLIGHTS

Research



The UArizona Aquaculture Pathology Lab is testing a photocatalyst for use as a tool for removal of pathogens from water.

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Teaching



A favorite student extra-credit activity, "Animal Encounters on the UArizona Mall", allows for animal-human interaction.

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Extension



Gila County Ag Daze provides biosecurity lessons to youth and a fun wrap-up for the 4th and 5th grade participants.

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Dr. Betsy Greene Receives 2023 CALs Outstanding Achiever Award

In recognition of Dr. Greene's tireless commitment to Arizona Extension programs and her proven ability to lead, teach, and inspire, the College of Agriculture and Life Sciences presented Dr. Betsy Greene with the CALs Outstanding Achiever Award.

Dr. Greene is a University of Arizona Professor and Extension Horse Specialist who received her master's degree from the University of Arizona Animal Sciences Department and went on to complete her doctorate at Kansas State University.

Betsy's University of Arizona Extension program emphasizes working with agricultural and 4-H agents, ranchers, tribal extension agents, and industry professionals to develop strong educational programs/resources (recognized as the "Informed Arizona Equestrian") that address statewide industry issues. Her publications inform AZ horse owners about local health concerns (e.g. Sand Colic, Blister Beetles, etc.) and teach disease prevention to youth and adults (Science Creates Real Understanding of Biosecurity - SCRUB Curriculum).

Dr. Greene's extensive work with Arizona's tribal nations includes collaborating with tribal extension agents to formally develop educational programs in partnership with Navajo, San Carlos Apache, Hopi, and Hualapai Nations, and introducing Tohono O'odham Nation, the Colorado River Indian Tribe and the Pascua Yaqui Tribe, to equine extension resources.

She is known for her ability to present information so that participants feel comfortable applying techniques and knowledge to care for their own animals and she is a leader in providing culturally appropriate programming. As a founding member active in the leadership of the



(L-R) Dr. Ed Martin, Associate Vice President and Director of Extension, presents Dr. Betsy Greene, accompanied by Dr. Ron Allen, Professor Emeritus, with the CALs Outstanding Achiever Award at the ALVSCE Awards Celebration held April 24, 2023.

eXtension HorseQuest Community of Practice, she has also collaborated with national colleagues to develop educational materials for equine owners and producers.

From the Director



Somehow, we are well into my fourth month since arriving at ACBS. Those months have been filled with efforts to learn the UArizona system, meet one-on-one with many of you, and learn about the amazing things happening in our School and at the University. If we have not yet met in person, please feel free to reach out to coordinate a time so that I can hear about you, your work, and the things that you feel should be priorities for me across the next few months and beyond. I always welcome your input!


Beyond the learning activities highlighted above, many of my current efforts are focused on working with Dr. Leah Chavez and the entire Business Office to develop standardized processes for routine activities that ACBS members are involved in. When finished, these processes will help to increase transparency and ensure that all members of our community are treated equally. Additionally, having solid documentation for requests and resulting decisions will help to provide historical and tangible records for everything from basic expenditures, to use of our indirect funds, to support the ACBS mission. My additional efforts are being directed towards increased interactions across CALS units and colleges. In the short time I've been here, I've already heard some amazing ideas for cross-disciplinary activities that can help to increase our impact across the UArizona community and beyond. Finally, I'm making efforts to meet as many of our stakeholders as possible. As a land grant institution, our ultimate obligation is to these individuals, and meeting and talking to those folks is the best way for me to understand what is most important to each of them. Many of you have already taken the time to introduce me to individuals that you think I should know; thank you for that! If you have other introductions that you feel should be made, please don't hesitate to do so.

Finally, in terms of leadership, while I won't always get things right or agree with everyone, I can promise you that I will always do my best to hear your perspective and to take everything into consideration as I make decisions that affect you and ACBS as a whole. While I understand that the breadth of expertise that we have within ACBS in the areas of Research, Instruction, and Extension, could be viewed as a challenge to our unity, I believe that this diversity should instead be viewed as one of our greatest strengths; we are actively contributing in a remarkable number of fields and are poised to do even greater things. Thus, I want you all to realize that you are key members of an amazing team and to know that you and your expertise are equally valued components of the ACBS family. Thank you for all that you do.

- **Scotty**

D. Scott Merrell

Director and Professor
School of Animal and Comparative Biomedical Sciences
University of Arizona



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- Page 6 - Ag Daze & Connecting Communities - Betsy Greene; 4-H STEM Ambassadors - Gerardo Lopez
- Page 7 - All photos - Betsy Greene
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- Page 10 - All photos - Sadhana Ravishankar
- Page 11 - All photos - APL - Arun K. Dhar

2023 ALVSCE Outstanding Team Award

The Tribal Livestock/equine Extension Team was in the spotlight at the ALVSCE Awards Celebration, winning the ALVSCE Outstanding Team Award on April 24.



Tribal Livestock/Equine Extension Team members from across the state of Arizona: (L-R) Yvonne Kay, Trent Teegerstrom, Juan Arias, Jennifer Gardner Smith, Grey Farrell, Elisabeth Alden, Dr. Betsy Greene, Leander Thomas, Don Alamban, and Hubert Thomas (Missing Dr. Joslyn Beard, Ashley Wright, Nathan Brawley, Susan Sekaquapewa, Kristie Kinlicheenie, and Alex Carlisle.



Dr. Parker Antin (R) presents the Team Award to Tribal Livestock/Equine Extension Team members, (L-R) Joslyn Beard, Nate Brawley, and Betsy Greene.

Grants

Title: Antimicrobial Fogging Treatments for Safer and Longer Lasting Cantaloupes

Funding Agency: The Arizona Department of Agriculture

PIs: Sadhana Ravishankar and Bibiana Law

Funding Amount: \$95,371

RII Research Development Grants FY24 Funding - Faculty Seed Grants

Project: Prevalence and impact of equine metabolic syndrome in broodmares

PI: Elaine Norton

Project: Effect of Placental Inefficiency Induced Fetal Growth Restriction on Fetal Endothelial-Immune Cell Interaction

PI: Chi Zhou

Awards and Recognition

Patent Medallion Award

Michael W. Riggs and **Deborah A. Schaefer** were each recipients of Patent Medallion Awards in recognition of having inventorship on patents issued in the past 10 years: “Targeted *Cryptosporidium* Biocides”, US patent numbers 8,394,379 and 8,703,134, also issued in Australia, New Zealand and the Republic of Korea . Recognized by Tech Launch Arizona at a reception held April 26, 2023.

