Dear Colleagues and Friends,

Welcome to a new year and new opportunities. It is hard to believe that 2014 is over and we are well into the year 2015. I hope that you find yourselves well rested and ready to tackle the challenges of the year ahead.

My family and I have been in Tucson now for almost 3 months and we are loving it, especially the people and the climate. We look forward to getting out and around this beautiful state.

Students returned to classes Jan. 12, so the campus is alive and full of energy. This will be my first full semester as Director of the School of Animal and Comparative Biomedical Sciences (ACBS) and I am excited about the new opportunities and growth for our School, especially the new Veterinary Medicine and Surgery Program, which is set to take its first cadre of students in Fall 2016. I am also looking forward to hiring a new Dairy Extension Specialist and a new Equine Extension Specialist, as well as setting up my new laboratory to work on the gastrointestinal microbiology of both livestock and humans.

The future looks bright. To our valued stakeholders, faculty, staff, graduate students, and friends, thank you for your support. I wish you and your families all the best for a happy and safe new year, and I look forward to meeting and working with you in 2015, and the years ahead.

Kindest regards,
André Wright, PhD

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/sacbs

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.
Dr. André Wright began new position with the University of Arizona.

Dr. André Wright joined the University of Arizona School of Animal and Comparative Biomedical Sciences as Director November 17th, 2014.

André-Denis Girard Wright was born in Halifax, Nova Scotia, Canada. He served in the Canadian Armed Forces CIC (Air Force) Reserves from 1984 to 1992. The CIC Branch is the largest officer branch in the Canadian Forces. While in the CIC Reserves he completed his Bachelor of Science in the Department of Biology at Saint Mary’s University, Halifax, Nova Scotia, Canada in 1988. During that time, Dr. Wright worked through the ranks of the CIC and was ultimately promoted to Captain in 1989, where he served as a training officer and retired in 1992 to attend graduate school. He went on to complete his Masters of Science in the Department of Zoology at the University of Guelph, Ontario, Canada in 1993. Wright pursued his PhD in the Department of Zoology at the University of Guelph receiving his degree in 1998.

After completing his graduate work Dr. Wright left Canada and went to work for Australia’s Commonwealth Scientific and Industrial Research Organization (CSIRO). CSIRO, Australia’s national science agency, is one of the largest and most diverse scientific institutions in the world. During his 12 years of work at CSIRO, Dr. Wright used his leadership and research abilities to propel himself forward into the position of Research Group Leader for the Gut Microbiology and Metagenomics Unit where he lead and managed 42 scientists, staff and graduate students.

At this point in time Dr. Wright chose to leave Australia for the United States and accept a position as Professor and Department Chair of Animal Science at the University of Vermont (UVM). While at UVM he also held joint appointments with the Department of Medicine, and the Department of Microbiology and Molecular Genetics. During his tenure at UVM, Dr. Wright made huge strides forward for the department. With his leadership the department flourished, becoming the 8th largest major, out of 120 majors (nearly 330 students), at the University of Vermont.

He improved stakeholder relationships through frequent informal meetings, revival of the departmental newsletter and implementation of a social media presence through Facebook and Twitter.

Along with his leadership work, Dr. Wright has maintained an active research laboratory. For over a decade he has been developing strategies to increase the efficiency of nutrient utilization in livestock and to raise the level of production of food in an ecologically sustainable way (i.e., decrease enteric methane). Several years ago he expanded his research interests to include human gut microbiology. Dr. Wright’s internationally recognized research uses metagenomics to examine the gut microbiome of animals, including humans, to better understand the interactions between host genetics, immune responses, and the gut microbiota, which are largely unexplored.

Since 2002, Dr. Wright has been awarded over $5.1 million dollars in extramural funds. He has published 83 peer-reviewed papers, 16 book chapters, and has been invited to give 28 plenary lectures in 10 different countries. He serves on the Editorial Boards for 5 journals, has served on 7 review panels for the USDA, NSF, and NASA. In 2008 he had a ciliated protozoan named after him, Apokeronopsis wrighti, in recognition of his contributions to microbiology.

ACBS welcomes Dr. Wright to Tucson and the UA Wildcat family.

Several Options Available for Students

ACBS offers students 3 undergraduate and 2 graduate majors.

The School of Animal and Comparative Biomedical Sciences houses three undergraduate majors; Animal Sciences, Veterinary Science and Microbiology.

The Animal Sciences degree encompasses a wide range of animal science and industry areas of study including food safety, equine or dairy production, industry and production animal systems, marketing, research and utilization of animals in agriculture, entertainment and companionship. The diverse curriculum allows students to focus on specific areas suited to their individual interests.

A major in Veterinary Science provides it’s students with a solid foundation in modern and advanced biology with an applied focus on the health and welfare of animals. It is utilized by pre-vet and pre-med students as well as by students who plan to pursue graduate school or employment right after graduation.

A major in Microbiology provides a solid foundation in modern biology with an applied focus on microorganisms such as bacteria, viruses, fungi, algae, parasites, protozoans, etc. Given the focus on microbes, students learn about infectious diseases and how microbes interact with their environment and their host organisms. The major is utilized by pre-med, pre-vet, pre-pharm, and pre-health students as well as by students who plan to pursue graduate school or employment following graduation.

For graduate students ACBS offers two majors; Animal Science and Microbiology. Both programs lead to MS or PhD degrees. Numerous opportunities exist for course work and research in either area of study. With this flexibility students are able to work with faculty to incorporate their individual research interests and career goals into their plans of study.

To assist students in achieving their academic goals, the School boasts a healthy scholarship program of over $250,000 per year.
Hard Work Pays Off

ACBS student receives poster awards, will attend prestigious program.

Veterinary Science senior Jahaira Vera has been awarded two awards for her presentation at the Graduate Professional Student Council (GPSC) Student Showcase. The GPSC Student Showcase is held Homecoming weekend every fall on the University of Arizona Mall.

For her presentation “Phthalates and Ovarian Hormones: an in-vitro Study” authored by Jahaira C. Vera, Nivedita Sen, and Zelieann R. Craig, Vera was awarded Best Honors Interdisciplinary Research Award and first place in Biological Sciences. During the judging process, a panel views each exhibitor’s presentation and rates it according to overall display, clarity of presentation, and the exhibitor’s ability to field questions concerning their project.

The Honors Interdisciplinary Award is given to the Honors student presentation that best demonstrates the contributions of different disciplines to the question addressed. The Biological Sciences Disciplinary Award is given to the undergraduate student with the best presentation in the field of Biological Sciences.

When asked about receiving these awards, Vera says “I feel honored to have accomplished this much. It is great to see that all my efforts and the efforts of my mentor are being noticed.”

Vera’s hard work and dedication to her education is paying off in other ways as well. Vera has been selected to participate in the Society of Toxicology Minority Undergraduate Program. This program takes place during the Society’s Annual Meeting, being held this year in San Diego, California March 22nd through 26th, 2015.

Acceptance to the program is competitive and allows undergraduate students to learn about the science of toxicology, develop strategies for applying to and being successful in graduate school, network with graduate students, toxicologists and other undergraduates, as well as meet graduate school and summer internship program directors. Vera will also have the opportunity to attend scientific sessions and meeting events while at the conference.

Dr. Zelieann Craig, Vera’s School of Animal and Comparative Biomedical Sciences mentor, says “I am very proud of Jahaira’s accomplishments and very impressed with her intelligence and determination.” Craig goes on to say “It is students like Jahaira that make research in an academic institution such a wonderful experience.” Vera will graduate this spring with honors and plans to continue with her studies at the University of Arizona in pursuit of her PhD. She began her college career with the intent of becoming a veterinarian, but as she progressed in her degree, she realized that a career in research is her ideal goal.

When reflecting on her time at the UA, Jahaira says “I am a first generation college student and come from a disadvantaged background so being in this position where I am graduating this May and planning on going to graduate school has been the dream come true for my parents and myself.”

We wish Jahaira all the best in her future goals and congratulate her on receiving these prestigious awards.

Agricultural Alumnus of the Year

P. Andrew “Andy” Groseta, the College of Agriculture and Life Sciences Alumnus of the Year, is a third-generation Arizona rancher who has reached pinnacles of success in his ranching career, industry leadership roles, and service to the community and his alma mater.

A partner in Headquarters West Ltd., a statewide agribusiness firm, Groseta has served as president of the Arizona Cattle Growers Association and the National Cattlemen’s Beef Association.

Groseta was selected in 2008 by then-President George W. Bush to attend the inauguration of South Korean President Lee Myung-bak as a member of the U.S. presidential delegation. He represented U.S. cattlemen in resolving the U.S.-Korean beef trade issue, allowing U.S. beef back into South Korea.

In 2006, he and Mary Beth Groseta donated land in northern Arizona to the College of Agriculture and Life Sciences – invaluable to UA’s presence north of the rim. This past year, Andy Groseta spent hours lobbying state representatives for increased funding, which paid off in an increase of nearly 33 percent in base funding for the UA Cooperative Extension.

