

School of Animal & Comparative Biomedical Sciences

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A Message from the Director

It is hard to believe we have concluded another year. The close of the semester gives us the chance to reflect upon all that we have accomplished over the last 16 weeks. I want to congratulate our new graduates. In particular, I want to recognize Matthew Salerno, graduate from the Veterinary Science Program, Daniella Peinovich, graduate from the Animal Sciences Program and Anusha Vishnubhotla, graduate from the Microbiology Program, who were selected as the CALS Outstanding Senior for their respective majors.

In other news, I am delighted to announce the launching of the first Food Safety Boot Camp "SaferFoodCats" which will take place this June. The goal of this summer program is to provide high school students from Arizona with the opportunity to learn about food safety and get hands on experiences with experts in the field.

Additionally, I would like to announce that renovations are underway at the Al Marah Equine Center. I want to express my gratitude to the Tankersley Trust for their generous donation which will help with the renovations of the facilities. We are very excited about the possibilities this magnificent facility will offer to faculty, staff and students. The ACBS Undergraduate Equine Program and equine classes will begin taking place at the updated facility this coming fall.

Lastly, I want to express my gratitude to our faculty and staff for providing rich, engaging and well-rounded experiences for our students. I wish you all a very happy, safe and enjoyable summer. I look forward to seeing you all in August.

Warmly,
Patricia Stock



Photo Credit: Patricia Stock

Support ACBS

There are many ways you can support the School of Animal and Comparative Biomedical Sciences. Gifts of any size help to propel ACBS closer to its goals and have an immediate and lasting impact on our programs. Your generosity provides outstanding educational opportunities for our students and helps to attract and retain the brightest faculty. With your support, ACBS research gives back to the state of Arizona community through our extension programs, as well as the nation and the world, through the discoveries we make and the products we develop.

Gifts may be made online at the University of Arizona Foundation website:

www.uafoundation.org/give/cals Be sure to designate the funds by selecting other and typing in ACBS.

Or contact our school business office to discuss specific ways your contribution can be made or dispersed. Whether you choose to give to a specific project or program, or simply donate to the school overall, we thank you.

ALVSCE Poster Forum

The Division of Agriculture, Life and Veterinary Sciences, and Cooperative Extension (ALVSCE) which is made up of the College of Agriculture and Life Sciences (CALs), the College of Veterinary Medicine, and Cooperative Extension, hosted a poster forum on March 22, 2019. The poster forum showcased research being done in all areas of ALVSCE and helped to further collaboration amongst researchers, academic units, and cooperative extension.



Photo: Betsy Greene

Juan Arias talks to Dr. Shane Burgess about the work done by Federally Recognized Tribal Extension Programs (FRTEP) agents across Arizona.

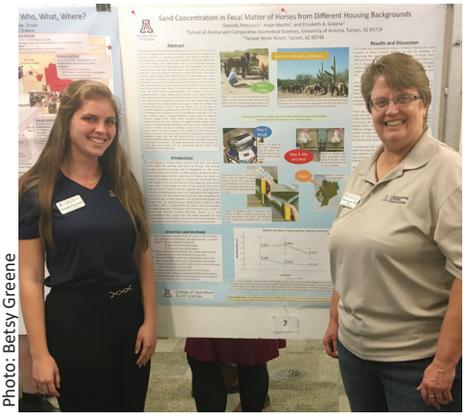


Photo: Betsy Greene

Daniella Peinovich and Dr. Betsy Greene pose in front of Daniella's Honors research poster "Sand Concentration in Fecal Matter of Horses from Different Housing Backgrounds"

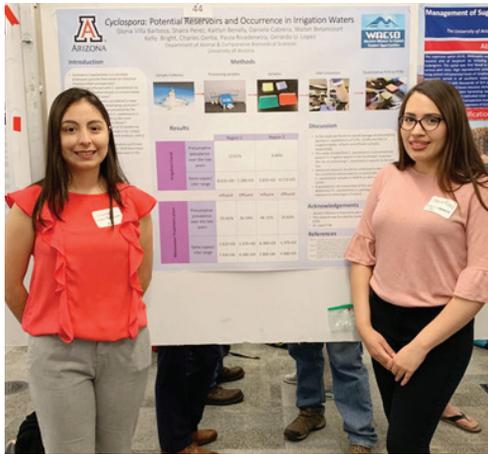


Photo Credit: Jerry Lopez

(L-R) Gloria VillaBarbosa and Shaira Perez present their poster at the ALVSCE poster forum.

Gloria Villa Barbosa, physiology senior, and Shaira Perez, molecular and cellular biology junior, presented a poster on "Cyclospora: Potential reservoirs and occurrence in irrigation waters". The two students have been working in Dr. Jerry Lopez's lab on the project authored by Daniela Cabrera, Kaitlyn Benally, Drs. Charles P. Gerba, Walter Betancourt, Kelly Bright, Paula Rivadeneira, Masaaki Kitajima, and Gerardo U. Lopez. Breanna Salt and Brennen Jones, both ACBS veterinary science majors, Western Alliance to Expand Student Opportunities (WAESO) program students have also been working on the project. WAESO is an Arizona State University grant funded by the Louis Stokes Alliance for Minority Participation (LSAMP) program of the National Science Foundation (Award number:1101728).

As a co-author on two posters, Dr. Greene enjoyed watching presenters, colleague Juan Arias (Tribal Extension Agent, San Carlos Apache Tribe) and student Daniella Peinovich (ACBS Undergraduate Honors Student), discuss their posters with a variety of attendees ranging from peers to ALVSCE Vice President and CALS Dean Shane Burgess, at this very well-attended event. The poster session provided great practice for Daniella, since her poster has been accepted in the undergraduate competition at the Western Section of the American Society of Animal Science meetings in Boise, Idaho, in June.

Animal Encounters on Campus

ACBS course brings animals to the UA Mall to provide a hands-on "Animal Encounters" experience.

Dieter and Netzin Steklis co-teach a popular General Education class ACBS 160: *Human and Animal Interrelationships* where students learn about the ancient history and pathways of animal domestication, as well as our connection to various domesticated animals today.

Though the classroom always includes a lively discussion about current issues surrounding domesticated animals, these Professors in Animal and Comparative Biomedical Sciences wanted students to make the classroom come alive and experience the domestic relatives of jungle fowl, Bezoar goats and the wild horse. With the help of a Student-Faculty Interaction grant, they were able to bring a group of various animals to the UA Mall to provide a hands-on "Animal Encounters" experience. The extra credit assignment was to take an animal selfie and post it to social media with an interesting factoid.