2023 ALVSCE Research Poster Forum Trainee Award

These awards recognize outstanding research presentations delivered by trainees working with ALVSCE faculty. The award provides funds to be used for research activities associated with the research training of undergraduate, graduate, and postdoctoral trainees.

Gayatri Vedantam

Research Presentation: “Surgical Fragmentation of Kidney Stones Releases LPS, LTA, and Live Bacteria: A Possible Mechanism for Systemic Inflammatory Response Syndrome (SIRS)?”

Presenting Author: Farhan Anwar

Zeliann Craig

Research Presentation: “Effects of a Phthalate Mixture on Ovarian Antral Follicle Protein Abundance”

Presenting Author: Kara Miller

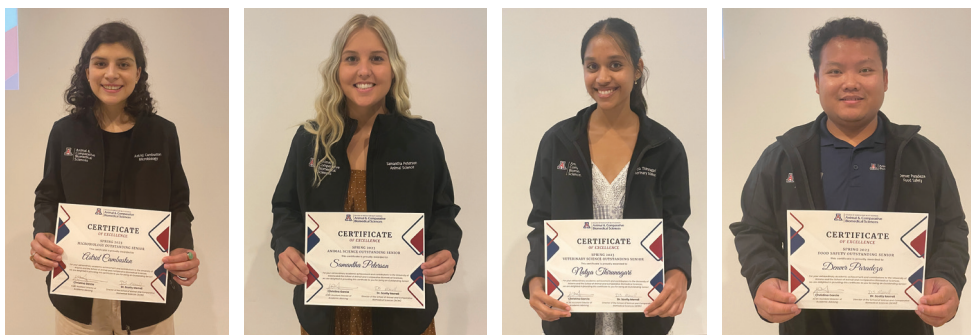
Animal Encounters on the UArizona Mall

Students take a break from classes to meet some new furry friends at the Animal Encounters on the UArizona Mall. The event, organized by Drs. Dieter and Netzin Steklis, is an extra credit activity for ACBS 160, introductory class on “Human and Animal Interrelationships”. Students look forward to the annual event which gives them a chance to interact with and ask questions about various domesticated animals.



ACBS Outstanding Seniors and Senior Celebration

ACBS students, faculty, and staff gathered at the end of the Spring 2023 semester to celebrate the outgoing seniors and all of their accomplishments. Outstanding Seniors were named for Animal Science, Microbiology, Veterinary Science, and for the first time, Food Safety.



2023 Spring Outstanding Seniors (L-R): Astrid Cambuston - Microbiology and Exceptional Academic Performance and Service to the Community Award. Samantha Peterson - Animal Science. Natya Thirunagari - Veterinary Science. Denver Paradeza - Food Safety.

Congratulations 2023 Spring ACBS Grads!

Animal & Comparative Biomedical Sciences

Thi Truc Huynh, MS
Bryanne Elizabeth Waller, MS

Animal Sciences

Science and Pre-Professional

Naomi W Chao, BS
Juan Manuel Flores Diaz, BS
Michelle Nicole Leal, BS
Samantha L Peterson, BS
Alexandra Julie Thompson, BS
Yi Zhang, BS

Animal Industry

Noelle Marguerite Champagne, BS
Danielle Kaye Monroe, BS
Sienna Nicole Posegay, BS
Katelyn Marie Raugust, BS

Equine

Mercedes Rebecca Christie, BS
Weston James Inners, BS
Kayde L Metras, BS

Race Track Industry

Michael Eric Sandulli, BS

Food Safety

Denver Dizon Paradeza, BS

Microbiology

Madison Paige Goforth, MS

Rodrigo Anselmo Arana Garrido, BS
Kiara Frances Begay, BS
Sebastian Maximos Beller, BS
Shaan Singh Bhullar, BS
Maggie Niccole Blamires, BS
Bailey Erin Bowles, BS
Joshua Thomas Cholewicki, BS
Nicholas Connor Cusick, BS
Gurbeen Kaur Dadiala, BS

Renata Ewa De Loncker, BS
Hazel Eastlack, BS
Kayla Michelle Foster, BS
Katherine Alexandra Friends, BS
Ari Hernandez, BS
Kathleen Grace Holzwarth, BS
Megan Grace Hurr, BS
Meredith Morgan Johnson, BS
Janell Elizabeth Kartoz, BS
Trent Robert Kelly, BS
Melanie R Kridler, BS
Tien Thuy Le, BS
Phuong Le, BS
Esther Patricia Ochoa Gomez, BS
Urmi R Patel, BS
Salvatore Vincent Petruzzella, BS
Danielle Jeannine Philo, BS
Alexander Ryan Pizano, BS
Kristina Susana Raygoza, BS
Anysia Romo, BS
Elizabeth Rosemary Strones, BS
Nuriel Sussman, BS
Marie-Clementine Tixier, BS
Marina C Torres, BS
Khai Truong, BS
Jonathan Brian Weathersby, BS
Hazel Grace White, BS

Veterinary Science

General

Natalie Marie Adras, BS
Isaac Andrade, BS
Holly Mae Clark, BS
Courtney Leigh Consolian, BS
Emily Joanne Crawford, BS
Luis Fernando Cruz Manalisay, BS
Rachel A Evans, BS
Trace Hancock, BS
Colette Noelia Hocking, BS

Taylor Brooke Insana, BS
Marisa Natsuko Johnson, BS
Samantha Alayne Knight, BS
Natalie Lauren Krug, BS
Emma Shea Lakritz, BS
Nathan Baldwin Larson, BS
Samantha Baileigh Larson, BS
Emma Florence Lindsey, BS
Emma J Lively, BS
Zoe Elise Mason, BS
Hannah M McAlister, BS
Elizabeth Moreno, BS
Yuki Nakaizumi, BS
Jasmin M Nunez, BS
Rocio Pedroza, BS
Amy L Pennington, BS
Sarah Robles, BS
Amaya Romanski, BS
Stephanie Sheila Rosenberg, BS
Meghan C Schmelz, BS
Kayden Alysia Shotwell, BS
Avery Anne Stauffacher, BS
Makenzie Rose Stratton, BS
Hannah Malia M L Szoke, BS
Joshua Riley Their, BS
Natya Thirunagari, BS
Kyra Elizabeth Tidball, BS
Alsyna Christine Wang, BS
Evelyn Catherine Young, BS
Applied Animal Behavior
Kira L Daly, BS
Grace M Hannon, BS
Isabel Rose Herrera, BS
Amber Danielle Jones, BS
Olivia Rose Kahn, BS
Emily Gray Kapperman, BS
Mackenzey Marie McCulley, BS
Audrey Ana Ramirez, BS