Groseta earned bachelor’s degrees in animal science and agriculture education and a master’s degree in agriculture education from the UA.

“The personal touch of the ag faculty definitely helped me get through college,” says Groseta, who grew up on a Verde Valley ranch.

Groseta said he is proud that his son and two daughters also are part of the Wildcat family. He expects that his grandchildren also will become Wildcats.

Reprinted from UA News Blog, Oct 27, 2014
CALS Outstanding Senior

ACBS graduating Seniors recognized for their accomplishments.

Once a semester, a series of outstanding graduating seniors from each department in the College of Agriculture and Life Sciences (CALS) are recognized for their academic achievements and community involvement. The students are nominated by a professor or faculty member in their corresponding department and are awarded plaques at the dean’s luncheon prior to their fall or spring commencement. The award winners from the School of Animal and Comparative Biomedical Sciences for Fall 2014 are Mariana Hudson (Animal Sciences), Asad Mansoor (Microbiology) and Christina Jefferies (Veterinary Science).

“Winning this award was incredibly humbling. I put an immense amount of effort into my education over the past 4 years and I was truly honored to be recognized for my achievements” says Asad Mansoor.

Mansoor double majored in Microbiology and Spanish. He is currently in the process of applying to medical school with the goal of practicing medicine and conducting research in Infectious Disease.

Mansoor goes on to say “My favorite aspect of studying at the UA was the fact that everyone here seems to promote a kind and positive learning environment. Professors at the UA want their students to succeed and are always willing to go above and beyond to help their students.”

Christina Jefferies, a veterinary science major discusses the awards importance to her.

“It is an amazing feeling to be recognized by your mentors,” comments Jefferies. “I am thankful to all the amazing professors and advisors I have had during my time here, and I am eager to see what doors my education can open for me in the near future.”

Jefferies received honorable mention on the Dean’s List for her 4.0 GPA in the Spring 2014 semester and has spent substantial time in the Veterinary Diagnostic Laboratory researching veterinary pathology. In addition to her academic achievements, Jefferies remains active in her community by organizing local, charity events in the Tucson area.

Congratulations to all of the ACBS outstanding senior award winners.

Collegiate Livestock Growers

Name change and association with National Block and Bridle reflect club’s expanding interests.

In the Fall of 2005, the Collegiate Cattle Growers Association (CCGA) was formed by a group of students who wanted to share their love for cattle and the beef industry with others at the University of Arizona. In 2014 CCGA officially changed their club name to the Collegiate Livestock Growers Association (CLGA) in order to reflect the expanding interests of both new and old members. Along with the name change, the club also chose to become officially associated with the National Block and Bridle Club to offer students additional networking and scholarship opportunities. CLGA’s members consist of mainly ACBS students, however, there are also members from all over the College of Agriculture and Life Sciences.

Each year CLGA holds several events that members can participate in. Some examples are Business and Industry tours, National Block and Bridle Convention, SAILA Jackpot Show, WTF (Where’s the Food, Without the Farmer?) day, and the ACBS homecoming tailgate. Along with those events there are monthly business meetings that are held on the 1st and 3rd Thursday at 7pm in Shantz. Members are encouraged to help out with events throughout the year by serving as event chairs, on committees, or even just simply attending. The club also strives to promote social and personal development through several events as well.

- Summer Miller
CLGA Reporter
Road to Nationals

UA Equestrian Team aims for repeat Nationals appearance.

Each year, collegiate equestrian team riders have the opportunity to qualify for the Intercollegiate Horse Show Association’s (IHSA) year-end Nationals competition. The Nationals competition is a four-day horse show for the top IHSA riders and teams in the nation.

Last year, the University of Arizona sent three of its riders on the western team to Nationals in Harrisburg, Penn. The show included hunt seat and western competition at the Pennsylvania Farm Show Complex and Expo Center from May 1 - 4, 2014.

Members of the University of Arizona Equestrian Team recalled the experience of showing at such a large-scale show.

“It was very exciting. It was definitely a different experience because I’ve never been to a big show like that before. I’ve only done local shows so it was definitely different and exciting and nerve-wracking, but very, very fun,” said 2014 team president Stephanie Norton.

2014 was the first time since 2001 that a member of the UA equestrian team has qualified and competed in the IHSA National Championship.

“It was really a shock to make it all the way to Nationals but it was great with the three of us teammates, that was fun, and getting to ride some really nice horses was amazing,” said western team captain Mickey Bagley.

At the 2014 Nationals, Bagley was a finalist in the open reining, Norton placed seventh in the novice horsemanship, and Bridget Grobosky placed third in the intermediate horsemanship.

Bagley considers last year’s show a huge success for the team.

“I think last year was kind of the first time we really came together as a team and we focused on getting the team shown really well. We did what was best for everybody to get the points they needed and that seemed to be pretty darn successful in getting us all the way to Nationals,” said Bagley.

Their success last year was somewhat unexpected as the team has been in the rebuilding stages after losing funding from the University. Grobosky said that the experience was critical for the team’s reputation and organization.

“Last year we all had this end goal of making it to Regionals,” she said, “and once we made it past that and we realized we had to travel across the country, we became that much closer as a team.”

IHSA was created to give students the opportunity to compete in horse shows regardless of their skill level or financial background. Riders are divided into divisions by their riding abilities and have the opportunity to move up between the divisions as their riding competency improves. Riders with past riding experience begin in the division most appropriate for their skill level.

Divisions range from beginning walk/trot up to open classes in both western and hunt seat.

To make horse showing available to all regardless of finances IHSA requires each horse show to provide horses and tack for the riders to use for the competition. Before each IHSA event begins the riders gather and draw a horse’s name out of a hat. When it’s time for a rider to compete, the rider finds the horse they drew, mounts, adjusts the stirrups on the saddle provided with their horse and enters the ring.

“This events the playing field, and everyone can really showcase their talents,” Norton said.

The IHSA has about 400 college teams that participate in its competitions annually. The schools are separated into different zones and regions depending on their location.

Competitions are held throughout the fall and beginning of the spring semester where riders earn points in their respective divisions. Once a rider accumulates 36 points in a particular division, they move up to the next division and qualify to compete in a year-end regional competition in the division they pointed out of.

Points accumulate throughout the show season and roll over to the next show season. This allows for most riders to compete in a year-end regional competition at some point during their college career if they continue to show in IHSA and improve their riding abilities.

The open division is the highest division available to riders competing in IHSA. Riders in the open division cannot point out as there is not another level to move in to. In the open division, riders must earn 18 points to qualify for the year-end regional competition and points do not roll over from year to year.

Riders who place in the top two in each Regionals competition, move on to the Semi-Finals competition for western riders or Zones competition for hunt seat riders. If riders place in the top four at Semi-Finals or top two at Zones, they qualify for the year-end national show.

After making it to Nationals last year, the UA riders are prepared to do it again this year.

“It made the whole experience of collegiate riding that much bigger and that much more real,” Grobosky said. “I can’t wait to do it again.”

So far this year, four riders on the western team and one rider on the hunt seat team, have qualified for Regionals as of January 31st. There are two western and four hunt seat shows left in the 2014-2015 season that may provide an opportunity for more UA riders to earn the points necessary to qualify for Regionals. Bagley believes her riders have an excellent chance to make it through Regionals to Semi-Finals or Zones and on to Nationals this year.

“We’re going for it as a team again. We’re trying to get as many people pointed out so they qualify for Regionals,” she said.

Bagley goes on to say “It’s really incredible to represent your school in a competition because with horse showing you usually compete as an individual, and granted, we are competing as individuals, but being able to represent the UA and be part of a team is very cool.”

The team is funded solely by fundraising and welcomes team sponsorships. If you are interested in assisting the UA Equestrian Team with travel or competition expenses please contact Bridget Grobosky, bridgetgrobosky@email.arizona.edu. For information on future fundraising events in the Tucson area search for the team Facebook page under University of Arizona Equestrian Team.

- Bridget Grobosky
UA Equestrian Team President

The University of Arizona
Livestock Judging Team

2014 Judging Team calls it a season; 2015 Team starts campaign at AZ National

The fall 2014 season was a busy one for the UA livestock judging team. The team competed at the Fall Western Classic in Medford, Oregon and placed fourth overall. Kylie Ancil placed first in sheep, Karli Eaves third in goats as well as twelfth high individual. Michelle Allen was seventh and eighth in sheep and cattle, respectively. Next up for the team was the Tulsa State Fair in Oklahoma and the State Fair of Texas, placing eighth as a team. In mid-October, the team traveled to the Fresno Fair and was the third high team overall. The season wrapped up in Louisville at the North American International.

The annually awarded Don Butler Traveling Trophy, which is given to the UA Judging Team member with the highest points for the entire season (spring and fall), went to Michelle Allen with 7770 points. Members of the 2014 team included Michelle Allen (Yuma, AZ), Kylie Ancil (Marion, IN), Sonora Cubillas (Sonoita, AZ), Karli Eaves (Buckeye, AZ) and Ashley Jeffers-Sample (Holbrook, AZ).

