School of Veterinary Medicine
Agriculture and Natural Resources Update
December 2015

NEW FACULTY

Dr. Richard Pereira has joined the Department of Population Health and Reproduction as Assistant Professor of Clinical Livestock Herd Health. He received his BVM from the Federal University of Uberlandia, Minas Gerais, Brazil; completed an internship at the University of Florida, Gainesville; followed by a residency in Production Medicine at Cornell University. Pereira received his PhD in Comparative Biomedical Sciences from Cornell and holds advanced training in livestock herd health and reproduction. His primary research focus is the understanding of emergence, persistence and transmission ecology of antimicrobial resistant and zoonotic bacteria in livestock, with the aim of developing interventions to reduce and prevent the spread of disease and drug resistance. He will provide clinical veterinary herd health and reproduction services at the Veterinary Medical Teaching Hospital and provide in-hospital clinical reproductive services and case management.

Dr. Bret McNabb has joined the Department of Population Health and Reproduction as an Assistant Professor of Clinical Livestock Reproduction. He received his DVM from UC Davis and following two years in large animal practice in Montana, returned to Davis to complete a residency in Food Animal Reproduction and Herd Health, a Masters of Preventive Veterinary Medicine and became board certified in the American College of Theriogenologists. He has served as Resident Veterinarian and Staff Veterinarian in the Veterinary Medical Teaching Hospital since 2009, and has been Chief of Service for the Livestock Herd Health and Reproduction Service since 2013. McNabb's areas of interest include livestock fertility, male and female reproductive and venereal diseases, obstetrics and advanced reproductive technologies.

CURRENT FACULTY RECRUITMENT

- Professor of Clinical Diagnostic Microbiology (CAHFS-San Bernardino Lab)
- Professor of Clinical Diagnostic Pathology (CAHFS-Tulare lab)
- Specialist in CE-Beef Cattle Herd Health and Production (PHR/Vet Ext)
- Director, California Animal Health and Food Safety Laboratory
- Veterinary Medical Teaching Hospital Director

WORKSHOP HELD ON RESPONSIBLE ANTIBIOTIC USE IN LIVESTOCK

The school and the Farm Foundation brought together the state's livestock and poultry producers, their feed suppliers and veterinarians to discuss a changing landscape of antibiotic drug use in food animals. These changes are a result of a national effort to reduce antibiotic resistance. New FDA guidelines will require label changes allowing only therapeutic uses for some medically-important antimicrobial drugs, and call for increased veterinarian oversight for these drugs used in animal feed, which are currently sold over the counter with unrestricted access.

Industry leaders were among the speakers at the workshop held at the School of Veterinary Medicine. They included Chuck Ahlem of Hilmar Farms; Bill Mattos of the CA Poultry Federation; Stuart Hall of Feedlot Health Management Services; and Marit Arana of A.L. Gilbert Company. Craig Lewis of the U.S. FDA and Kathe Bjork of the USDA provided an overview of the new guidelines. Dean Michael Lairmore emphasized the role the school plays in reducing antibiotic resistance and working with its partners to build consumer trust in a safe food supply, citing FARAD, research and vaccine development through the Center for Food Animal Health, surveillance and diagnostic testing at California Animal Health and Food Safety Laboratory System, and international outreach by Western Institute for Food Safety and Security.

State Veterinarian Annette Jones provided an overview of CA SB27 (signed into law later that week). Afternoon break-out sessions allowed participants to discuss the management challenges ahead, and provided state and federal agency staff, veterinary medicine faculty and CE specialists insight into changes needed to meet the requirements. The workshop was one of 12 that the Farm Foundation is hosting across the country. A report gathered at the workshop will be presented at a national summit to advance the conversation on the industry's adaptation to the changing environment of antibiotic drug use. An Op ed on the topic by Dean Lairmore can be found at http://www.sacbee.com/opinion/op-ed/soapbox/article37990245.html More information and resources can be found at http://www.fda.gov/AnimalVeterinary/SafetyHealth/AntimicrobialResistance/

PASTURED POULTRY FARM TO EXPLORE SOLUTIONS FOR SMALL CHICKEN FARMS

The school and its partners unveiled a new Pastured Poultry Farm, home to 150 young laying chickens and a living laboratory where students and researchers hope to develop innovative solutions benefiting pasture-based poultry farms, integrative crop-and-poultry farms, and backyard flocks. Pasture-based chicken production offers many benefits as well as some challenges in terms of food safety, animal health and welfare, and environmental impacts. The 4.5-acre

farm, located about one mile west of the central campus, includes a seeded, irrigated pasture, where chickens can forage, and a student-built Eggmobile for protection and overnight housing. The project - largely driven by students drawn from the School of Veterinary Medicine, College of Engineering, and College of Agricultural and Environmental Sciences - is co-led by Maurice Pitesky, a cooperative extension poultry specialist with the school.