Updates on Food Safety Education and Outreach

Dr. Margarethe Cooper and her collaborators integrate food safety into overall public health programs. She teams up with Dr. Shujuan “Lucy” Li (Entomology) and Dr. Channah Rock and Natalie Brassill (Environmental Science), to work with collaborators and stakeholders to identify food safety education needs and leverage grant supported projects for the protection of public health. The team has secured several projects relating to promoting integrated pest management (IPM) and food safety practices and increasing accessibility of resources among underserved communities.

In collaboration with the Produce Safety Alliance, Inter Tribal Council of Arizona, and many other program partners, they conducted a series of Food Safety and IPM Workshops on tribal lands in 2022-2023. Training topics covered the Food Safety Modernization Act (FSMA) and followed the main training competency areas of the FSMA Produce Safety Rule. Topics also included other safety practices, such as kitchen pests and management, pesticide safety, microbial threats, and disinfectants and sanitizers in food handling/prep facilities. Over 200 tribal participants attended the in-person

trainings. As the result of this collaborative effort, tribal participants improved awareness and knowledge of food safety practices to protect public health and reduce food-borne illnesses. The results have been presented at several annual meetings and conferences.

In addition, Margarethe and her collaborators also mentored students to become leaders and future scientists in food safety, pest management and public health. Currently, they are mentoring several tribal students who are interested in food safety and agriculture.



Produce Safety Alliance Grower Training for Tribal Communities at the 2022 Intertribal Agriculture Council Annual Conference in Las Vegas. Trainers are pictured (from left to right): Seeley (IFAI), Galagarza (FDA), Blasini (PSA), Li (UArizona) and Cooper (UArizona).

UArizona Attends Reciprocal Meat Conference

A UArizona delegation of nine attended the Reciprocal Meat Conference (RMC), the annual meeting of the American Meat Science Association, in St. Paul, MN, June 24 to 28, 2023. UArizona attendees included faculty members, Dr. Samuel Garcia and Dr. Duane Wulf, graduate student, Bryanne Waller, and undergraduate students, Amelia Badorek, Rodolfo Elias, Lucila de la Caridad Garcia, Kenyan Kerman, Denver Paradeza, and Lindsay Stoltz. The 2023 conference was the largest RMC ever with 970 attendees and 135 speakers. Technical and scientific programming highlights included sessions on pre- and postnatal stress impact on muscle development and meat quality, innovations in poultry and meat processing, and animal cell cultured food products.

Dr. Wulf gave an invited presentation entitled “Capturing Beef Cutability: A Collaborative Approach to Addressing Red Meat Yield” to a standing-room-only crowd. Bryanne Waller presented a poster entitled “The F94L myostatin gene increased muscle area and Type II muscle fiber quantity and decreased strip steak angularity in beef x dairy cattle”, which generated significant interest.

The University of Arizona fielded its first-ever RMC undergraduate quiz bowl team, with team members Amelia Badorek, Rodolfo Elias, Kenyan Kerman, Denver Paradeza, and Lindsay Stoltz. The UA Quiz Bowl team finished with a record of 2-2 in the double elimination tournament. All seven students also participated in the Iron Chef competition, where Lucila de la Caridad Garcia was a member of the second-place team with their “Fiesta Carnita Hot Dish”. Overall, the students represented the University of Arizona very well and were super excited and very grateful for this highly impactful opportunity.



The UArizona delegation gathers at the Reciprocal Meat Conference.

Battle of the Brats

The UArizona Food Product and Safety Lab competed in the Battle of the Brats at the national American Society of Animal Science (ASAS) Meetings in Albuquerque, NM, on July 17, 2023. Their entry, Smokin’ Pepper Cheddar Brat, won first place against the other 10 competing universities. This is the first time the UArizona has participated in the brat contest.



(left) Graduate Student, Bryanne Waller presents at the RCM poster session.



(above) UArizona students compete in the Iron Chef competition.

2023 Ag Daze

The Gila County Ag Daze field trip to H-4 Ranch in Tonto Basin was a success! During the school year, Gila County Cooperative Extension, provided lessons to 4th and 5th grade students throughout the county. At the end of the school year, the H-4 Ranch in Tonto Basin, Arizona, hosted 'Ag Daze' to close out these lessons. At this event students engaged in hands on learning at different stations set up on a rotation. The Biosecurity/Disease Transfer station challenged students to figure out the best way to limit disease spread by choosing a safe travel path for the Hay and Grain delivery truck. This was the 12th year for the Ag Daze program which included over 428 students across 15 classrooms receiving in class lessons and over 300 of these students spending a day attending Ag Daze at the H-4 Ranch.



Clockwise from top right:

- The Ag Daze Cooperative Extension team.
- Hubert Thomas (L) and Juan Arias (R) from San Carlos tribal extension helped run the disease prevention exercises with Dr. Betsy Greene (Center).
- Dr. Betsy Greene working with a group of 4th graders on the biosecurity activity at 2023 Ag Daze.



Horses Connecting Communities

This 2-day event held at Dine College in Tsaille, AZ was held on June 17-18, 2023. What began as dissertation research by Dr. Kelsey Dayle John, has developed into a great partnership between her (UArizona American Indian Studies), UArizona Cooperative Extension, UArizona Veterinary Medicine, Dine College, Colorado State University Veterinary Medicine, and many more. Pictured at right are presenters from those organizations including UArizona Horse Specialist, Dr. Betsy Greene (far left).



4-H STEM Ambassador Project



The 4-H STEM YOUNiversity team took four county STEM Ambassadors to the Ignite by 4-H, the 2023 National 4-H Youth Summit in Washington, DC, held March 8-12. It was a trip of a lifetime for these 4-H members, including Ivan Becerril - Santa Cruz County, Melanie Dominguez - Pinal County, Jonas Johnson - Greenlee County, and Tyrell Dewangyump - Hopi Tribe.