The 2015 judging season is already underway with two contests completed. In December, the team finished fifth overall and fourth in sheep and goats at the Arizona National in Phoenix. The team then traveled to Denver at the beginning of January to compete at the National Western Stockshow. Members of the 2015 team are Samantha Ballard (Buckeye, AZ), Erika Derma (Yuma, AZ), Zane Gouker (Lakeside, AZ), Mallory Mejia (Buckeye, AZ), Mitchell Neilson (Phoenix, AZ) and Brianna Peraza (Vail, AZ).

- Dan Kiesling
UA Judging Team Coach

UA Food Safety Conference

Microbiology graduate student wins first place poster award.

ACBS graduate student, Arlette Schneider, received first place for her poster presentation at the UA Food Safety Conference held in October 2014. Her poster entitled “Antimicrobial activity of essential oil x against multi-drug resistant Salmonella enterica on organic leafy greens” authored by Arlette Schneider and Sadhana Ravishankar, was the top scored poster over all categories; undergraduate, graduate and post-doc. The award came with a $250 prize.

Schneider, currently in her second year as a master’s student studying microbiology in Dr. Sadhana Ravishankar’s food safety laboratory, found her interest in microorganisms while working in Dr. Lynn Joens lab as an undergraduate. “I decided to pursue my master’s degree in microbiology because I find the ever-changing world of microbes to be fascinating” says Schneider.

About microbes she goes on to say “They drive our ecosystems, aid in food production, and even play a huge role in our own physiology.”

Future plans for Schneider include attending the 2015 International Association of Food Protection Annual Meeting where she hopes to present the work she has completed for her master’s thesis.

After graduation Schneider anticipates working in the food safety or the biotech-industry. About her future prospects she says “I look forward to my future endeavors in the field of microbiology and am confident that the skills I acquired here at the UA will propel me into a successful career.”

U.S. Dairy Education & Training Consortium

Important program makes progress on securing permanent funding.

The Southern Great Plains Dairy Consortium has kicked off a fundraising effort to establish a $6 million endowment with a $150,000 multi-year commitment from CoBank and Farm Credit of New Mexico. CoBank has committed $25,000 a year over a four-year period with an additional $12,500 per year provided by Farm Credit of NM.

Professor Michael Tomaszewski, Consortium director, and Extension specialist emeritus at Texas A&M University announced the contribution at a recent Consortium board meeting hosted by Farm Credit of NM in Albuquerque. In addition, Tomaszewski announced the renaming of the group, which will now be know as the U.S. Dairy Education & Training Consortium as the six-week summer program to train animal and dairy science students moves beyond its original regional concept to a national stage.

In addition to the gifts from CoBank and Farm Credit of NM, the Consortium also has gained significant support from the dairy industry at large to help sponsor the courses, which provides academic credits to participants through their home universities. Allied industry has contributed generously from the very beginning of the Consortium program in 2008, ranging from $50,000 to $65,000 per year.

In its sixth year, the Consortium reached capacity at 52 students and some 20 applicants had to be turned away because of a lack of space. Animal and dairy science majors account for the largest percentage of attendees followed by agribusiness and pre-veterinarian majors. With the sharp decline in dairy science classes in recent decades the consortium program provides an invaluable opportunity for students to gain hands-on, practical dairy science knowledge that would be unavailable to them otherwise.

Consortium member universities include: Abilene Christian University, University of Arizona, Colorado State University, New Mexico State University, Oklahoma State University, Tarleton State University, Texas A&M University, Texas Tech University, University of Florida, Washington State University, and West Texas A&M University.

For more information on the U.S. Dairy Education & Training Consortium, visit sgpdct.tamu.edu
Race Track Industry Program “Field” Trip 2014

“What do baseball and horse racing have in common? Except for being two of the oldest sports in our country it wouldn’t seem like much at first glance. The commonality is the surfaces that are used in both—dirt and turf.

With that background, the RTIP students and faculty journeyed to Chase Field in Phoenix on Friday, September 12 as guests of Jon and Laura Hubbs who own Stabilizer Solutions, a company that works with many venues including race tracks and ball parks on turf and dirt design.

Chase Field is located in downtown Phoenix and is home to the Arizona Diamondbacks. It opened in 1998 and was the first stadium built with a retractable roof and natural grass. The high summer temperatures in Phoenix make the roof a necessity and growing grass a challenge as we learned from the head groundskeeper after the game. The facility has a unique amenity—a swimming pool in right center field—try finding one of those at Yankee Stadium!

The RTIP was treated like royalty, having use of two suites with very different vantage points: one was on the 2nd floor right side and the other a dugout box on the field beside the visiting team. The dugout box was so close to the field that some of the students were photo-bombed by Diamondbacks mascot D. Baxter and a few of the San Diego Padres players before the game.

Food and drink was plentiful at both locations thanks to a very efficient and upbeat Diamondbacks staff. Our hosts, Jon and Laura, went back and forth greeting everyone and answering all of the students’ questions.

At the end of the night everyone was invited down to the field to meet with the head groundskeeper, Grant Trenbeath, who has been at the stadium since it opened. He took time out of his busy schedule to explain the issues with growing grass in the heat and limited sunlight and some of the maintenance procedures that were going on. We saw the Stabilizer synthetic dirt used on the perimeter, which is specially formulated to keep dust to a minimum and to always look great.

What was also amazing was the amount of work the grounds crew has to do after the game. They were seemingly everywhere, but especially intent on the pitcher’s mound and home plate. It looked like they would be some of the last people to leave the building that night.

The RTIP’s last act before leaving was to line up in the Arizona Diamondbacks dugout for a “team picture.” It was probably not the best idea as it hadn’t been cleaned yet, but it is not every day you can have the run of a major league ballpark.

A good time was had by all, and we thank Jon, Laura, Grant and the Arizona Diamondbacks for this fun and unique field trip.
Project Illuminates Bird, Crocodile Evolution

A massive project has sequenced the genomes of 48 bird and three crocodile species, opening doors to understanding the evolution of dinosaurs’ living descendants.

In an era of big data, modern genome sequencing techniques allow individual research groups to sequence whole genomes quickly and cost-effectively, creating the possibility for large-scale genome mapping projects.

The Avian Phylogenomics Consortium, led by Eric Jarvis of Howard Hughes Medical Institute at Duke University, has undertaken just such a project: The international consortium has sequenced the genomes of 48 bird and three crocodile species.

The consortium’s first findings were published December 2014 in 28 peer-reviewed papers simultaneously released in scientific journals, including Science, Genome Biology and GigaScience.

The findings illuminate the evolution of the living species that descended from the survivors of the mass extinction that destroyed most of the dinosaurs 66 million years ago, with implications for the conservation of modern species and the understanding of vertebrate evolution.

But before the genomes could be analyzed, the massive datasets generated by the project begged a new question: How to securely store the genomic data so that it could be analyzed and shared among the researchers?

University of Arizona Associate Professor Fiona McCarthy, a researcher in the School of Animal and Comparative Biomedical Sciences, member of the BIOS Institute and expert on the chicken genome as a model avian species, has worked on the project since its conception.

McCarthy immediately recommended to her collaborators that they store the genomic data on CoGe, a comparative genomics platform powered by the iPlant Collaborative. Funded by the National Science Foundation since 2008, iPlant provides the computational capacity and software for researchers to securely store, analyze and share massive datasets.

Developed by Eric Lyons, co-principal investigator of the iPlant Collaborative at the UA, and funded by the National Science Foundation, CoGe is a freely available online platform that enables researchers to securely store whole genomes, share the data among selected parties, compare multiple whole genomes at once, and search for specific genetic sequences.

McCarthy likened the platform to a library in which all the books (genomes) are organized on the shelves, and a search catalog lets researchers find specific pages (genetic sequences).

“CoGe can make everything more efficient so that you can find exactly what you’re looking for and compare information between sequences,” she said.

“CoGe is the only tool I’ve seen where you can compare so many different species at once. You can force other genome browser tools to compare two or three genomes at a time. Now we’re looking at 40 bird genomes simultaneously, and the number is just going to go up as we get more sequence data.”

McCarthy is a coauthor on three of the publications together with Lyons, an Assistant Professor also in the UA’s College of Agriculture and Life Sciences and member of the BIOS Institute.

“Our main role was to get the sequence data for all the different genomes organized and all in one place — on CoGe — with the tools so that scientists can ask biological questions about these species,” McCarthy said.

With 51 genomes to play with, biological questions abound. The genetic information has important implications for conservation, as well as understanding behavioral traits in modern birds and understanding more about human health.

“We’re looking to understand a lot about vertebrate evolution and development as a whole,” McCarthy said. “By comparing genetic information between species on CoGe, researchers can use birds and other animals to understand more about human health and development.”

She and Lyons are coauthors on a paper led by Jaime Gongora of the University of Sydney and published in PLoS One describing an area of the crocoidilian genome relating to immune function. The information about the genetics of crocodile immunity is applicable to understanding how vertebrate species — including humans — recognize and fight infection.