Photo Credit: ACBS

"What was remarkable was that as soon as the animal pens were set-up and a few animals were unloaded from the trailer, mobs of students gathered as if a magnet were pulling them. It just was another example of how much animals matter to people today," said Netzin Steklis who studies the biopsychology of human-animal interrelationships.

"The students became active learners as well as teachers to their peers. Actually interacting with animals they heard about in lectures, readings and quizzes and telling the world what they learned, really brought the classroom to life!", said Dieter Steklis.

Special thanks to the patient animals and staff of TRAK (Therapeutic Ranch for Animals and Kids) for coming to campus.

To view what students shared go to <https://youtu.be/35t6zgLjQc>



Photo Credit: UA Photo/Chris Richards

Students post selfies with animals on the UA Mall for extra credit in ACBS 160 Human and Animal Interactions course.

\$1.5M Gift Will Fund Endowed Chair in Food Safety Education at UA

Margarethe Cooper, an assistant professor of practice in animal and comparative biomedical sciences, is the inaugural holder of the Victor P. Smith Endowed Chair in Food Safety Education.

The University of Arizona School of Animal and Comparative Biomedical Sciences has received a \$1.5 million gift from Victor P. “Vic” Smith to establish an endowed chair in food safety education.

“Education in food safety is becoming increasingly important in our lives,” said Patricia Stock, interim director of the School of Animal and Comparative Biomedical Sciences. “The food safety bachelor’s degree was created to provide a platform to educate and prepare our students to become the lead force in the agriculture food safety industry. The generous contribution of Mr. Smith will not only contribute to the enhancement of student educational and engagement opportunities, but will also help increase the visibility of our food safety program at the national and international levels.”

Stock has selected Margarethe Cooper, an assistant professor of practice in animal and comparative biomedical sciences, to be the inaugural holder of the Victor P. Smith Endowed Chair in Food Safety Education.

During her postdoctoral training at the UA, Cooper studied the bacterium *Campylobacter jejuni* in the food chain. She was also a research affiliate for the U.S. Department of Agriculture in Albany, California, where she conducted research in the food safety and microbiology unit, analyzing the molecular interaction of *Escherichia coli* O157:H7 on lettuce using next-generation sequencing. The support of the endowed chair will help Cooper to develop and promote food safety educational programs and connect students with industry partners for food safety-related career opportunities.

“Since its establishment as a land-grant university, the UA has taken very seriously its commitment to partnering with the state’s agricultural industry by working with growers and ranchers to solve challenges, translate research into real-time best practices, and strengthen Arizona’s economy,” said UA President Robert C. Robbins. “This gift from Victor Smith will help us do even more of that work by supporting both research and education in food safety. We are so grateful for his generosity and his partnership.”

Smith is CEO of JV Smith Cos. Based in Yuma, Arizona, JV Smith Cos. is a diverse group of operations with farming, cooling, distribution facilities and shipping capacities in Arizona, California, Colorado and the Baja peninsula of Mexico. These operations produce a variety of commodities, including lettuce, spinach, carrots, celery and green onions. In his role, Smith is responsible for oversight of nine common controlled business units: Skyview Cooling Co., JV Farms, JV Farms Organic, Triangle Farms, Promotora Agricola El Toro, El Toro U.S.A., Skyline Potato, Southern Colorado Farms and Skyline Land.

Smith grew up in Pueblo, Colorado. He studied economics and business law at the University of Colorado from 1970 to 1974. He went on to study finance at Arizona State University in 1975. He joined Skyview Cooling Co. in the fall of 1975 and quickly earned a leadership role, becoming vice president in 1977. In 1988, he became president of Skyview Cooling Co. Throughout the 1990s and early 2000s, Smith added leadership roles in other JV Smith companies to his portfolio. In 2012, he accepted his current role as CEO with oversight of all eight of the affiliated companies.

In addition to his work with JV Smith Cos., Smith is actively involved in Arizona community and agricultural organizations, having served on more than a dozen boards over the past 30 years. He is currently a board member for the Western Growers Association, the Produce Marketing Association, the Arizona Commerce Authority and the Arizona Department of Agriculture Advisory Council.

Endowed chairs are vitally important to the university’s future, said John-Paul Rocznik, president and CEO of the UA Foundation.



Photo: UA Communications

From left to right: UA President Dr. R. Robbins, Mr. Victor Smith, Mrs. Karen Smith, Dr. Margarethe Cooper, Endowed Chair Food Safety Education, and Dr. Shane Burgess, CALS Dean at the endowment ceremony for the Food Safety Education Endowment at the Arizona Inn on Dec 4, 2018.

“Vic Smith has made a gift that will keep the UA at the forefront of this field and provide opportunities to generations of deserving faculty and students,” Rocznik said.

“He is known for promoting the use of technology in harvesting, quality control, and worker safety, and has developed, and inspired others to develop, innovations that have advanced his entire industry,” Burgess said. “He’s completely changed the sector he’s been in for the past 30 years. He’s a Fourth Industrial Revolution visionary.”

Over the years, Smith and his wife, Karen, have supported numerous charitable causes. In 2013, they created the Smith Family Foundation to ensure donations were being maximized to meet community needs and to offer scholarship opportunities to the dependents of JV Smith Cos. Employees. The foundation has supported Amberly’s Place, KIDS CuddleKit Closet, YMCA Yuma, YRMC Foundation-School Drive and Youth Initiative, Yuma Catholic High School, Yuma Community Food Bank, and the Yuma County Science Fair.

Helping the community is also part of the ethos of JV Smith Cos. In 2014, the organization launched the Power Plate, which uses fun characters and a plate with sections to teach schoolchildren that half of their plate should be filled with fruits and vegetables. The program increased consumption of vegetables by 62 percent in one elementary school in Yuma School District One.

- Jennifer Yamnitz, UA College of Agriculture and Life Sciences

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<https://uanews.arizona.edu>

CALS Spring 2019 Outstanding Seniors

Three exemplary ACBS undergraduate students are recognized for their hard work and outstanding achievements.