The Arizona 4-H members, along with several other Healthy Living Ambassadors, led by Liz Sparks,

Assistant Agent, 4-H Youth Development, Pima County and Luis Aguilar-Chavez, 4-H Extension Assistant II, 4-H Youth Development, Cochise County, had the opportunity to attend workshops in Agri-Science, STEM, and Healthy Living, meet new 4-H members from across the country, and visit several museums. Liz even made it possible for them to meet Arizona's United States Senator, Mark Kelly.

As county STEM Ambassadors in their communities, Ivan, Melanie, Jonas, and Tyrell, have been actively involved in promoting STEM programs. They have participated in, and been peer teachers for, several STEM projects over the past few years.

Esther Tuner, Associate Agent, 4-H Youth Development, Pinal County, Norma Elisa Ruiz, Assistant in Extension, 4-H Youth Development, Santa Cruz County, Andie Astra, Instructional Specialist Coordinator, College of Education, and Dr. Gerardo (Jerry) Lopez, Associate Extension Specialist STEM, School of Animal and Comparative Biomedical Sciences, also attended the Conference. Andie, Jonas, and Dr. Lopez were invited to give a presentation on the Cross Reality Curriculum they developed for the Agri-Science track. Jonas led the presentation, while sharing his experience completing the XR project.

A huge thanks to Liz for coordinating the travel arrangements and museum tours while in Washington DC. A special thanks to the AZ 4-H Youth Foundation, their Executive Director Deb Lester, and the generous donors, who made this trip of a lifetime possible for these STEM Ambassadors.

4-H State Horse Judging

The State 4-H Horse Judging Clinic was held at the Campus Agriculture Center in Tucson on 5/27/2023. The 2023 national champion horse judging team worked with Mike Lehar to officiate the State Contest. The Arizona state winners and qualifiers will compete at the 2024 National Western Horse Judging Contest held in January 2024, in Denver, Colorado, with Amanda Huhta coaching.



The 2023 National Champion Horse Judging Team with Mike Lehar (center).



The Arizona state winners and qualifiers for the 2024 National Western Horse Judging Contest.

Equestrian Team Banquet

The UArizona Equestrian Team gathered to celebrate the end of their show season and send off six graduating seniors. The Team had a great year with several high point and reserve high point wins throughout the season. A major accomplishment for the team was to have Senior, Kelsey Yin, win Novice on the flat at Nationals. The first National title for the team.

<https://www.uofaequestrian.com/>



National Association of Equine Affiliated Academics (NAEAA) Annual Conference

Dr. Betsy Greene and her colleague Aubrey Wright (OH) organized the 2023 NAEAA Annual Conference in Grapevine, Texas, in early June. The theme was "Teaching for Success: Course Outcomes and Assessment, Experiential Learning, and Curricular Consistency." Fifty people representing 37 academic institutions and the equine industry from 18 states and Mexico participated this 2-day conference.



NM ALIRT Workshop

Dr. Greene represented UArizona Extension at the 2023 New Mexico Agriculture and Livestock Incident Response Team (ALIRT) training on April 12-14, 2023. The training had an excellent balance of both procedural and hands-on learning opportunities. The Incident Command System (ICS) was used to train for responses to incidents and disasters, highlighting actions when an animal disease outbreak occurs. The next day they presented very useful hands-on and "scenario work throughs" at the Socorro Rodeo Grounds. They even had a horse stuck in a cattle guard to troubleshoot actions, liabilities, responders and equipment needed.



Training for Animal Emergencies

"Prior Preparation Prevents Poor Performance" is a great phrase for this spring exercise organized by the Arizona Department of Agriculture. Dr. Greene and Dr. Beard joined many pertinent government, academic, veterinary, and law enforcement, representatives to work through a scenario where a specific animal disease would provide a serious threat to Arizona ranchers and their livestock.

Ireland Equine and Cultural Tour

In May, Dr. Greene hosted an Ireland Equine and Cultural Tour for extension and industry professionals and university students. The 14 participants represented University of Arizona, Washington State University, Oregon State University, University of Kentucky, as well as a Tucson veterinary clinic. The group visited the Irish National Stud, Kildangan Stud (part of Darley Thoroughbred operations), Coolmore Stud, (part world's largest thoroughbred breeding/racing organization), two separate farms home to Olympic Eventing and Showjumping riders/trainers, a Connemara Pony Stud, the Curragh (the largest racetrack in Ireland), and a five-generation family saddle maker. Of course, they made some stops at Kilkenny and the Blarney Castle, along with some other scenic and lovely towns and locations along the way. All in all, it was an excellent educational experience combined with great fun!



4-H Tech Changemakers

The 4-H Tech Changemakers (TCM) Program is a National 4-H Council Program where 4-Hers help support and teach adults 18 and older to develop digital skills to assist them in gaining employment and to reduce the gap of digital literacy in underserved and rural communities. The TCM program is a one-year grant funded project and this is Arizona's second year as an awardee. Arizona had a small but mighty team with Norma Elisa Ruiz, Assistant in Extension, 4-H Youth Development and Teen TCM, Ivan Becerril, from Santa Cruz County, leading the charge.

Ivan and Norma reached out to community partners, family and friends in Nogales, AZ, to provide the 12 "Grab n Go" lessons. These range from creating strong passwords, searching for digital information, resume building, and developing Excel skills, just to name a few. Ivan provided the lessons in both English and Spanish to accommodate Spanish speaking adults. He delivered approximately 36 one-hour sessions over the course of the year, reaching 223 adults, with the support of Norma. The pair exceeded our grant goal with 2,676 adult contacts.

This is Ivan's second year participating in TCM and this year he was selected to be one of three National Teen TCM spokespeople. Ivan and the rest of the team participated in a TCM capacity building training in March at the Alabama 4-H Center in Columbiana, AL. Project support and management was provided by Andie Astra, Instructional Specialist Coordinator, College of Education, and Dr. Gerardo (Jerry) Lopez, Associate Extension Specialist STEM, School of Animal and Comparative Biomedical Sciences supported and managed the project. Thanks for the support from National 4-H Council, donors Verizon, and the AZ TCM team for addressing the digital literacy divide in our underserved and rural communities!