The ability to sequence so many genomes and compare them side-by-side opens wide the doors of investigation for a myriad of future studies.

“Now we have so much data, but we’ve got to actually understand what it all means,” McCarthy said. “This wealth of information will not only impact our research but also our teaching. We’ve got students working on this data, and new opportunities to work with high school students and their teachers on something interesting for them.”

Delving into the bird and crocodile data — now freely available to researchers and the public through the CoGe and Giga websites — may lead to answers to questions genomic biologists have yet to ask.

“That’s what’s really exciting,” McCarthy said. “We don’t even know what’s going to come out of it.”

The bird and crocodile genome sequencing project was funded by the National Science Foundation, the National Institutes of Health and the U.S. Department of Agriculture, in addition to grants to individual research groups.

- Shelley Littin
iPlant Collaborative

Reprinted from UA News December 11, 2014
(Edited for length)
Proof-of-Concept Funding Awarded

Law Lab to investigate potential of two livestock vaccines.

Dr. Bibiana Law has received Proof-of-Concept funding from the UA’s Tech Launch Arizona program to investigate and increase the commercial potential of two vaccines.

The first is a vaccine for chickens to reduce *Campylobacter jejuni*, one of the world’s most common bacterial causes of foodborne illness. Vaccinating the food animals which carry these bacteria has the potential to greatly reduce numbers of the bacteria in food products and the environment, therefore decreasing the risk of human illness they currently pose.

With the Proof-of-Concept Program, Dr. Law is testing vaccination delivery methods and dosages to establish the efficacy and cost effectiveness of the vaccine under industry relevant conditions.

The second vaccine targets swine dysentery, a re-emerging bacterial disease of pigs which is economically devastating to affected pork producers. Prior to its decline in the mid-1990s, swine dysentery was associated with an annual cost to US pork producers of $100 million. Since the mid-2000s, an increase in the number of swine dysentery cases reported in the US and internationally has been noted, indicating potential failure of the treatment and management strategies in place, including increased antimicrobial resistance in disease associated strains. Proof-of-Concept funding is being used to validate the potential of a previously tested vaccine for efficacy against emergent and internationally relevant swine dysentery associated strains.

**Poultry Vaccine Project**
Dr. Bibiana Law  
bibiana@email.arizona.edu  
Dr. Alexandra Armstrong  
aledar@email.arizona.edu

**Swine Dysentery Vaccine Project**
Dr. Bibiana Law  
Dr. Michael Anderson  
maa1@email.arizona.edu

Tech Launch Arizona  
http://techlaunch.arizona.edu

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Bogan Lab

*Improving fertility by studying causes of pregnancy loss and infertility.*

Dr. Bogan’s research interests are to understand and reduce the large number of pregnancies that are lost in humans and domestic animal species due to inappropriate regression of the ovarian corpus luteum (CL) during early pregnancy; and to investigate the links between reduced fertility, coronary heart disease (CHD) risk factors, and metabolic disorders. Bogan’s research studies utilize an integrative physiology approach where experiments ranging from the molecular to whole organism level, in both animal and human models, are used to answer questions with translational implications.

Lab members:

Andrew Wojtanowski (MS candidate from Physiology GIDP)  
Thushara Madanayake, PhD (Postdoc)

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McCarthy Research Program

**Bioinformatics and genomics.**

The McCarthy research group focuses on the areas of bioinformatics and genomics. We are currently working to maintain and develop further resources for AgBase (http://www.agbase.msstate.edu), a database that provides functional information, bioinformatics tools and training and support for agricultural researchers dealing with large-scale data genomic data sets. Our goal is to enable agricultural researchers in translating genomics data into gains for agriculture, the environment and society. As part of this work, we provide functional annotation for several agricultural species, including key livestock, aquaculture, crops and pathogens. We also provide standardized chicken gene nomenclature to the international research community and are working to develop this resource to include other agriculturally and biomedically important birds. We are also working with other UA cyber infrastructure groups (e.g., iPlant) to make bioinformatics and genomics resources more broadly available to the animal research community. In addition to the bioinformatics group, we also do “wet-lab” experimental biology, are currently looking at tissue specific expression in chicken tissues, as well as using proteomics to investigate protein expression in transgenic crops.

**Recent publications/highlights:**


Ravishankar Lab

Novel approaches to combating foodborne pathogens.

Dr. Sadhana Ravishankar's research program focuses on Food Safety & Microbiology research. Research in her lab addresses the following topics: Control of foodborne pathogenic bacteria including antibiotic resistant strains using various technologies and multiple hurdle approach; Natural antimicrobials and their applications in organic foods, antimicrobial and anti-oxidative activities of plant compounds in grilled meats; Bacterial attachment and biofilm formation in leafy green production environments; Survival and prevalence of foodborne pathogens in fresh produce growing environments; Stress tolerance responses of foodborne pathogenic bacteria; Aflatoxin detection from cereal crops native to the desert region. One of the goals of her research is to find practical solutions to issues faced by fresh produce growers in Yuma and in that regard is investigating alternate natural post-harvest sanitization solutions for organic leafy greens. She collaborates with the fresh produce and organic sanitizer industries to achieve this goal. Research in her lab demonstrated that plant based antimicrobials have the potential to reduce foodborne pathogens on organic leafy greens and meat products, as well as inhibit the formation of potentially carcinogenic heterocyclic amines in grilled ground beef patties. Her team has showcased some of this research by conducting food safety demonstrations to the community at various events such as the Tucson Festival of Books, Biotechnology Career Expo, Southwest Ag Summit, and Lettuce Days in Tucson and Yuma, AZ.

Research Highlights/Awards:

Graduate student Arlette Schneider presented a poster entitled “Antimicrobial Activity of Essential Oil X Against Multi-Drug Resistant Salmonella enterica on Organic Leafy Greens” at the 2014 Food Safety Conference in Tucson, AZ. This poster was awarded first place in the student and post-doctoral scholar poster competition.

Graduate Students:

Arlette Schneider
Gustavo Pinoargote
Kamini Joshi

Recent Publications:


Vedantam Lab

Mechanism(s) of gut colonization by Clostridium difficile.

The Vedantam laboratory investigates the mechanism(s) of gut colonization by the diarrheic disease pathogen Clostridium difficile. C. difficile is the etiologic agent of C. difficile infection (CDI), a leading cause of healthcare-associated disease worldwide. Over 400,000 cases of CDI occur annually in the USA, imposing a $3.2 billion excess burden on the healthcare system. C. difficile is also a significant cause of food-animal disease, specifically infecting neonatal pigs, calves and foals. Currently, no vaccine is commercially available to prevent CDI. Research in the laboratory is focused on the molecular characterization of non-toxin virulence factors of C. difficile, and is aimed at designing safe, low-cost, and easy-to-use interventions to combat as well as prevent CDI. The laboratory routinely performs C. difficile surveillance in Tucson-area hospitals and quantitates the incidence of both healthcare- and community-acquired CDI.

Laboratory Members:

Michael Mallozzi, PhD, Post-Doctoral Fellow
Bryan Roxas, MS, Research Specialist
Michele Chu, MS, Research Specialist
Andrew Clark, MS, Graduate Student
Rebecca McQuade, Graduate Student
Farhan Anwar, Graduate Student
Chelsea Adamson, Undergraduate Research Scholar
Aaron Brussels, Undergraduate Research Scholar
Joshua Kochanowsky, Undergraduate Research Scholar

Recent Publications:

**The Peruvian Experience**

*Investigating parasitic diseases in South America*

Chuck Sterling, PhD, former Interim Director of Animal and Comparative Biomedical Sciences and past Department Head of Veterinary Science and Microbiology, has been conducting research with collaborative colleagues in Peru for the past 29 years. The subjects of interest have mainly been parasitic diseases, many involving children, such as cryptosporidiosis and giardiasis, but also have included discovery of a new human parasite, *Cyclospora*, and continuing work on cysticercosis and Chagas disease. His main collaborator has been Robert Gilman, MD, DTMH of Johns Hopkins University. Their efforts have resulted in over 30 publications in which both he and Dr. Gilman are authors. Chuck plans to retire at the end of 2015, so his visit to Peru this coming spring is special in many ways. After that Chuck has agreed to consult on training grant programs involving Peruvian investigators that will continue well on into the future.

**Viswanathan Lab**

*The interactions between pathogenic bacteria and host cells.*

The Viswanathan research laboratory is interested in the interactions between pathogenic bacteria and host cells. Specifically, they study the mechanisms by which enterohemorrhagic *Escherichia coli* ("spinach or hamburger E. coli") and related bacteria cause disease. After attaching to epithelial cells in the intestine, these bacteria inject specific molecules into host cells via a specialized structure called the Type III secretion system. The injected molecules specifically alter the biology of the host cells, presumably to support pathogen survival. Research efforts focus on understanding the molecular alterations in the host cells resulting from these injected molecules, and how these eventually contribute to disease. Recent studies demonstrate that pathogenic *E. coli* actually suppress the death of host cells. On a broader level, the ultimate goal of these research endeavors is to understand how enteric pathogens are disseminated in the environment and to eventually seek methods to control their spread.