Each semester the College of Agriculture and Life Sciences (CALS) selects and honors 15 outstanding seniors (1 from each of the undergraduate majors) that are exemplary examples of their graduating class. The selected students have not only excelled at their studies but have volunteered, interned, conducted research, and persevered toward their professional goals and, in turn, have made a difference within their campus and local communities. To celebrate and recognize their hard work and outstanding achievements, CALS hosts an Outstanding Senior Awards luncheon to honor these graduating seniors for their dedication, experience, and future goals. The Spring 2019 award winners for ACBS are Anusha Vishnubhotla - Microbiology, Matt Salerno - Veterinary Science, and Daniella Peinovich - Animal Sciences.

For ACBS senior, Anusha Vishnubhotla microbiology was the right fit from the start. About her choice and future goals she



Microbiology Spring 2019 Outstanding Senior Anusha Vishnubhotla (left) with Dr. Scott Wilber, ACBS Assistant Professor of Practice. Anusha will join Stanford University, as a research assistant working on HIV. After gaining work experience she will attend graduate school so that she can create her own research and make contributions to medicine.

Photo Credit: Patricia Stock

says, "I chose Microbiology as a major because I have always been interested in different kinds of bacteria and viruses. I always have known since I was 5 years old that I wanted to do something in medicine and make a huge contribution to medicine. I knew I wanted to focus more on bacteria and viruses since I was a junior in high school. I hope to use my major to be able to do research on some potentially pathogenic bacteria and understand

their pathogenesis."

Looking back over her time at the UA and what has made the biggest impact for her future, Animal Sciences honoree, Daniella Peinovich says, "Joining the Dean's Leadership 50 my junior year was one of the most impactful decisions I made during college. Not only did I greatly expand my professional skills to prepare me for my future in the workforce, but I also met so many incredible people through the organization that I hope to maintain strong connections with even after graduation."

Matt Salerno, Outstanding Senior in Veterinary Science, advises incoming University of Arizona students to "Get involved. Opportunities rarely come to those who sit around and wait. Every internship, award, leadership position, scholarship, study group, preceptorship or friend that I have had since coming to Arizona came from stepping outside of my comfort zone and not being afraid to fail." While at the UA, Matt was the Team Captain of the UA Men's Swimming and Diving Team as well as an Olympic trial qualifier level swimmer. He completed clinical hours with Dr. Luise King at Southern Arizona Veterinary Specialty and Emergency Center and volunteered at Therapeutic Ranch for Animals and Kids, a local non-profit organization.

We would like to congratulate these exceptional students and wish them well in their future endeavors.



Photo Credit: Patricia Stock

Animal Sciences Spring 2019 Outstanding Senior Daniella Peinovich (center), with Dr. Betsy Greene (left) her undergraduate research advisor and ACBS Director, Dr. Patricia Stock. Daniella is from Livermore, CA. She is interested in the equine industry, specifically physical therapy for injured horses. After a gap year she plans to explore career options and master's programs.



Photo Credit: Patricia Stock

Veterinary Science Spring 2019 Outstanding Senior Matt Salerno. Matt will be attending The Ohio State University College of Veterinary Medicine in the Fall to earn his Doctor of Veterinary Medicine (DVM).

Improved Diagnostic for Cryptosporidiosis

Through Tech Launch Arizona, the University of Arizona is partnering with Kerafast, a Boston-based reagents company, to license reagents that offer the opportunity for the development of a rapid, highly sensitive diagnostic test for Cryptosporidiosis, the leading cause of waterborne diseases among people in the U.S.

Cryptosporidiosis, or Crypto, infects almost 750,000 people each year, according to the Centers for Disease Control and Prevention. Globally in 2010, nearly 100,000 cases were fatal. The tiny bug is spread through any contact with infected feces and is frequently contracted via water sources such as mountain streams, public pools or contaminated municipal drinking water.

The disease is of particular interest to Dr. Michael Riggs, a veterinarian and professor in the School of Animal and Comparative Biomedical Sciences at the UA College of Agriculture and Life Sciences. Riggs' research concentrates on characterizing immune responses

to Crypto – specifically on the development of recombinant vaccines, immunotherapies and drug discovery for Cryptosporidiosis – and improved methods for diagnosis.

Current means of detecting and diagnosing Crypto present challenges and the use of a wide variety of diagnostic methods along with the inconsistent application of techniques makes it difficult to compare results from clinical and veterinary studies.

The reagents developed in Riggs' laboratory offer the opportunity for the creation of a rapid, highly sensitive diagnostic test for Crypto. Partnering with Kerafast will make the test more easily available to scientists worldwide to advance research toward better Crypto diagnosis and treatment.



Photo: Chris Kremer on Unsplash

The Centers for Disease Control and Prevention reported that U.S. outbreaks of Cryptosporidiosis linked to swimming pools and water playgrounds doubled from 2014 to 2016.

Paul Tumarkin, Tech Launch Arizona

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<https://uanews.arizona.edu>

PariBet Racetrack Industry Student Experience (PRISE)

The students keep Mike Weiss, general manager of Rillito Park and president of PariBet, coming back year-after-year.



Photo: Joshua Reed Photography
Mike Weiss, general manager of Rillito Park and president of PariBet.

The PariBet Racetrack Industry Student Experience (PRISE), was created by Mike Weiss, general manager of Tucson's Rillito Park and president of PariBet, as an opportunity for students who want to work in the horse racing industry, to learn about and work in racetrack operations while attending the University of Arizona. In its fifth racing season the program offers paid positions covering every aspect of the race track enterprise. Students not only learn what it takes to

run a racetrack, they participate in it, which keeps the track running and gives students an unprecedented experience.

Originally open only to Race Track Industry Program students, the internship program expanded its partnership to include all majors in the College of Agriculture and Life Sciences for this season. As Weiss

describes it, running Rillito is like running a city. With over 25 interns working at the track this year students have a hand in every area of the business. From the barn areas, to regulation, concessions, to admissions, marketing, social media, and maintenance, students are able to experience for themselves what it takes to make this "city", and the "show" as he describes the racing experience, run.

Mike Weiss' love affair with racing began in his home city of Cleveland, Ohio where he worked as a groom through high school, loaded horses in the starting gate and timed work outs. Working his way through various positions and tracks, after 23 years at his last track, with 20 as General Manager and Executive Vice President, he moved on to his own company PariBet, an advanced deposit wagering service, and left the cold winters of Ohio for Florida. Along with hard work Mike also credits the UA Race Track Industry Program, which he attended and received a John K Goodman distinguished alumni award from, with helping him on his career path.