Teen Tech Changemaker, Ivan Becerril (center) with one of the "Grab n Go" lesson groups.

Ag Discovery Program

The Lopez Lab hosted the Ag Discovery Camp, an hour and a half activity focused on the collaborative efforts involved in solving foodborne outbreaks and the potential career paths available to pursue, such as animal science, microbiology and food safety. Twenty high school students, along with several undergraduate students, were engaged in understanding the food safety and environmental microbiology research the Lopez lab conducts on *Cyclospora cayatanensis*, a protozoan coccidian human parasite, associated with food outbreaks. With the help of microbiology graduate students, Cesily Cirerol, Dominic Rodriguez, and Khai Truong, Ag Discovery students rotated between six stations learning the Cyclospora workflow. This included collection of a surface water sample or raw agricultural commodity (i.e., lettuce and cilantro), concentration, DNA extraction and purification, and qPCR detection. As well as the more recent genomics sequencing confirmation methods using the Oxford Nanopore MinION and the High Performance Computing (HPC).

The Ag Discovery Program is a two-week residential camp starting with the first week at UArizona-Yuma, Yuma, AZ and the second week at

the UArizona-Main Campus, Tucson, AZ. It is a partnership between the University of Arizona College of Agricultural and Life Sciences (CALS) and the United States Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS). It is led by Dr. Tanya Hodges, Regional Academic Programs Manager-Yuma Distance Campus, Dr. Baleshka Brenes, Director Agriculture Programs-UAZ Yuma, Dustin Sandberg, Plant Pathologist/Botanist Identifier, and USDA members Dr. Gloria Magana and Dr. Deborah De La Riva. Thanks to all the faculty and staff that support this amazing program in preparing our next generation of Ag professionals!



4-H Greenhouse (SEED) Project

The Greenhouse Sustainable Energy and Engineering Design (SEED) Project was implemented by the AZ 4-H STEM YOUiversity team in collaboration with 4-H staff and volunteers from three counties, Gila, Pinal, and Maricopa.

The three sites engaged youth in a hands-on and problem-based learning experience. Youth learned the engineering design process, technical drawing using scaled blueprint perspectives, 2D and 3D drawing, landscape design, and topography. Teens also learned about circuitry and sustainable energy technologies and how to install solar panels and wind turbines on their model scale greenhouse. Additionally, youth learned about the importance of working in diverse teams and respecting each other's cultural backgrounds and perspectives while designing their greenhouse SEED project.

The Greenhouse SEED curriculum was hosted on Google Classroom and supported by the 4-H STEM YOUiversity team.



Underwater Robotics Project

The Underwater Robotics (aka remotely operated vehicle or ROV) Project had a great turnout with 15 teams participating in the AZ 4-H MATE (Marine Advanced Technology Education) Scout Regional Competition hosted on May 6, 2023, in partnership with AZ 4-H STEM YOUiversity.

4-H staff and school volunteers/coaches from six counties; Gila, Pinal, Maricopa, Pima, Cochise, and Santa Cruz engaged youth during the spring semester and early summer with hands-on and problem-based learning experiences using the ROV curriculum. 4-H teams accessed ROV lessons on Google Classroom hosted by the 4-H STEM YOUiversity team which includes Elizabeth (Betsy) Wilkening, lead Outreach Instructor Assistant II; Andie Astra, Instructional Specialist Coordinator, College of Education, and Dr. Gerardo (Jerry) Lopez, Associate Extension Specialist STEM, School of Animal and Comparative Biomedical Sciences.

Youth built their ROVs in preparation for the regional competition where they competed in three areas: water demo tasks (best of two attempts); engineering presentation, and business marketing display. Rio Rico High School offered a summer program in June. Additionally, youth learned about the importance of working in teams and collaborating to complete the project.

A special thanks to the AZ 4-H Youth Foundation, Deb Lester, Executive Director and all the donors for their generous support for providing Arizona youth STEM programming. A special thanks also goes to all the volunteers on the day of the competition, we could not have done it without your support!



Youth compete in the AZ 4-H MATE Scout Regional Competition.



First place team: Ngnerrs, from Glendale High School in Maricopa County, with 205 points, coached by Jae Chang.

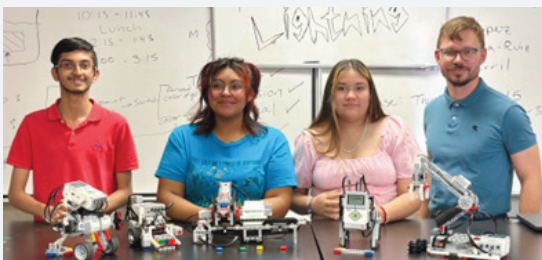
Second place team: JLM Underwater, a 4-H program in Maricopa County, with 163 points, coached by Ken Yee, Americorps Member, and Caroline Werkhoven, Assistant in Extension, 4-H Youth Development.

Third place team: Gila Monsters, a 4-H program in Gila County, with 139 points, coached by Toni DeAnda and David Flores and also supported by Jon Hatch and Thuy Bishop, 4-H Program Coordinators and Renee Carstens, County Extension Director and 4-H Agent.

Lego Robotics Project

The AZ 4-H STEM YOUiversity team offered the Lego Robotics Project for the 6th consecutive year in collaboration with 4-H staff and volunteers from Pinal and Santa Cruz County. The curriculum is a hands-on problem-based learning experience giving youth an opportunity to work in small teams to build and program EV3 MINDSTORM Lego Robots using the LabView graphical programming language.

The Lego Robotics Curriculum was hosted on Google Classroom to allow 4-H staff and flexibility in scheduling. The AZ 4-H Youth Foundation, Deb Lester, Executive Director and the generous donors have made it possible in providing Arizona youth with this engaging STEM program.



Undergraduate Research Opportunities

Dr. Gerardo (Jerry) Lopez, Associate Extension Specialist STEM, ACBS aims to provide undergraduate research opportunities to underrepresented first generation students, inspiring them to pursue STEM related careers. Dr. Lopez is a Faculty Fellow in the Arizona, Science, Engineering, Math Scholars Program (ASEMS), College of Agriculture and Life Sciences, and a collaborator on the Western Alliance to Expand Student Opportunities (WAESO), Louis Stokes Alliances for Minority Participation (LSAMP), a National Science Foundation (NSF) funded Consortium of 13 institutions across Arizona, Utah, and Colorado, led by Arizona State University.