**Laboratory Members:**
- Jennifer Roxas, Graduate Student
- Shylaja Ramamurthy, Graduate Student
- Aishwarya Rao, Graduate Student
- Ross Monasky, Undergraduate Research Scholar
- Keith Lammers, Undergraduate Research Scholar
- Asad Mansoor, Post-baccalaureate Research Scholar

**Recent Publications:**


**Riggs Lab Overview**

*The study of Cryptosporidium.*

Riggs’ research program centers on the immunobiology of bovine and human cryptosporidiosis, a diarrheal disease caused by the parasitic protozoan parasite *Cryptosporidium* spp. The focus has been on characterizing protective immune responses; developing recombinant vaccines, immunotherapeutic and other new drug discovery; and definition of the molecular pathogenesis of host cell infection. Since 1989, his *Cryptosporidium* research program has been continuously supported by funding as Principal Investigator from the NIH, USDA, private foundations and industry, and is currently supported through 2019 by two new NIH grants. Discoveries during this period have led to thirteen patents for *Cryptosporidium* inventions, eight licensing agreements for patented intellectual property, and over 40 refereed publications and scholarly book chapters.

**Graduate Students:**
- Shelby Wendel
- Kylie Smith (starting summer 2015)

**Recent Highlights:**


Invited Member, International Scientific Advisory Group for *Cryptosporidium* Strategy, Bill & Melinda Gates Foundation, charged with making formal recommendations to Gates on research funding priorities for discovery and development of new therapeutics, vaccines, and other interventions for *Cryptosporidium* in the developing world, 2014 – 2015.

**Figure:** Enteropathogenic *E. coli* (green) attached to human intestinal epithelial cells (grey) and causing cell death (red exudates and flat, demoded areas; scanning electron micrograph; Scott Wilbur and Kevin Lewis, Viswanathan laboratory).
Lightner Lab Update

Isolating causative agent of AHPND in shrimp

Most of my lab's work in 2013-2014 was on a newly emerged disease in southeast Asian shrimp farms (China, Malaysia, Vietnam and Thailand) and its recent occurrence in western Mexico (Mexican States of Nayarit, Sinaloa, and Sonora). The disease is called Early Mortality Syndrome, but it is more correctly called Acute Hepatopancreatic Necrosis Syndrome/Disease (AHPND) because of the severe sloughing of hepatopancreatic (HP) tubule epithelial cells from the HP tubules in the acute phase. In the terminal phase of the disease, the HP is destroyed by invasive Vibrio spp. which utilize the sloughed and necrotic HP tubule cells as a nutrient source.

Since its appearance in 2009, the disease has cost southeast Asia (and Mexico in 2013) in excess of USD$1 billion each year. Because of shortages of farmed shrimp, prices are expected to nearly double in 2014.

My lab developed a case definition for the disease which was presented to the Network of Aquaculture Centers in Asia (NACA) at a conference in Bangkok, Thailand in 2012. That case definition led to the discovery of the causative agent by this laboratory in March of 2013. An abstract from a recent key publication on EMS/AHPND is as follows: A new emerging disease in shrimp, first reported in 2009, was initially named Early Mortality Syndrome (EMS).

A more descriptive name for the acute phase of the disease was proposed as Acute Hepatopancreatic Necrosis Disease (AHPND). Affecting both Pacific white shrimp (Penaeus vannamei) and black tiger shrimp (Penaeus monodon), the disease has caused significant losses in Southeast Asian shrimp farms. AHPND was first classified as idiopathic because no specific causative agent had been identified.

However, in early in 2013, the Aquaculture Pathology Laboratory at the University of Arizona (UAA-APL) was able to isolate the causative agent of AHPND in pure culture. Immersion challenge tests were employed for infectivity studies, which induced 100% mortality with typical AHPND pathology to experimental shrimp exposed to the pathogenic agent. Subsequent histological analyses showed that AHPND lesions were experimentally induced in the laboratory and were identical to those found in AHPND infected shrimp samples collected from the endemic areas. Bacterial isolation from the experimentally infected shrimp enabled recovery of the same bacteria colony type found in field samples. In three separate immersion tests, using the recovered isolate from the AHPND positive shrimp, the same AHPND pathology was reproduced in experimental shrimp with consistent results. Hence, AHPND has a bacterial etiology, and Koch’s Postulates have been satisfied in laboratory challenge studies with an isolate of the agent.

The agent is a unique strain of Vibrio parahaemolyticus.

Recent Publications:

Recent Awards:
Global Aquaculture Alliance (GAA) Lifetime Achievement Award
Dry and Wet Aging Beef Steaks

Effects on Tenderness, Palatability and Oxidative Rancidity.

Students working with Dr. John Marchello at the Food Products and Safety Lab. (Photo courtesy of John Marchello)

The beef industry is exploring new ways to market products in order to maintain a competitive edge. One way to maintain competitiveness is to improve and understand more about palatability characteristics of beef because it is known that palatability greatly influences future purchases. The objective of the present study was to determine the effects of two aging techniques, dry aging verses wet aging, on tenderness as measured by shear force values and sensory panel evaluation. One half of each beef carcass was wet aged and the other dry aged for 14 days. Samples were taken on days 7 and 14 to compare and evaluate tenderness and oxidative rancidity of the fat. Sensory evaluation was also conducted to determine if palatability differences between dry and wet aged steaks existed. Dry and wet aged steaks were not statistically different for tenderness and oxidative rancidity values (P>0.05). This study also revealed that in sensory evaluation tenderness was statistically different between wet and dry aged steaks (P<0.05) where wet aged steaks were more tender; however, juiciness, flavor intensity, and acceptance showed no statistical difference (P>0.05). When the shear force values for the dry and wet aged steaks were averaged together, steaks aged for 14 days were more tender (P<0.05) than the 7 day aged steaks.

- John A. Marchello
- Elaine V. Marchello

Recent Publications:
Reproductive Toxicology Lab

*The effects of phthalates on female infertility.*

Dr. Craig’s work focuses on understanding how phthalates, a group of endocrine disruptors, affect the function of the ovary, the major reproductive organ in females. Work in her laboratory is focused on using animal models to help understand the mechanisms by which phthalates exert their effects on the ovary, determine whether phthalates cause female infertility, and examine whether the effects of phthalates on female reproduction can be prevented or reversed. Using this knowledge, she hopes to develop additional models to evaluate other chemicals and environmental factors that could influence both human and animal reproduction.

**Laboratory Staff:**
Xiaosong Liu, PhD, Assistant Research Scientist
Nivedita Sen, MS, Research Technician
Lindsay Rasmussen, Graduate Student
Jahaira Vera, Undergraduate Student, Honors College

**Honors and Awards:**
Jahaira Vera – UA GPSC 2014 Student Showcase, First Place Undergraduate Presentation in Biological Sciences Category
Jahaira Vera – UA GPSC 2014 Student Showcase, Interdisciplinary Research Award by an Honors Student

**Presentations at National Meetings:**

Limesand Lab Update

*Working to understand how the fetus responds to maternal stressors.*

In the fetus, insulin is a major anabolic hormone secreted by endocrine cells within the fetal pancreas. Similar to adults, insulin in the fetus is secreted in response to nutrient availability, which suggests that insulin responses help coordinate fetal growth with the nutrient supply from the mother. Our work in the intrauterine growth restricted fetal sheep has shown that insulin secretion and insulin producing cells are decreased in the fetus. This shows that defects in the endocrine pancreas exacerbate growth restriction and is a site for reprogrammed metabolism in the fetus. We have shown these deficiencies are, in part, caused by the high concentrations of stress hormones, epinephrine and norepinephrine, circulating in the growth restricted fetus. These hormones are normally associated with quick responses however, in the growth restricted fetus, these fight or flight hormones are elevated for weeks. Our work indicates this chronic stress response plays an important role in shifting fetal metabolism. These adaptations occur not only in the pancreas, but also in skeletal muscle and fat, the tissues primarily responsible for glucose homeostasis. And importantly, the adaptations caused by chronic stress persist into childhood, as evidenced by our work in growth-restricted lambs. Collectively, our work shows that fetal stress hormones imprint metabolic deficiencies and represent one aspect that might be reversible to improve infant outcomes.

**Major Funding:**
National Institutes of Health
Bill and Melinda Gates Foundation

**Mentoring:**
Amy Kelly, PhD
Student
Melissa Davis, PhD
Student
Rachel Smith, MS Student
Leticia Camacho, PhD, Post-doctoral Fellow
Meghan Hill, MD, Maternal Fetal Medicine Fellow

**Visiting Scholar:**
Shelley Harris, a PhD student at Oxford Brookes University in Oxford, England, is currently visiting Dr. Limesand’s laboratory for three weeks to perform studies on fetal sheep islet. Her experiments are designed to address important regulatory processes that impact pancreatic endocrine cell growth and development.