Mike uses his experience in racing to show students that he didn't walk in with a suit and tie on and most positions at the track are the same way. When he consults with a track, as he did with a small track in North Dakota and with Rillito, he's not just giving them a business plan and sitting back. He's in the trenches, running the tractor if needed, anything that needs to happen for the races to run.

For Mike it's more than the work and the races that keep him coming back to Tucson, "Every year I say this is my last year (at Rillito) and then I meet another group of students that just grab me, and I have to stay to see what they're going to do. The students, that's the part I really enjoy."



Photo: Joshua Reed Photography
UA students and Rillito Park interns, (L-R) Elisabeth Carter, Emily Campbell, and Jayson Campbell prior to saddling up and ponying horses to the starting gate.



Photo: Joshua Reed Photography
UA students and Rillito Park interns, Claudia Alvarez and Alex Sausville, give their race predictions to the crowd as the horses and jockeys prepare for the next race at Rillito Park. Rillito is one of the only US race tracks to give predictions in both English and Spanish.

SaferFoodCats

Summer program will introduce high school students to food safety research, education, and career opportunities.

This summer, selected rising 9th-12th grade high school students, will have the opportunity to explore food safety research and career opportunities through a new experiential learning program offered through the UA School of Animal and Comparative Biomedical Sciences. The SaferFoodCats program is a 12-day immersion program which introduces students to career pathways in food safety, while experiencing working in a real-world food safety laboratory.

Program participants will partner up and work together, to create and implement a collaborative food sampling project, which will be documented in a scientific notebook, summarized, and presented in a poster on the final day of the program.

The project will include learning and performing necessary laboratory work and analyzing DNA data using bioinformatic techniques. Students will interact and work with food safety researchers and professionals to learn more about what they do, as well as, visit various on and off campus sites related to food safety to learn more about the food supply chain and how it is protected. Participants will reside in the UA dormitories and evenings will be spent exploring 4-H activities and in developing leadership and team-building skills.

For more information on the SaferFoodCats program contact saferfoodcats@email.arizona.edu or 520-621-3290.





Mark Kaufman Workshop Presented by Turf Publicists of America

The opportunities legalized sports betting present to horse racing was the topic of the TPA-sponsored Mark Kaufman Workshop, held as part of the Global Symposium on Racing in December.

The workshop is named in honor of Mark Kaufman, a passionate turf publicist who died in 1995.

Monmouth Park Marketing Director, Brian Skirka, moderated the discussion, which represented sports betting, horse racing and horse player perspectives. Participating on the panel were Michael Grodsky, Vice President, Marketing, William Hill US; Christopher Larmey, Chairman, NCH Player's Committee, NTRA; and Jeff Lowich, Sr. Director Retail Ops. & Industry Relations, TVG.

The Supreme Court ruling in May 2018 cleared the way for states to legalize sports betting. Panelists discussed current sports books in Las Vegas and New Jersey; the potential sports betting landscape and the future of mobile wagering; the demographics of sports bettors versus horse players; the use of handicapping tournaments to introduce horse racing to sports bettors; and how revenue generated by sports betting can enhance racing.

Alex Sausville Selected as 2018 TPA Scholarship Winner

University of Arizona Race Track Industry Program student, Alex Sausville, was named the 2018 recipient of the \$2,000 Turf Publicists of America scholarship. TPA officers and RTIP faculty selected Alex from several candidates.

A native of Scotia, New York, Alex fell in love with the sport during summer trips to Saratoga with his family. However, it was the exciting atmosphere surrounding Belmont Park for the 2012 Belmont Stakes that he says hooked him on racing.

Since that experience, Alex has traveled the country visiting racetracks. Stops at Beulah Park and the old Great Barrington Fairgrounds inspired his life goal to see every racing venue, current and past, in North America. In the last six years, he has been to more than 80 racetracks.

Alex, who will graduate in 2019, is a passionate advocate for racing. He hopes that by sharing his love for the sport with others, he will help the sport thrive in the U.S. and around the world.



Photo: RTIP

UA Race Track Industry Program student Alex Sausville receives Turf Publicists of America scholarship.



Photo: RTIP

(L-R): Alex Sausville interviews RTIP students Hugh Drexler, from Massachusetts and Abel Zander, from Illinois, both seniors on the business path, for Episode 1 of the "Off the Turf" podcast.

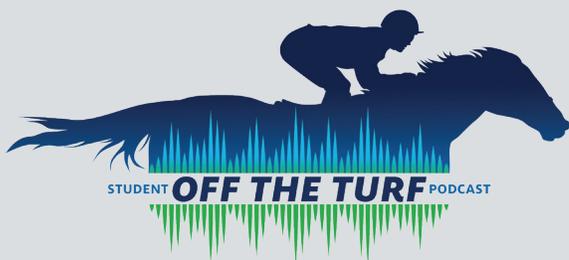
Weekly Podcast Features RTIP Students and Industry Issues

Created and hosted by RTIP student and TPA Scholarship winner Alex Sausville, "Off the Turf" is a new weekly podcast that highlights the students of the RTIP and their perspectives on the challenges that racing faces. Sausville showcases the diversity of the RTIP student's background and then explores the issues that are important to them, giving the students a forum to share how they'd like to be a positive force for the future of the sport.

It was the enthusiasm expressed by Sausville's high school basketball coach, during a visit with him over the winter break, about the power of podcasts that sparked the idea. Having no previous experience in creating a podcast, Sausville researched all he could about production techniques and spent countless hours researching "how to" videos. Upon his return to campus, he pitched the idea to the RTIP faculty for approval and had the first podcast up within a couple of weeks.

"The amount of preparation it takes was really eye-opening, from researching the topics, to creating the questions, to digging up great trivia - but the result is incredibly rewarding. The best part is how excited the students are about participating; the first thing they ask when the interview is over is when they can be on again," said Sausville.

You can find all the podcasts at <https://www.ua-rtip.org/turf>.



Finding an Alternative to Pesticides

Developing a safer alternative to the chemical pesticides commonly used to combat plant pathogens.

Patricia Stock, entomology professor and director of the UA School of Animal and Comparative Biomedical Sciences, used an UA Accelerate for Success grant and funding from the College of Agriculture and Life Sciences Innovation Venture Investment Program, to test the activity of secondary metabolites from *Photorhabdus* bacteria with applications in agriculture. Compounds derived from *Photorhabdus*, an insect pathogenic bacterium, were found to have antimicrobial and nematocidal properties that can potentially replace chemical pesticides.