Dr. Lopez hosted and mentored 12 undergraduate students during the 2023 Spring semester as part of ASEMS, WAESO, or as volunteers, six of which graduated with their bachelor's degree in a STEM program, along with one graduating master's student. Four of the six undergraduate students have been accepted to graduate programs.

During the summer, Dr. Lopez hosted a high school student through the Southwest Environmental Health Sciences Center, Steps 2 STEM Research Internship Program; and one ASEMS Scholar Training Academy for Research (STAR) in STEM Program. A special thanks to CALS leadership team for funding the ASEMS program and the WAESO team for providing stipends which help support students engaged in semester-long research experiences.



Students gain research a laboratory experience in Dr. Lopez's lab.

Ravishankar Lab Updates

Awards and Recognition

Outstanding Senior in Microbiology Exceptional Academic Performance and Service to the Community

Astrid Cambuston, an undergraduate student in Dr. Ravishankar's Lab, received both the Spring 2023 Outstanding Senior in Microbiology and the Exceptional Academic Performance and Service to the Community awards from CALS. The awards were presented at a ceremony held on May 4, 2023.



Dr. Sadhana Ravishankar with Astrid Cambuston at the 2023 ACBS Senior Celebration.

Stanley M. Alcorn Memorial Scholarship

Richard Park, a graduate student in Dr. Ravishankar's lab, is the recipient of the 2023-2024 Stanley M. Alcorn Memorial Scholarship offered by CALS.

Sky Blu Underwood Memorial Student Support Scholarship

Kirat Bains, a graduate student in Dr. Ravishankar's lab, is the recipient of the 2023-2024 Sky Blu Underwood Memorial Student Support Scholarship offered by CALS.

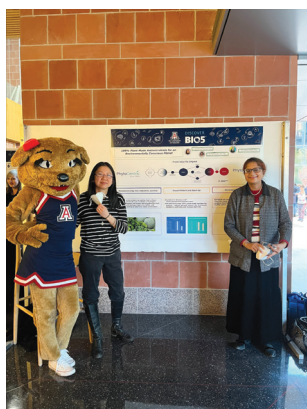
Institute of Food Technologists (IFT) First Chapter Travel Award

Kirat Bains received the Institute of Food Technologists (IFT) First Chapter Travel Award to attend the 2023 IFT Annual Meeting in Chicago.

Outreach Activities

Annual Student Industry Networking Event (SINE 2023) February 15, 2023

Dr. Ravishankar attended the Annual Student Industry Networking Event (SINE 2023) held at BIO5 and discussed her research with students and other attendees.



Flinn Scholars Presentation - February 16, 2023

Dr. Ravishankar and her team members demonstrated their food safety projects to a group of Flinn Scholars (high school students) and their parents as part of a lab tour that was organized by CALS.



FFA (Future Farmers of America) State Leadership Conference February 24, 2023

Dr. Ravishankar and her graduate student Richard Park, served as judges for the new product development competition and graduate student, Kirat Bains, served as a volunteer at the FFA conference held at the University of Arizona.

Southern Arizona Regional Science & Engineering Fair (SARSEF) March 2023

Members of the Ravishankar team, including Richard Park, Kirat Bains, Likitha Mudigonda and Astrid Cambuston, served as judges for the UA-Food Safety Consortium sponsored awards at the Southern Arizona Regional Science & Engineering Fair (SARSEF). Additionally, Astrid Cambuston and Likitha Mudigonda, presented the awards to the award winners among the elementary, middle, and high school students.

Yuma Produce Industry Expert Lab Visit - April 20, 2023

Dr. Ravishankar and her team members discussed and conducted demonstrations of their food safety projects and discussed future research needs.

Sazon Empresarial Tucson Food Startups - April 26, 2023

Dr. Ravishankar, along with faculty from the School of Nutritional Sciences and Wellness, met with the organizer of Sazon Empresarial Tucson Food Startups to discuss their food testing needs and provide information on the services offered by her Food Testing Lab at ACBS.

Produce Industries Meetings - May 12 and 31, 2023

Dr. Law and Dr. Ravishankar met with members of the produce industries to discuss their research and testing needs and potential for collaborations.



Aquaculture Lab Testing a Photocatalyst for Use as a Tool for Removal of Pathogens

The Aquaculture Pathology Laboratory (APL) at the West Campus Agriculture Center, located at Miracle Mile and I-10, is working with a company to test a new design of photocatalyst. The goal will be to determine whether this device can be used in commercial applications to maintain water quality, remove pollutants, and aid in pathogen control.

The process of photocatalysis has been researched for decades and proven to remove pollutants from both air and water. But practical application of the technology in real-world settings has been mostly limited to air purification or small-scale, personal water sterilization.

To adapt this technology into a tool which can be used in both personal aquariums and large-scale aquaculture, the APL, in the School of Animal and Comparative Biomedical Sciences, has begun work with a prototype photocatalyst designed to disinfect up to 1000 L (364 gal).

This photocatalyst was attached to a tank containing marine shrimp (*Penaeus vannamei*). Early results indicate a reduction in ammonia, nitrite, and nitrates. Nitrate removal in home aquariums often requires water exchanges, producing waste and requiring monitoring. The shrimp in this tank appear

healthy and do not display any symptoms indicating a negative response to the device.

Previous publications in photocatalyst research have confirmed the ability to destroy organic compounds in water.

The APL plans to test the ability of this device to remove pathogens harmful to shrimp, including bacteria, viruses, and fungal parasites. Future work may lead to collaboration in testing the unit's ability to remove longer-lasting contaminants from water, including pesticides and PFAS- both of which have the potential to be harmful to humans.

Since the inventor of this technology claims it can destroy "forever chemicals" in-situ, yet show no harm to the shrimp, the APL will continue research endeavors to explore the potential applications of this technology.



The Aquaculture Pathology Lab is testing a new design of photocatalyst to disinfect water in commercial applications.

Aquaculture Pathology Lab Updates

Conference Sessions

Aquaculture America, World Aquaculture Society Meeting - New Orleans, LA

Dr. Arun K. Dhar chaired a session in the Aquaculture America, World Aquaculture Society Meeting, February 23-26, 2023, in New Orleans, Louisiana. Researchers from the Aquaculture Pathology Laboratory presented four papers and a poster in the conference.