**Recent Publications:**

Renquist Lab

*Investigating liver communication to the peripheral nervous system.*

The Renquist laboratory focuses on the role of metabolites in the control of feed intake, response to heat stress and release of growth promoting hormones. With improved understanding we aim to design dietary treatments to increase feed intake, decrease the impacts of heat stress and increase growth. Because the liver is the “Grand Central Station” of nutrient flux through the body, our work centers on the role of liver-brain communication mediated by the peripheral nervous system. In October 2014, the Arizona Biomedical Research Commission awarded us with a 3-year grant to investigate liver communication to the peripheral nervous system.
Improving Beef Cattle Efficiency

Studying the relationship of RFI, voluntary forage intake and cow survival under range conditions.

Approximately 60% to 70% of overall energy costs for beef production go into the cow herd. Identifying and understanding the nutritional, metabolic, genetic, and endocrine differences among animals will aid in the determination of why certain animals are more efficient than others.

Residual Feed Intake (RFI) is measured by subtracting an animal’s actual intake from a predicted intake. The lower intake animals, in terms of RFI, have negative values. The low intake corresponds to lower metabolic rate. Once a cow matures, production and metabolism are the main energy demanders. A cow’s value is based upon her ability to maximize production with minimal feed intake. Therefore, economic efficiency is primarily related to feed intake.

Recently, we measured forage intake on cows that have survived under Arizona range conditions at the University of Arizona V-V ranch. We found that the average RFI for the cows was -1.5 lb (good), that 74% of the surviving cows had a negative (good) RFI, and that the good RFI cow had better condition. There was no relationship of RFI to body weight. The low RFI cows consumed hay at 1.9% of BW, while the high RFI cows consumed hay at 2.4% of BW. This is a field observation of only 40 cows, but it suggests that RFI or intake may be useful in selecting cows that survive under arid range conditions.

There are two important benefits to utilizing RFI in a cow herd. First, there is an economic benefit since cattle have decreased dry matter intake (DMI) with the same level of performance which lowers input costs. Secondly, there is an environmental impact, because low RFI cattle have lower DMI. In a grazing situation, animals are consuming less forage so stocking rates can be increased, or alternatively, range condition will improve due to less grazing pressure. In addition, methane production is reduced, due to lower forage consumption, which can reduce environmental impact.

For the beef cattle industry to continue to thrive, producers will need to focus on efficiency within the herd. Since current methods of measuring feed efficiency are expensive and time consuming, an alternative approach must be identified. An opportunity exists to estimate feed intake using a dense set of single nucleotide polymorphism markers distributed throughout the bovine genome. The bovine “SNP Chip” is a tool which may be used for that purpose. Based on the substantial amount of variation present in RFI within a population, it is likely that an EPD (expected progeny differences) for intake will be developed.

- Dan Faulkner
Extension Beef Specialist

V Bar V Ranch

Working ranch provides hands-on experience for students.

The V Bar V Ranch is part of the University of Arizona Agriculture Experiment Station network. Transecting the Mogollon Rim, the 71,000 acre ranch runs about 30 miles east from Camp Verde and varies between four and five miles in width. Forty acres is private land with the remainder held under lease from the U.S. Forest Service. Elevations on the ranch range from 3,200 to 7,000 feet. The ranch is permitted to run 550 animal units and provides habitat for a wide range of wildlife. Vegetation zones include high desert chaparral, pinon-juniper woodland, and pine forest.

The V Bar V is a fully operating ranch and the research conducted there predominantly focuses on an applied approach to problem-solving. Presently, the ranch is conducting research on beef cattle performance from conception to consumption, range cow efficiency, range monitoring and education, watershed management, range cattle nutrition, range cattle reproduction and synchronization techniques, feedlot performance and carcass quality.

In addition to being a working ranch, the V Bar V is an extension of the University of Arizona classroom. Whether students come from a city, urban or ranching background, the ranch offers the opportunity for students to gain hands-on experience and learn new skills. At the V Bar V, students learn how to apply the textbook knowledge they’ve gained to real-life situations, with the guidance of UA instructors and ranch staff.

Students have several options available to them when it comes to utilizing the V Bar V. They may choose to stay at the ranch for extended periods to do an internship, come for shorter stays as an extension of a class they are taking (such as the calving management class), or simply assist for a day when cattle are being processed. However a student chooses to utilize the ranch, they will gain valuable experience and be better prepared to enter the workforce.

If you would like to learn more about the V Bar V and ranching in Arizona consider attending the Ranch Explorer’s Field Day. This family friendly, annual event, is hosted by the ranch, the fourth Saturday of August and includes educational activities, presentations, displays, and a barbeque lunch.
The Arizona Veterinary Diagnostic Laboratory (AzVDL) provides accurate and timely diagnostic assistance in animal health to veterinarians, animal owners, university researchers and state and federal agencies. The laboratory serves a diverse client base with submissions of wild animals, exotic zoo animals, pet animals, horses and food producing animals. AzVDL works closely with the Office of the State Veterinarian, USDA, Arizona Game and Fish and other state and federal agencies.

Services provided by the AzVDL include pathology (necropsy, histopathology, cytology, immunohistochemistry and other diagnostic tools used to determine the cause of disease), microbiology (the use of microbiological techniques to identify bacteria, viruses, parasites, and other infectious agents, and their relationships to animal disease), molecular diagnostics (polymerase chain reaction to identify infectious agents), serology (analysis of serum to monitor animals’ prior exposure to diseases) and toxicology (testing available by referral to cooperating labs).

Veterinarians and staff at the AzVDL are actively involved in independent and collaborative research projects, teaching and extension. The AzVDL is a key participant in the Arizona Livestock Incident Response Team (ALIRT) and assists in the investigation of unique or unusual health situations. ALIRT is a response team composed of veterinarians, Arizona Cooperative Extension personnel, Department of Agriculture livestock officers and other specialists. The program is a valuable service provided to Arizona livestock producers and is designed to enhance the diagnosis of unexplained livestock deaths.

On January 14, 2015, Dr. Sharon Dial conducted online cytology rounds at the Arizona Veterinary Diagnostic Laboratory (AzVDL). 117 attendees remotely attended from North and Central America, Europe and Asia where they viewed cases submitted to the AzVDL. The program, developed by Dr. Dial for the American Society of Veterinary Clinical Pathologists, consists of monthly rounds presented by a different clinical pathologist each month. So far presentations have been conducted by pathologists at TAMU, Cornell, University of Georgia, University of Guelph, Oklahoma State University, The Ohio State University and two private laboratories; Cytovetpath in Onterio and Invitro Laboratory in Austria.

About the online cytology rounds program, Dr. Dial says “It is a lot of fun and keeps me connected to my colleagues across the globe.”
ACBS Faculty

Ronald Allen, PhD  rallen@ag.arizona.edu  520-621-7626
Professor

Dr. Allen is a pioneer in the study of skeletal muscle stem cells (called satellite cells) in domestic animals and humans. Dr. Allen's research has led to an understanding of how the body signals satellite cells to multiply, form muscle fibers and self-renew to maintain the satellite cell population. Satellite cell function is relevant to muscle growth in domestic animals, to human muscle disease and injury, and to problems associated with aging.

Kacee Adams, MS  kacee@email.arizona.edu  520-318-7023
Instructional Coordinator, Specialist

Adams manages the UA Equine Center including daily operations, breeding, horse care and training. Classes taught include ACBS 271A Training and Management of the Weanling, ACBS 272 Introduction to Horsemanship, ACBS 273 Developing the Training Foundation in Yearlings and ACBS 371 Sales and Marketing Strategies for Performance and Race Horse Prospects.

Michael A. Anderson, PhD  maal@email.arizona.edu  520-444-1120
Assistant Research Scientist

Dr. Anderson is currently working in Dr. Law’s lab on two vaccine development projects which is his main research interest. Prior to his current work, he served as the Microbiology Section Head at the UA Veterinary Diagnostic Lab. He also spent 15 years working for a major Veterinary Biologics developer/manufacturer resulting in multiple USDA Biologics licenses.

Alexandra Armstrong, PhD  aledar@email.arizona.edu  520-621-4148
Assistant Research Scientist

Dr. Armstrong’s research interests focus on Campylobacter and Salmonella in the environment and foods and vaccine development for reduction of foodborne pathogens. Classes taught include MIC 205 Introduction to Microbiology and MIC/VSC/IMB 454/554 Host-Microbial Interactions.

David G. Besselsen, DVM, PhD  besselsd@email.arizona.edu  520-626-1066
Director, University Animal Care and Attending Veterinarian

Dr. Besselsen, Director of University Animal Care (UAC) and UA Attending Veterinarian, specializes in laboratory animal medicine and pathology. He is responsible for long term planning and operations oversight for UAC, with an emphasis on laboratory rodent population medicine, quality assurance, and facility design. His areas of research emphasis are pathologic assessment of animal models of human disease, and diagnostic test development and characterization of rodent infectious disease.