Stock, who is also a member of the UA BIO5 Institute, is working with Tech Launch Arizona, the UA office that commercializes inventions stemming from research, to develop her research into products that can be used throughout the world.

- Alison Mairena, Tech Launch Arizona

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<https://uanews.arizona.edu>

News from the P. Stock Laboratory

Congratulations to Marilyn Mews (Microbiology), Meghan Yousefelahi (Biochemistry) and Dalaena Rivera (Microbiology), undergraduate researchers from our lab who graduated this past May. Dalaena, who was also an honors college student, completed her thesis titled "Effect of ascariosides on sex attraction and reproduction on first generation adults of *Steinernema carpocapsae* nematodes (Nematoda: Steinernematidae)". She will continue her graduate education in Microbiology in a joint program at California State University and University of California - San Diego.

Megan, also an honors college student, studied the role of bacterial symbionts on nematode metabolism. Her thesis title was "Influence

of *Xenorhabdus nematophila* (Enterobacteriaceae) on lipid and free fatty acid metabolism of its nematode host *Steinernema carpocapsae* (Nematoda: Steinernematidae)". She

will be pursuing an accelerated master's degree in Biochemistry at the UA and will continue with her research in our lab. Marilyn will attend the UA in an accelerated master's degree in Microbiology and will conduct her research in the Stock lab as well.

Ayako Kusakabe, PhD candidate in the Entomology and Insect Science, Graduate Interdisciplinary Program (EIS GIDP), won second place in the Nematode Division Travel Award of the Society from Invertebrate Pathology. She will be attending their annual meeting in Valencia, Spain, next July. Additionally, she was awarded an UA Graduate and Professional Student Council Grant. The grant will support her research project that deals with the discovery, identification and bioactivity of secondary metabolites of *Photorhabdus* bacteria.

Undergraduate students, Isabel Forlastro (Animal Science) and Danny Duong (Physiology) were both awarded research grants from the UA Honors College to conduct their research projects in the Stock lab over the summer.

Min Woo Lee, postdoctoral associate in the lab, will soon be departing to Wooster, OH, where he will join the ARS-USDA as a research scientist. We bid him farewell and wish him and his family the best!



L-R: Undergraduate student Luis Ruiz, doctoral student Ayako Kusakabe and professor Patricia Stock have identified compounds derived from *Photorhabdus*, an insect pathogenic bacterium, that can potentially replace chemical pesticides.

Photo: Alison Mairena/Tech Launch Arizona

ACBS Appointments, Promotions, Awards and Retirements

ACBS Director

After a rigorous interview and selection process Dr. Shane Burgess, ALVSCE Vice President and CALS Dean, has selected Dr. Patricia Stock as the Director of the School of Animal and Comparative Biomedical Sciences. About her appointment Dr. Stock says "I am thrilled about this opportunity, which will allow me to continue providing my vision and leadership while facilitating discovery, learning and engagement programs within our school." She goes on to say "I thank you for the support you have already provided but more importantly for your trust in me. I look forward to continuing to work with you." Dr. Stock can be reached at 520-621-0868 or spstock@email.arizona.edu.

Promotion to Professor

Fiona M. McCarthy

Promotion to Associate Professor with Tenure

Zelieann R. Craig

Benjamin J. Renquist

Awards

Dr. Sadhana Ravishankar was awarded the Minjiang Scholar Scientist of Fujian Agriculture & Forestry University, Fuzhou Province, China.

University of Arizona startup GenetiRate has been designated one of two companies honored with the Seafood Innovation Award at the North Atlantic Seafood Forum (NASF) 2019. The company won the honor for its technology for genetic selection to improve sustainability and production. Launched in 2018, GenetiRate was founded on a technology invented by **Benjamin Renquist, PhD**, an associate professor in the School of Animal and Comparative Biomedical Sciences.

More than 950 UA employees were recognized April 19, 2019 at the annual Service Awards ceremony, which celebrated employees who marked recognized work anniversaries in 2018. ACBS faculty and staff included **Betty Prewitt**, 45 yrs; **Nancy Costanza**, 35 yrs; **Wendy Davis**, 30 yrs; **Michael Mallozzi**, 10 yrs; **Dr. Gayatri Vedantam**, 10 yrs; and **Dr. V.K. Viswanathan**, 10 yrs.

Retirement

On May 6, 2019, after 36 years of service to the University of Arizona and ACBS, Nancy Costanza retired from her position as a Laboratory Coordinator, Senior. Before her departure ACBS gathered to celebrate her retirement, thank her for her service and wish her well.

Photo: University of Arizona



Betty Prewitt, administrative assistant for the ACBS's Race Track Industry Program, celebrates 45 years of service at the University of Arizona.

Photo: UA ACBS



(L-R) ACBS Director, Dr. Patricia Stock presents Nancy Costanza with a plaque recognizing her 36 years of service to the UA.

3rd Annual Southern Arizona Equine Health Symposium

Collaborative event brings equine health presentations to AZ horse owners.

The 3rd Annual Southern Arizona Equine Health Symposium was a resounding success. Over 200 attendees participated in 20 different presentations and demonstrations focusing on the health and welfare of horses. Dr. Angelo Telatin educated the crowd on *“Improving horse husbandry/training using learning psychology”*, and then moved to the arena to demonstrate *“Problem solving for common behavior issues in hand and under saddle”*. He also wowed the

audience with a bridless jumping demonstration during the lunch hour. Dr. Greene presented *“Life in Arizona: Dealing with Heat Stress”* with Dr. Ann Pearson (Reata), and Betsy worked with Ashley Wright (Area Livestock Agent), Dr. Carli Reece (Adobe), Dr. Robbie Hendrix (Reata), and farrier, Eddie McKenzie to give the audience a hands on opportunity to learn about

(or refresh) vital signs in *“Horse 101: Knowing Normal in Your Horse”*. Pima County 4-H Agent Ashley Jeffers-Sample presented *“Youth and Horse Opportunities: 4-H, FFA, Rodeo and More!”*, and the day ended with an *“Ask the Expert Panel”* including most presenters and moderated by Dr.

Greene. This educational event is an excellent collaboration between UA Equine Extension, Reata Equine Veterinary Group, Adobe Veterinary Center, and our industry partners. For more information go to: <https://extension.arizona.edu/2019-southern-arizona-equine-health-symposium>, and mark your calendar for next year’s event on January 25, 2020.