International Visitors

A delegation from Vietnam visited the Aquaculture Pathology Laboratory to establish a collaboration with the University of Arizona and to address major disease problems in crustacean farming in the Cao Mao Province of Vietnam. Cao Mao province is located in the southern most region of Vietnam and is the largest producer of farmed crustacean in the country. In recent years, emerging diseases have been a major issue in the sustainability of crustacean farming. The collaboration will focus on identifying the etiology of emerging diseases and developing diagnostic tools in preventing further spread of these diseases.

Awards and Recognition

Dr. Arun K. Dhar was awarded the Honorary DSc. for his worldwide contribution in fisheries sciences from North Bengal Agriculture University in West Bengal, India, on April 5th, during the university commencement. The University (locally known as Uttar Banga Krishi Viswasvidyalaya), is where Dr. Dhar conducted his undergraduate studies in Agriculture Sciences. Located in the northern region of the state of West Bengal at the foothills of the Himalayas, the University is nationally recognized in India for its undergraduate studies and for its contribution to agriculture in the northern part of the state.



Photos from top:

- Members of the Aquaculture Pathology Lab presented 4 papers and a poster at the Aquaculture America, World Aquaculture Society Meeting in New Orleans, Louisiana.
- A delegation from Vietnam visited with the Aquaculture Pathology Laboratory on establishing a collaboration with the UArizona.

Presentations and Symposia

Anwar F. Surgical Fragmentation of Kidney Stones Releases LPS, LTA, and Live Bacteria: A Possible Mechanism for Systemic Inflammatory Response Syndrome (SIRS)? Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Vedantam G.** Tucson, AZ. March 30, 2023.

Bains K. Evaluation of the efficacy of natural antimicrobials and prevention of biofilms formed by foodborne pathogens on food contact surfaces. Seminar presented at the ACBS Spring Seminar Series, May 1, 2023.

Cirerol C. Determine the prevalence and transmission of *Cyclospora cayetanensis* in the South-East Coast Region of the United States. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Lopez G.** Tucson, AZ. March 30, 2023.

Clark M. Discrepancy in *Clostridioides difficile* Infection Diagnostic Test Results is Predominant in Healthcare Settings. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Vedantam G.** Tucson, AZ. March 30, 2023.

Dhar AK, Cruz-Flores R, Mai HN, and Warg JV. Comparison of Real-Time Pcr Assay Performance for Detecting *Decapod penstylhamaparvovirus 1* in Penaeid Shrimp. Aquaculture America 2023 Conference, World Aquaculture Society, February 23-26, 2023, New Orleans, Louisiana.

Foscue J, Schofield P, and Dhar AK. Examining the Potential Transmission Of *Enterocytozoon hepatopenaei* (EHP) Between *Penaeus stylirostris* and *Penaeus vannamei*. Aquaculture America 2023 Conference, World Aquaculture Society, February 23-26, 2023, New Orleans, Louisiana.

Fullen L. Understanding the Prevalence and Transmission of *Cyclospora cayetanensis* in Produce Growing Regions in the Southwest and Mexico. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Lopez G.** Tucson, AZ. March 30, 2023.

German X. Understanding the prevalence and transmission of *Cyclospora Cayetanensis* in Produce Growing Regions in West Coast. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Lopez G.** Tucson, AZ. March 30, 2023.

Greene EA. Equine Body Condition Scoring, Nutrition, and Evaluation. Hands-on workshop at Song of the Horse Camp. Tuba City, AZ. June 1-3, 2023.

Greene EA. Equine Health Evaluation. Hands-on workshop at Song of the Horse Camp. Tuba City, AZ. June 1-3, 2023.

Greene EA, Trott JF, and Beard JK. Revisiting perceived needs of Arizona horse owners to update/focus cooperative extension horse educational programming/resource development directions. Poster at Equine Science Society Annual Meetings. Grapevine, TX. June 6-9, 2023.

Greene EA, John G, David D, and Salt B. Biosecurity Activity and Tips: a. Animal Activity, b. Major Horse Diseases-Quick Facts, c. ALIRT Kit Contents, and d. Q&A with Drs. Greene and John. Presentation at Horses Connecting Communities at Dine College. Tsaille, AZ. June 17-18, 2023.

Greene EA, David D, Walker B, Benally K. Equine Physical Exams: Hands-on Workshop. Workshop at Horses Connecting Communities at Dine College. Tsaille, AZ. June 17-18, 2023.

Greene EA and John G. Vaccine types, handling, uses, methods of administration, and decisions on which to use for your horses. Presentation at Horses Connecting Communities at Dine College. Tsaille, AZ. June 17-18, 2023.

Gregory A. Epidemiological Study of *Cyclospora cayetanensis*

in the Southeastern United States Through the Analysis of Genomic Markers. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Lopez G.** Tucson, AZ. March 30, 2023.

Harishankar A. Enteropathogenic E. coli effector EspH perturbs host endoplasmic reticulum functions. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Viswanathan VK.** Tucson, AZ. March 30, 2023.

Hlomatchi J. Analyzing the prevalence and transmission of *Cyclospora cayetanensis* in the Southwestern United States and Mexico. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Lopez G.** Tucson, AZ. March 30, 2023.

Huynh TT. Engineering an infectious cDNA clone of Laem Singh virus infecting shrimp to develop a viral vector to deliver antiviral therapies. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Dhar A.** Tucson, AZ. March 30, 2023.

Jaqueth A and **Greene EA.** Introducing biosecurity concepts and hands-on skills with limited budgets and resources. Workshop presented at National Association of Equine Affiliated Academics Annual Conference. Grapevine, TX. June, 2023.

Kartoz J. Prevalence of *Cyclospora cayetanensis* in the Western US for Epidemiological Investigation of Outbreaks. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Lopez G.** Tucson, AZ. March 30, 2023.

Leckband A. Impact of Short Chain Fatty Acids in *Campylobacter jejuni* Virulence. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Cooper K.** Tucson, AZ. March 30, 2023.

Lopez G. Arizona 4-H Tech Changemakers 2022: Teen TCM Reducing the Digital Divide in our Underserved and Rural Communities. Poster presentation at the 2023 ALVSCE Research Poster Forum. Tucson, AZ. March 30, 2023.