Randy Bogan, PhD  boganr@email.arizona.edu  520-621-1487
Assistant Professor

Dr. Bogan’s research interests are to understand and reduce the large number of pregnancies that are lost in humans and domestic animal species due to inappropriate regression of the ovarian corpus luteum (CL) during early pregnancy; and to investigate the links between ovarian processes and coronary heart disease (CHD) risk factors. Bogan's research studies utilize an integrative physiology approach where experiments ranging from the molecular to whole organism level, in both animal and human models, are used to answer questions with translational implications.

Elizabeth Bracken, BS  lbracken@email.arizona.edu  520-621-2355
Associate Coordinator, Race Track Industry Program

Primary duties include teaching ACBS 345 Animal Racing Laws and Enforcement, ACBS 342 Organization and Administration of the Racing Department and ACBS 441 Racing Organizational Structure and Financial Management Classes. Bracken also assists RTIP faculty and staff with planning the Global Symposium on Racing and Gaming.
Zelieann R. Craig, PhD
zrcraig@arizona.edu    520-621-9965
Assistant Professor

Dr. Craig’s work focuses on understanding how phthalates, a group of endocrine disruptors, affect the function of the ovary, the major reproductive organ in females. Work in her laboratory is focused on using animal models to help us understand the mechanisms by which phthalates exert their effects on the ovary, determine whether phthalates cause female infertility, and examine whether the effects of phthalates on female reproduction can be prevented or reversed. Using this knowledge she hopes to develop additional models to evaluate other chemicals and environmental factors that could influence both human and animal reproduction.

Gregory Bradley, DVM
gabrad@ag.arizona.edu    520-621-2356 x 16
Director, Arizona Veterinary Diagnostic Laboratory and Research Scientist

Dr. Bradley manages all aspects of the Arizona Veterinary Diagnostic Laboratory. His research interests include diagnostic pathology.

Robert J. Collier, PhD
rcollier@ag.arizona.edu    520-621-7622
Director, William Parker Agricultural Research Complex and Professor

Research focuses on effect of environment and heat stress in particular on gene function. Areas of specific research interest include nutritional, physiological, endocrine and cellular responses to heat stress. Practical management models and environmental research facilities are utilized to provide environmental conditions facing livestock in Arizona. Additional research is centered on role of serotonin in regulation of milk secretion and regulation of calcium metabolism in the transition dairy cows.

Shane Burgess, DVM, PhD
dean@cals.arizona.edu    520-621-7621
Dean, College of Agriculture and Life Sciences

Dr. Burgess is a veterinarian and Ph.D. in biomedicine. He is currently Vice President for Veterinary Sciences and Cooperative Extension, Dean of the College of Agriculture and Life Sciences and Director, Arizona Experiment Station at The University of Arizona. His funded research and published works are in human and other animal and plant systems and genomic biology, bioinformatics, high-performance computation in biology, immunology, virology, cancer biology, vaccinology, bacteriology, toxicology, bioenergy, aquaculture, parasitology, agriculture and biotechnology.

Wendy Davis, BS
wdavis@agarizona.edu    520-621-5663
Associate Coordinator, Race Track Industry Program

Davis has a 100% teaching appointment and is responsible for ACBS 142 Introduction to the Animal Racing Industry, ACBS 340 Race Track Marketing and Media Relations, ACBS 370 Form and Function of the Equine Athlete and jointly responsible for ACBS 497A The Joe Hirsch Speaker Forum. She currently serves as the advisor for all students in the RTIP option as well as many students from the other three options offered within the animal sciences major.

S. Peder Cuneo, DVM, MS
cuneo@email.arizona.edu    520-621-2356 x 19
Extension Veterinarian

Dr. Cuneo focuses on production veterinary medicine, with an emphasis on improving reproductive performance of cattle and post weaning health performance. He has a special interest in emerging diseases and foreign animal diseases and their interaction with public information and policy.

Sharon Dial, DVM, PhD
sdial@u.arizona.edu    520-621-2356 x 15
Research Scientist

Dr. Dial is a diagnostician at the Arizona Veterinary Diagnostic Laboratory. Her research interests include Coccidioidomycosis (Valley Fever), diagnostic pathology and immunohistochemistry.
Cynthia J. Doane, DVM  
cjdoane@email.arizona.edu  
520-626-6705
Associate Director, UAC and Associate Veterinary Specialist
Dr. Doane is a clinical veterinarian interested in large animal surgical models with special expertise in non-human primates.

Dan Faulkner, PhD  
dfaulkner@email.arizona.edu  
520-626-5573
Extension Beef Specialist
Dr. Faulkner’s research program studies the factors that influence cow forage intake, efficiency and longevity under Arizona range conditions in order to assist Arizona beef producers in improving the economic viability and environmental impact of their beef operations.

Christina Garcia, MS  
jcb3@email.arizona.edu  
520-626-3526
Academic Advisor
Garcia received her BS in Animal Science, University of Arizona (2008) and MS in Animal Science- Ruminant Nutrition, University of Arizona (2010). She is serving as an Academic Advisor for Veterinary Science and Microbiology and as the Graduate Program Coordinator for the Animal Sciences Graduate Program. Garcia is also acting as the club advisor for the VIDA (Volunteers in Intercultural and Definitive Adventures) in the School of Animal and Comparative Biomedical Sciences.

Samuel Garcia, PhD  
srgarcia@email.arizona.edu  
520-318-7021
Lecturer and Program Coordinator
As lecturer, Dr. Garcia assists in teaching various classes in the area of Animal Science. These include ACBS 102 Lecture and Lab, ACBS 380 Food Safety, ACBS 420 Meat Animal Composition, ACBS 477 Beef Resource, a senior capstone class and an instructional class for the culinary arts program at Pima Community College. In his position as Program Coordinator he oversees all operational aspects of the UA Food Product and Safety Lab. He also directly assists in harvesting, fabrication and processing of meat animals, ratites, buffalo, yaks and poultry.

Robert Glock, DVM, PhD  
rglock@ag.arizona.edu  
520-621-2356 x 13
Research Scientist
Dr. Glock is a diagnostian at the Arizona Veterinary Diagnostic Laboratory. His Research interests include economically significant diseases of cattle and swine as well as food animal diagnostics. Dr. Glock holds veterinary licenses in multiple states including Arizona, Colorado, New Mexico and Nebraska.

Vince Guerriero Jr., PhD  
guerrier@email.arizona.edu  
520-621-7764
Associate Professor
Dr. Vince Guerriero’s research is focused on the biochemistry of proteins that regulate the heat stress response and development of these proteins as drugs. His laboratory has discovered and characterized a gene that codes for a protein that regulates the heat stress response and is involved in cancer cell growth. His research will improve the understanding of animal adaptation to stress and will provide new treatments for cancer.

Dean Hoffman, BS  
deannahoffman@email.arizona.edu  
520-621-5660
Lecturer
Dean A. Hoffman joined the Race Track Industry Program in January, 2014. Hoffman will teach racing courses as well as support the Program’s marketing efforts and its yearly conference, the Global Symposium on Racing & Gaming. Hoffman, a long-time executive editor of the United States Trotting Associations’ Hoof Beats magazine, brings a wealth of talent to the Program and greatly increases the faculty’s knowledge of national and international harness racing.
**Noble Jackson, DVM**

Associate Professor of Practice and Undergraduate Advisor

Dr. Jackson teaches ACBS 406 Diseases of Companion Animals, ACBS 449 Diseases of Wildlife and is the acting faculty advisor for the UA Student Chapter of the Wildlife Disease Association. Jackson’s research interests include the incidence of canine heartworm infection in the coyote, *canis latrans*, in Arizona.

**Kate Johansen, MS**

Senior Academic Advisor

Johansen serves as the Microbiology Graduate Program Coordinator and as an undergraduate major advisor for both Microbiology and Veterinary Science majors. She also teaches MIC 195F: Plagues, Peoples, and Society and MIC 195G: Careers in Microbiology, and serves as the staff sponsor for the Microbiology Club. Johansen’s research interests include measuring the prevalence of Trypanosoma infections in local pack rat (*Neotoma albigula*) and New Mexico kissing bug populations.

**Daniel Kiesling, MS**

Lecturer and Undergraduate Advisor

Kiesling serves as livestock judging coach, lecturer, student advisor and coordinator of the UA Teaching Farm. His Master's degree research focused on beef cattle nutrition. His career background also covers cow-calf, stocker cattle and sheep production as well as live animal and carcass evaluation.

**Paula D. Johnson, DVM, MS**

Associate Veterinary Specialist, UAC

Dr. Johnson is a member of the Veterinary Services team and is the Head of Surgical Services for University Animal Care. She is also involved in educational outreach and serves as the consulting veterinarian for the Southern Arizona Veterans Affairs Health Care System animal program.

**Bibiana Law, PhD**

Associate Research Professor

The Law Laboratory focuses on the development and testing of poultry vaccines to reduce the load of *Campylobacter* in chickens, as the handling and consumption of poultry is considered to be the most significant risk factor in transmission of this illness-causing bacterium to humans. Research also includes development of disease and challenge models in poultry, vaccine development for porcine diseases such as swine dysentery, and other work relating to the foodborne bacteria Salmonella and *Campylobacter*.