Photo: Betsy Greene

Dr. Angelo Telatin jumping during his lunch hour bridless demonstration.



Photo: Betsy Greene

Dr. Betsy Greene and Dr. Ann Pearson had great questions from the packed room (over 70 people) during their *“Life in Arizona: Dealing with Heat Stress”* presentation.

Hippology Academy

Horse Specialists from AZ, IN, MN, NE, and NJ working as a part of www.extensionHorses.org created an online short course *“Hippology Academy Part I”* for youth, adults, leaders, and extension personnel to gain knowledge and practice for Hippology Contest content. Topics included anatomy, health, forages, toxic plants, diseases, biosecurity, nutrition, and parasites. All topics were chosen to match content areas for National 4-H Hippology and Horse Bowl contests and National FFA Horse Evaluation CDE. There is a Hippology Academy II in the planning stages now. Funds generated from this course go directly into supporting the work on national collaborative projects which benefit horse enthusiasts in our home states, across the country, and the world.

“Tack Box Talk: Horse Stories with a Purpose”

At our Annual Extension Horses meetings in January, State Horse Extension Specialists participated in training on planning, recording, editing, and distributing podcasts in order to create another method to reach our equine enthusiasts across the nation in a trusted learning environment.

We have previously recorded episodes on *“Winter Horse Care”* and *“When is it Too Hot to Ride?”*, additionally since January, we have recorded several upcoming episodes. The first episode of Season 2 covers Polysaccharide Storage Myopathy and is titled, *“The Story of Virginia and Flea”* is up at www.extensionhorses.org/podcasts.html.

AZ FFA CDE Horse Judging Contest

The first Friday in March is always reserved on Dr. Greene’s calendar as the Faculty Chair for the FFA Horse Judging Contest at the UA Agricultural Center. Over 150 FFA youth participate in the horse judging competition, and it takes many hands and hooves to provide this contest for our contestants. This year, Griffyn Krause, UA animal science and biochemistry major, was the student chair. Griffyn was excited to lead after competing in these events in prior years. She recruited student volunteers and worked closely with the equine facility staff (Kacee Richardson and Sam Biffar) to get student riders/handlers and horses matched for the four judging classes. Thanks to all of the students, staff and horses for providing a great contest for the FFA competitors.



Photo: Betsy Greene

FFA Horse Judging Contest Faculty Chair, Dr. Betsy Greene and Student Chair Griffyn Krause.

American Youth Horse Council Meetings

Dr. Betsy Greene presented a workshop at the American Youth Horse Council Conference, hosted by Washington State University and University of Idaho. She demonstrated one of the SCRUB (Science Creates Real Understanding of Biosecurity) hands on laboratories that she and Dr. Kris Hiney (Oklahoma State University) are developing as a part of their grant. The hands on activity played off of a *“Horse Disaster Table Top exercise”* from the previous day, and attendees tried their hand at disinfecting stall walls and *“windows”* from the imaginary quarantine barn. They got a hands on feel for cleaning vs. disinfecting, and how difficult it can be to get rid of all of the bacteria/virus (which in this case was glow-germ powder). The workshop was very well received, and resulted in invitations to present at a statewide and a regional teacher conference in Massachusetts.



Photo: Betsy Greene

Workshop participants team up to clean and disinfect barn wood and *“windows”*. The group with the least *“glow”* from the blue light won.



Photo Credit: Jerry Lopez

Students participate in a STEM activity at the 2019 Southwest Ag Summit illustrating the complexity and collaborative nature found in solving foodborne illness outbreaks.

2019 Southwest Ag Summit

Over 100 students from local high schools in Yuma, AZ, attended the annual Southwest Ag Summit where they rotated among various talks and presentations. Dr. Gerardo (Jerry) Lopez with the 4-H STEM Extension Program provided an environmental microbiology and food safety STEM activity illustrating the complexity and collaborative nature found in solving foodborne illness outbreaks. The Annual Ag Summit High School program is organized by Tanya Hodges Regional Academic Programs Coordinator University of Arizona-Yuma/LaPaz/Imperial Valley, Alberto Urbieto Sr. Academic Program Coordinator, UA-Yuma Learning Center and in collaboration with Arizona Western College.

7th Annual 2019 UA Health Professions Health Sciences High School Expo

Tucson high school students in the TRiO Education Talent Search (ETS) and Upward Bound programs attended the 7th annual University of Arizona Health Professions Health Sciences High School Expo, on February 19, 2019, at the Arizona Health Science Campus. Students participated in rotations in medicine, environmental microbiology, nursing, and public health. For one of the rotations, Dr. Gerardo Lopez's 4-H STEM Extension team provided hands-on, engaging activities for attendees focused on environmental microbiology and food safety to peak students' interest in pursuing STEM careers. Dr. Lopez's team includes Daniela Cabrera, 4-H program coordinator and research specialist, Kaitlyn Benally, veterinary science senior, Shaira Perez, molecular and cellular biology junior, and Gloria Villa Barbosa, physiology senior. Thank you to Josephine Morgan-Gin, academic advisor senior in the Colleges of Letters, Arts, and Science (CLAS) Pre-health Professions Advising Center for organizing this event in collaboration with Agnes Attakai, Director Health Disparities Outreach Prevention Education and many others.



Photo Credit: Jerry Lopez

Students learn about environmental microbiology and food safety at the Health Professions Health Sciences High School Expo.



(Above) Dr. Sahana Ravishankar (3rd from left) and her lab members (L-R) Qi Wei, Richard Park, and Aishwarya Rao, engage students and parents on the importance of food safety and microbiology during Innovator's Night at the Southern Arizona Regional Science and Engineering Fair (SARSEF).

Photo Credit: Sadhana Ravishankar



Future Innovator's Night at SARSEF

Dr. Sadhana Ravishankar and her team hosted the University of Arizona- Food Safety Booth at the Southern Arizona Regional Science & Engineering Fair (SARSEF)- Future Innovator's Night on March 8, 2019, held in the Tucson Convention Center. At the booth they were able to explain the importance of food safety and microbiology, prevention of cross-contamination, and the use of natural sanitizers for washing fresh produce. SARSEF is held annually in Tucson and is dedicated to creating Arizona's future critical thinkers and problem solvers through science and engineering. Thousands of children and their parents visit the SARSEF posters and exhibits. 1,800 projects, representing more than 4,000 students, that have been chosen to compete, are on display.