Lopez G. Space Mission Command 2022: 4-H Multi-State Space Exploration Consortium (4-H MSSEC). Poster presentation at the 2023 ALVSCE Research Poster Forum. Tucson, AZ. March 30, 2023.

Mai H. The Complete Genome Sequence of *Penaeus vannamei* Singly Enveloped Nuclear Polyhedrosis Virus (Pvsnpv) Reveals More Similarity to Nudiviruses Than Baculoviruses. Poster presentation at the 2023 ALVSCE Research Poster Forum. Tucson, AZ. March 30, 2023.

Mai HN and Dhar AK. The Complete Genome Sequence of *Penaeus vannamei* Singly Enveloped Nuclear Polyhedrosis Virus (PvSNPV) Reveals More Similarity to Nudiviruses Than Baculoviruses. Aquaculture America 2023 Conference, World Aquaculture Society, February 23-26, 2023, New Orleans, Louisiana.

Mamidi A. Effect of Dibutyl phthalate (DBP) Exposure During Pregnancy on Maternal Uterine Artery Vascular Function in Mice. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Zhou C.** Tucson, AZ. March 30, 2023.

Mastellar SL, Burk SV, Jaqueth A, and **Greene EA.** 3D printing for teaching equine and animal science topics. Team presentation at National Association of Equine Affiliated Academics Annual Conference. Grapevine, TX. June, 2023.

Miller K. Effects of a Phthalate Mixture on Ovarian Antral Follicle Protein Abundance. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Craig Z.** Tucson, AZ. March 30, 2023.

Mydosh J. Carbon Utilization Variances of *Campylobacter jejuni* strains Associated with Two Different Clinical Manifestations. Poster

(Pubs continued on 12)

Pubs (continued from 11)

presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Cooper K.** Tucson, AZ. March 30, 2023.

Perez A. Determining prevalence of *Cyclospora cayetanensis* in the Florida region of the United States. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Lopez G.** Tucson, AZ. March 30, 2023.

Ravishankar S. Sadhana Ravishankar's Career in Food Safety Research & Innovation. Presented to Senior Capstone Class of Applied Biotechnology, Plant Sciences and Sustainable Plant Systems Major students, February 24, 2023.

Rodriguez D. Understanding the prevalence and transmission of *Cyclospora Cayetanensis* in Produce Growing Regions in Southwest and Mexico. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Lopez G.** Tucson, AZ. March 30, 2023.

Rollins M. Analyzing the prevalence and transmission of *Cyclospora cayetanensis* in the Arizona and Mexico. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Lopez G.** Tucson, AZ. March 30, 2023.

Roxas J. Use of Iterative Comparative Proteomics To Unravel The Layered Complexity of EPEC Pathogenesis. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Viswanathan VK.** Tucson, AZ. March 30, 2023.

Viswanathan VK. Tucson, AZ. March 30, 2023.

Russel R, Alenton R, Mai HN, and Dhar AK. Rna-Based Targeted Therapeutics Reach Underwater Through an Oral Delivery Platform Using a Shrimp Viral Vector. Aquaculture America 2023 Conference, World Aquaculture Society, February 23-26, 2023, New Orleans, Louisiana.

Rutins I. *Citrobacter rodentium* secreted effector EspZ regulates host mitochondrial structure and is essential for virulence in mice. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Viswanathan VK.** Tucson, AZ. March 30, 2023.

Schofield P, Padilla T, Foscue J, and Dhar AK. Review of In Vivo *Enterocytozoon hepatopenaei* (EHP) Propagation for Use in Experimental Challenge Studies Using *Penaeus vannamei*.

Senica S. Effects of Mycoplasma Elimination Treatment on HUVEC Proliferation. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Zhou C.** Tucson, AZ. March 30, 2023.

Simmons A. Crustacean Disease Diagnostic Techniques for the International Aquaculture Industry. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Dhar A.**

Tucson, AZ. March 30, 2023.

Suarez M. Analyzing the prevalence and transmission of *Cyclospora cayetanensis* in the Southwestern United States and Mexico. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Lopez G.** Tucson, AZ. March 30, 2023.

Sullivan A. A Bile Acid-Responsive Protein Modulates *Clostridioides difficile* Colonization. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Vedantam G.** Tucson, AZ. March 30, 2023.

Truong K. Understanding the Prevalence and Transmission of *Cyclospora cayetanensis* in US Southwest and Mexico Region. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **Lopez G.** Tucson, AZ. March 30, 2023.

Vishwanath SH. Predicting host-pathogen interactions between mouse and *Clostridioides difficile* 630. Poster presentation at the 2023 ALVSCE Research Poster Forum. Faculty member: **McCarthy F.** Tucson, AZ. March 30, 2023.

Warg JV, Mai HN, Schofield P, Clayton RD, and Dhar AK. Validation of a Real-Time Pcr Assay in Detecting Infectious Hypodermal and Hematopoietic Necrosis Virus (Ihhnv) In Penaeid Shrimp, Aquaculture America 2023 Conference, World Aquaculture Society, February 23-26, 2023, New Orleans, Louisiana.

Publications

Choi R, **Schaefer D, Betzer D,** McCloskey M, Whitman G, Huang W, Lee S, Pranata A, McLeod M, Marsh K, Kempf D, LeRoy B, Zafiratos M, Ojo K, Arnold S, Barrett L, Tzipori S, **Riggs M,** Fan E, Van Voorhis W. 2023. Comparison of toxicities among bumped kinase inhibitor analogs for treatment of cryptosporidiosis. Published in April 2023. Antimicrobial Agents and Chemotherapy. Volume 67 Issue 4 e01425-22. <https://doi.org/10.1128/aac.01425-22>.

Diaz DE, Knight CW, Wright AD, Grijalva PC and **Greene EA.** 2023. Horse Activity Responses to An Elevated Temperature Humidity Index in the Arid Southwest. *Con Dai & Vet Sci* 5(4)-2023. CDVS. MS.ID.000217. In Press

Major SR, Harke MJ, **Cruz-Flores R, Dhar AK,** Bodnar AG, and Trigg SA. 2023. Rapid detection of DNA and RNA shrimp viruses using CRISPR-based diagnostics. *Appl. Environ. Microbiol.* <https://lupinepublishers.com/dairy-veterinary-science-journal/pdf/CDVS.MS.ID.000217.pdf>

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