**Don Lightner, PhD**

Professor

Dr. Lightner’s research interests center on infectious diseases of farmed aquatic species, especially the viral diseases of the penaeid shrimp, and on the development of classical and molecular methods for their diagnosis. His Aquaculture Pathology Laboratory (APL) is an OIE (Office International des Epizooties or World Animal Health) Reference Laboratory and a USDA APHIS Approved Laboratory for testing of live shrimp and other products intended for export.

**Sean Limesand, PhD**

Professor

Research focuses on fetal development and growth, understanding how aberrant fetal nutrient and/or endocrine factors lead to postnatal complication or the fetal origins of adult disease. Seeks to identify mechanisms that alter pancreatic structure, physiology and metabolism in intrauterine growth restricted offspring to provide treatment strategies.
Elaine Marchello, PhD  evm@email.arizona.edu  520-626-3631
Professor of Practice and Assistant Dean in Career and Academic Services, CALS

John A. Marchello, PhD  jam@ag.arizona.edu  520-621-1188
Professor and Director Food Products and Safety Lab
Dr. Marchello has been a member of the University of Arizona faculty since 1965. He serves as a Professor of Meat Science and Muscle Biology and his courses focus on food safety issues, meat animal evaluation, carcasses and meat cuts. Dr. Marchello also directs the Food Products and Safety Lab and conducts research on meat animal quality and composition, food safety issues and food labels, and camel meat proteolytic enzymes and tenderness.

Fiona McCarthy, PhD  fionamcc@email.arizona.edu  520-626-7321
Associate Professor
Dr. McCarthy’s current research interest focuses on bioinformatics and genomics. She is a co-founder and current PI of AgBase, a database that provides functional annotation, tools and support for agricultural researchers dealing with large scale data sets that they wish to functionally model.

Ted H. Noon, DVM  tnoon@ag.arizona.edu  520-621-2355
Instructor (part-time)
Classes taught include ACBS 406, Diseases of Companion Animals and ACBS 449/549, Diseases of Wildlife.

Carlos R. Pantoja-Morales, PhD  cpantoja@u.arizona.edu  520-621-4438
Associate Research Professor
Dr. Pantoja is the main diagnostician (histopathology) at the UA Aquaculture Pathology Laboratory where diagnostic services are provided to the international shrimp farming industry. His work includes the characterization of infectious diseases of shrimp, development of diagnostic methods and control strategies. He is responsible for the implementation of Proficiency tests for international aquaculture laboratories employing molecular methods for detection of shrimp pathogens.

Sadhana Ravishankar, PhD  sadhravi@email.arizona.edu  520-626-1499
Associate Professor
Dr. Ravishankar’s research interests include the following: Control of foodborne pathogenic bacteria including antibiotic resistant strains using various technologies and multiple hurdle approach; Natural antimicrobials and their applications in organic foods, plant antimicrobial washes for fresh produce, antimicrobial and anti-oxidative activities of plant compounds; Bacterial attachment and biofilm formation in food production environments; Survival and prevalence of foodborne pathogens in fresh produce growing environments/organic composts; Stress tolerance responses of foodborne pathogenic bacteria.

F. Douglas Reed, MBA  dreed@ag.arizona.edu  520-621-5660
Director, Race Track Industry Program
Reed is responsible for all aspects of the racing program, including administration, instruction, promotion and fundraising. He is also director of the RTIP’s annual Symposium on Racing & Gaming, the world’s largest pari-mutuel racing conference. Reed has extensive experience as a racing official, track manager and racing and gaming industry consultant.
Carlos Reggiardo, DVM, PhD
creggiar@ag.arizona.edu
520-621-2356 x 14

Senior Research Scientist

Dr. Reggiardo is a diagnostician at the Arizona Veterinary Diagnostic Laboratory. His research interests include veterinary diagnostic medicine, veterinary microbiology, and infectious diseases.

Benjamin Renquist, PhD
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520-626-5793

Assistant Professor

The Renquist laboratory investigates the metabolic and hormonal responses to stress. Three stresses commonly studied in the lab include undernutrition, overnutrition, and heat stress. By understanding the physiological responses to heat we aim to develop targeted treatments that mitigate heat related losses. Through appreciating the metabolic adaptations to under- and overnutrition the Renquist lab is focused on advancing treatments for obesity associated diseases including diabetes and hypertension.

Mike Riggs, DVM, PhD
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520-621-8445

Associate Professor

Dr. Riggs’ research program centers on the immunobiology of bovine and human cryptosporidiosis, a diarrheal disease caused by the parasitic protozoan parasite Cryptosporidium spp. The focus has been on characterizing protective immune responses; developing recombinant vaccines, immunotherapeutic and other new drug discovery; and definition of the molecular pathogenesis of host cell infection.

Dave Schafer, PhD
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Resident Director of V-Bar-V Ranch

Research at the V-Bar-V addresses environmental, wildlife and domestic livestock issues applicable to Arizona and the Southwest. The historic V Bar V is a 47-pasture grazing allotment totaling 71,000 acres that runs about 30 miles east from Camp Verde along the Mogollon Rim. Research involves an applied approach to problem-solving, rather than laboratory studies in basic science. Current studies focus on three main areas: cow herd management; range and watershed activities, and wildlife interactions, particularly with elk.

Jack Schmitz, DVM, PhD
jschmitz@u.arizona.edu
520-621-2356 x 17

Professor

Dr. Schmitz is a diagnostician at the Arizona Veterinary Diagnostic Laboratory. His research interests include control of bovine viral diarrhea virus in beef cattle herds. Professional pursuits include recruitment and retention of rural and food animal veterinarians.

Lisa Shubitz, DVM
lfshubit@email.arizona.edu
520-626-8198

Associate Research Professor

Research focus includes developing a vaccine for coccidioidomycosis (known in lay terms as Valley Fever), studying the epidemiology of the disease in canines, the ecological distribution of the fungus in Southern Arizona and interactions between the host (both animal and human) and the fungus that causes Valley Fever using animal models.

Jim Sprinkle, PhD
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928-474-4160

Area Extension Agent in Animal Sciences

Jim Sprinkle is headquartered in Payson and covers primarily Yavapai and Gila counties but also works statewide in cooperation with other extension agents. Most of his work deals with range monitoring, range issues with agencies, range beef cow production and range nutrition. His current research is in the area of beef cattle trace mineral nutrition.
The Viswanathan laboratory is interested in the interactions between pathogenic bacteria and host cells. Specifically, the study of mechanisms by which enterohemorrhagic *Escherichia coli* and related bacteria cause disease. Recent studies have focused on the mechanisms by which these pathogens manipulate the survival of host cells. On a broader level, Viswanathan is interested in understanding how these pathogens are disseminated in the environment, and to eventually seek methods to control their spread.

The goal of research in the Vedantam lab is to investigate the mechanism(s) of gut colonization by the diarrheic disease pathogen *Clostridium difficile*. Research is focused on the molecular characterization of non-toxin virulence factors of *C. difficile* and is aimed at designing interventions to combat as well as prevent *C. difficile* infection (CDI).

Dr. Tang-Nelson’s research focuses on the diagnosis of invertebrate pathogens, especially those infecting penaeid shrimp. Work involves: (a) molecular characterization of pathogens through isolation, gene sequencing, and genomic analysis; and (b) development of rapid diagnostic methods through PCR and in situ hybridization. Recent studies include genotyping of white spot syndrome virus, characterization of insecticidal toxin genes in the marine bacterium *Vibrio parahaemolyticus*, and development of diagnostic tools for a microsporidian parasite of marine shrimp.

For more than a decade Dr. Wright has been developing strategies to increase the efficiency of nutrient utilization in livestock and to raise the level of production of food in an ecologically sustainable way (i.e., decrease enteric methane). Several years ago, his research interests expanded to also include human gut microbiology. Dr. Wright’s internationally recognized research uses pyrosequencing and metagenomics to examine the gut microbiome of animals, including humans, to better understand the interactions between host genetics, immune responses, and the gut microbiota, which are largely unexplored.
UA DVM Program

With a projected launch date of Fall 2016 and a $9 million donation made by the Kemper and Ethel Marley Foundation, plans continue to move forward with the development of the UA Veterinary Medicine Program. The program will be housed under the College of Agriculture and Life Sciences within the School of Animal and Comparative Biomedical Sciences.

“This program is incredibly important to Arizona and I thank the Kemper and Ethel Marley Foundation for their generous support,” said UA President Ann Weaver Hart in a press release. “This innovative program will help the UA to meet a critical need for veterinarians throughout Arizona, and provide a vital talent base for the state’s growing workforce needs.”

Established in 1990, the Kemper and Ethel Marley Foundation has previously invested in the UA by providing private support for the Marley Building and endowing Project CENTRL, a rural leadership initiative. In 2012, the foundation also made a $4.5 million gift to the UA Foundation to endow a research and extension program in sustainable rangeland stewardship.

For more information and updates on the University of Arizona Veterinary Medicine Program visit vmsp.cals.arizona.edu/-College of Agriculture and Life Sciences and University Communications.