Grants

Greene EA and Hiney K. "Science Creates Real Understanding of Biosecurity (SCRUB) Activity Kit to Supplement/Support Biosecurity Learning Objects" (USDA-NIFA) \$24,609.

Tronstad R, **Greene E**, Austin L, Dunn B, Marks H, Wright A, Sherman J, Rappold P, Hall A, and Brischke A. "Developing Opportunities and Growing Business of Limited-Resource and Native American Beginning Farmers and Ranchers in AZ". (USDA) \$600,000.

Tronstad R, **Diaz D**, Sherman J, Wright A, Hall A, and **Greene E**. "Risk Management education for Arizona's Livestock, Dairy, Forage, and Tree Nut Producers". (USDA/RMA) \$99,990.

Arias J and **Greene E**. "San Carlos Indian Outreach Resources project. (UA Extension Strategic Initiative Program). \$15,418.

Presentations and Symposia

Alden EA, Moore GR, Farrell G, Arias JM, Alamban AP, Carlisle A, Sakaquaptewa S, Dennison K, Teegerstrom T, Gardner-Smith J, and **Greene EA**. (2019). "Arizona Federally Recognized Tribal Extension Program (FRTEP): Who, What, Where?" Presented at: National FRTEP Conference. Oklahoma: FRTEP/Oklahoma State University. (October, 2018) and University of Arizona ALVSCE Poster Forum. ALVSCE Poster Forum, Tucson, AZ. March 22, 2019.

Anwar, Farhan. "Clostridium difficile Associated Disease: Looking Beyond the Toxins". Microbiology. Faculty Member: **Gayatri Vedantam**. University of Arizona ALVSCE Poster Forum. March 22, 2019.

Arellano, Stephanie. "Apple, Carrot, and Hibiscus Edible Films Containing the Plant Antimicrobials Carvacrol and Cinnamaldehyde Inactivate Salmonella Newport on Organic Leafy Greens in Sealed Plastic Bags". Food Safety. Faculty Member: **Sadhana Ravishankar**. University of Arizona ALVSCE Poster Forum. March 22, 2019.

Claus-Walker, Rachel. "Clostridium difficile Infection Surveillance in a Healthcare Setting: Strain Diversity and Identification of Novel Molecular Types (Ribotypes)". Microbiology. Faculty Member: **Gayatri Vedantam**. University of Arizona ALVSCE Poster Forum. March 22, 2019.

Cole, Hunter. "Persistence and Internalization of Salmonella on/in Organic Spinach Sprout: Exploring the Contamination Route". Food Safety. Faculty Member: **Sadhana Ravishankar**. University of Arizona ALVSCE Poster Forum. March 22, 2019.

Cooper, Kerry. "Characterization of Tree Fruit Bacterial Communities during Harvest". Food Safety. University of Arizona ALVSCE Poster Forum. March 22, 2019.

Greene E. (2019). "The Equine Digestive Tract: Better management through better understanding". Rillito Arizona Equine Wellness Program. Rillito Racetrack, Tucson, AZ (February, 2019).

Greene E. (2019). "Simple changes in day to day practices to increase biosecurity". Rillito Arizona Equine Wellness Program. Rillito Racetrack, Tucson, AZ (February, 2019).

Greene E.A. and Hiney K. (2019). "Fun with a new Teaching Tool: SCRUB (Science Creates Real Understanding of Biosecurity) Kit". Workshop presented at 42nd Annual American Youth Horse Council Symposium. Moscow, ID (March, 2019).

Greene, E. and Melchior, M. (2019). "How to Prepare your Horse for Rodeo Season". Presentation at Hualapai Nation. Peach Springs, AZ (March, 2019).

Lin, Joshua. "Diagnostic Techniques for Infectious Diseases in Shrimp". Aquaculture Pathology. Faculty Member: **Arun Dhar**.

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University of Arizona ALVSCE Poster Forum. March 22, 2019.

Oliveras, Vimarys. "Concentration-dependent Inhibition of Escherichia coli O157:H7 and Potentially Carcinogenic Heterocyclic Amines in Heated Ground Beef Patties by Apple, Olive, and Onion Powders and Clove Bud Oil". Food Safety. Faculty Member: **Sadhana Ravishankar**. University of Arizona ALVSCE Poster Forum. March 22, 2019.

Peinovich, Daniella. "Sand Concentration in Fecal Matter of Horses from Different Housing Backgrounds". Animal Health. Faculty Member: **Betsy Greene**. University of Arizona ALVSCE Poster Forum. March 22, 2019.

Ravishankar, S. 2019. "Food Safety- Identify Critical Control Points and Develop Pre- & Post-harvest Strategies to Minimize Microbial Contamination" presented at the USDA-SCRI Melons Project Annual PI Meeting/Webinar, January 7, 2019.

Villa Barbosa, Gloria. "Cyclospora: Potential Reservoirs and Occurrence in Irrigation Waters". Environmental Microbiology. Faculty Member: **Gerardo Lopez**. University of Arizona ALVSCE Poster Forum. March 22, 2019.

Wei, Qi. "Synergistic Effects of Combination Treatments of Essential Oils and a Plant Extract Against Multi – drug Resistant Salmonella Newport on Organic Leafy Greens". Food Safety. Faculty Member: **Sadhana Ravishankar**. University of Arizona ALVSCE Poster Forum. March 22, 2019.

Publications

Cordery A, Rao AP, and Ravishankar S. 2019. Antimicrobial Activities of Essential Oils, Plant Extracts and their Applications in Foods- A Review. Journal of Agriculture and Environmental Sciences, 7(2): 76-89.

Cruz-Flores R, Mai Hung N, and Dhar AK. 2019. Multiplex SYBR Green Real-Time PCR for the detection of Photorhabdus Insect-Related (Pir) Toxin Genes PirA and PirB. Molecular & Cellular Probes, 43: 20-28.

Dev Kumar G and **Ravishankar S**. 2018. Ozonized water with plant antimicrobials: An effective method to inactivate Salmonella enterica on iceberg lettuce in the produce wash water. Environmental Research, 171: 213-217.

Dev Kumar G, **Zhu L**, Siemens MC, Nolte K, Brassill N, Rios D, Galvez R, Fonseca JM, and **Ravishankar S**. 2019. Modified Coring Tool Designs Reduce Iceberg Lettuce Cross-Contamination. Journal of Food Protection, 82(3): 454-462.

Gilling DH, **Ravishankar S**, and Bright KR 2019. Antimicrobial Efficacy of Plant Essential Oils and Extracts Against Escherichia coli. Journal of Environmental Science and Health, Part A, DOI: 10.1080/10934529.2019.1574153.

Megahed ME, **Kanrar S**, and **Dhar AK**. 2019. Complete genome sequence of white spot syndrome virus isolated from Indian white prawn (Fenneropenaeus indicus) in Egypt. Microbiology Resource Announcement. 8(1): e01508-18.

Zhu L, Torres M, Betancourt WQ, Sharma M, Micallef SA, Gerba C, Sapkota AR, Sapkota A, Parveen S, Hashem F, May E, Kniel K, Pop M, and **Ravishankar S**. 2018. Incidence of fecal indicator and pathogenic bacteria in reclaimed and return flow waters in Arizona, USA. Environmental Research, 170: 122-127.

Provisional Patent

Ravishankar S and Dev Kumar G. 2019. Ozone In Combination with Essential Oil Microemulsions As Antimicrobial Sanitizers for Produce. Docket Number: UA 19-080; Application No. 62/775,724 filed 12/5/2018.

Aquaculture Pathology Laboratory Updates

Aquaculture America-2019 - a World Aquaculture Society Meeting

March 7-11, 2019 New Orleans, Louisiana

Dr. Arun K. Dhar, chaired a session on “Shrimp Health & Diseases”. In this session, presentations included, Dr. Hung N. Mai who spoke on developing an infection model for an experimental bioassay using a microsporidium parasite, *Enterocytozoon hepatopenaei*, commonly known as EHP. Dr. Luis Fernando Aranguren Caro, with a presentation on the comparison of the biology and the genome of EHP from Asia and Latin America. Dr. Roberto Cruz-Flores presenting two papers, one on the development of a non-lethal method of tissue sampling for screening animals for EHP which uses real-time polymerase chain reactions and electron microscopy. His second paper explored genome reconstruction of shrimp viruses from archived tissue samples embedded in paraffin blocks. This discovery opens a new horizon in evolutionary studies in shrimp viral diseases as the Aquaculture Pathology Laboratory allowing for the use of tissue samples archived at the Lab for the past few decades. Lastly, Mr. Paul Schofield presented a paper on the susceptibility of freshwater prawn to *Vibrio parahaemolyticus* causing Acute Hepatopancreatic Necrosis Disease (AHPND). Both AHPND and EHP are two emerging diseases that are threatening the global shrimp industry.

During the conference, Dr. Dhar also gave a presentation on “Evolving trends in shrimp disease detection” in a session entitled “Interpretation of molecular data - impacts on aquatic animal health management”. The conference attracted over 3,500 participants from all over the world.

Bengal Global Business Summit - 2019

Feb 8-9, 2019 Kolkata, West Bengal India

Dr. Arun K. Dhar was invited to give a talk on “Building a Disease Diagnostics Center to Support Shrimp Breeding Programs in West Bengal, India” and served as a member in a panel to discuss agrobusiness in West Bengal, India. Currently the Government of West Bengal is building a captive breeding program coupled with a shrimp disease diagnostic center. The Oceanic Institute, Hawaii Pacific University, Honolulu, HI, and the Aquaculture Pathology Laboratory are involved in this project. The goal of the project is to produce genetically superior and disease free broodstock. These stocks will



Photo: Arun K. Dhar

(L-R) Paul Schofield, Dr. Luis Fernando Aranguren Caro, Dr. Arun K. Dhar, Dr. Hung N. Mai, and Dr. Roberto Cruz-Flores at the Aquaculture America-2019 meeting in New Orleans, Louisiana.

be used to produce high quality healthy post-larvae for shrimp aquaculture in West Bengal and elsewhere in India. In 2018, India became the largest exporter of commodity shrimp in the US market. Dr. Dhar also visited an agricultural university located in the northern part of West Bengal, India (*Uttar Banga Krishi Viswavidyalaya, Coochbehar, West Bengal*) and presented a guest lecture to faculty, graduate and undergraduate students.

International Visitors

Professor Kyeong-Jun Lee, Ph.D., Department of Marine Life Sciences, Jeju National University, South Korea visited the Aquaculture Pathology Laboratory in February, 2019 to discuss potential collaboration with the lab. As a part of this collaboration building effort, Ms. Chorong Lee, a PhD student in Professor Lee’s laboratory spent three weeks working with Dr. Hung N. Mai, Dr. Luis Fernando Aranguren Caro, and Ms. Jasmine Millabas on a research project involving Acute Hepatopancreatic Necrosis Disease in shrimp.



Photo: Arun K. Dhar

PhD student Chorong Lee from Jeju National University, South Korea worked with Aquaculture Pathology faculty and staff on a research project involving Acute Hepatopancreatic Necrosis Disease in shrimp.

Student Presentations

Four undergraduate students working in the Aquaculture Pathology Laboratory, Tiffany Bledsoe (Bioinformatics and Molecular & Cellular Biology), Frances Marcos (Molecular & Cellular Biology), Katrien De Belder (Microbiology and Public Health), and Joshua Lin (Animal Sciences), won first place in the Innovation Award category for their entry in the UA Student Showcase on Feb 13, 2019. Their presentation focused on APL’s diagnostic work flow in detecting crustacean pathogens. The work flow included testing samples in three different units in the lab: PCR, Histopathology and Microbiology.



Photo: Arun K. Dhar

(L-R) Tiffany Bledsoe, Frances Marcos, Katrien De Belder, and Joshua Lin, won first place in the Innovation Award category for their entry in the UA Student Showcase on Feb 13, 2019.

Congratulations to our Spring 2019 graduates!



Check out the next issue of the ACBS Newsletter for a full list of graduates.

UPCOMING EVENTS

May 10

University of Arizona
May Commencement
7:30pm - Arizona Stadium
Tucson, Arizona
commencement.arizona.edu

June 18 - June 19

Center for Produce Safety Research Symposium
Austin, Texas
centerforproducesafety.org

June 20 - 24

ASM Microbe 2019
American Society for Microbiology
Mascone Center
San Francisco, California
www.asm.org

July 18 - 21

SSR Annual Meeting
Society for the Study of Reproduction
"Beyond Possible: Remarkable Transformation of Reproductive Biology"
San Jose, California
www.ssr.org

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