The student and faculty research teams will be delving into issues involving diseases and chicken health, predation by wildlife, and occupational health for workers. Eventually, the research team hopes to construct multiple Eggmobiles with different designs, in order to optimize cost, ergonomics and sustainability. In time, the researchers would like to expand the project to include broiler chickens as well as cropping systems that integrate poultry, in order to fully maximize the potential of the land for food production. Seed funding for the project was provided by UC ANR.

PREVENTING BIRD FLU IN BACKYARD CHICKENS

Through news media outreach, school experts reminded chicken owners to be extra vigilant to help avoid their birds contracting or passing the avian influenza (AI) virus.

Commonly called “bird flu,” the AI virus is routinely found in wild waterfowl. When this virus spreads to chickens and other domestic poultry, it can cause significant mortality and economic loss. This year the nation experienced the worst bird flu outbreak in history, but fortunately there have only been three confirmed cases in California — two of which carried the more dangerous, highly pathogenic strain. In each case, the disease, which is not dangerous to humans, was introduced by wild waterfowl migrating along the Pacific Flyway. Some of these wild birds might now be carrying the Eurasian strain of the H5 highly pathogenic AI.

State officials credit early disease detection and prevention, through proactive surveillance and good biosecurity practices, as key factors limiting the spread of AI. For example, a wildlife surveillance program conducted by USDA Wildlife Services regularly submits samples to the school’s California Animal Health and Food Safety Laboratory System (CAHFS) for testing. It helps scientists and animal health officials understand where certain viruses are circulating in the U.S., including the more dangerous strains for domestic poultry. CAHFS also provides free necropsies for owners of backyard flocks with less than 1,000 birds. The school and the CDFA offer some important biosecurity tips to help reduce the risk of chickens contracting bird flu. The tips are included in the full article found here: http://news.ucdavis.edu/search/news_detail.lasso?id=11330 . **Stay up-to-date on avian influenza at https://www.cdfa.ca.gov/ahfss/Animal_Health/Avian_Influenza.html**

RELATED POULTRY NEWS-

A grant has been awarded to veterinary researchers Rodrigo Gallardo and Beate Crossley to study new, highly pathogenic viruses affecting the U.S. poultry industry. The goal is to better understand why these viruses have been so difficult to eradicate and help prevent their introduction to commercial farms.

California backyard chicken owners can participate in a short survey to help university experts learn more about backyard poultry in the state. Data gathered from these confidential surveys will help develop outreach and training programs that will benefit public health, animal health and food safety. The survey is collaboration between the school and UC ANR.
http://ucanr.edu/sites/poultry/California_Poultry_Census/

Resources and easy-to-follow instructions to build a backyard chicken flock - plus fun trivia and important tips to keep chickens healthy – can be found in the **2015 Eggsercise Book** featuring Dr. Cluck, the chicken veterinarian. For kids and adults alike, the booklet was produced by CE Specialist Maurice Pitesky and others within the school, in partnership with the CDFA and can be found here
http://ucanr.edu/sites/poultry/files/181245.pdf

Symposium Responds to State's Boom in Backyard Chicken Owners - Participants representing stakeholders in backyard poultry farming - including 4-H and farm advisors, agricultural commissioners, feed store managers and veterinarians -took part in an intensive two-day lab and training program in Northern and Southern California that provided practical background in backyard and small-commercial meat and egg poultry production. Using a "Train the Trainer" approach, university and industry experts from the school, UC ANR, CAHFS, and the CDFA presented attendees with basic information about poultry nutrition and health, food safety, biosecurity, production management, avian disease and disease prevention, public health and more.

Funded by the CDFA, the symposium was held at UC Davis and Pierce Junior College Farm in Los Angeles, and led by the school's Maurice Pitesky and Rodrigo Gallardo, with the Center for Environmental Policy and Behavior's Mark Lubell and Matthew Hoffman. The trainings provided researchers with a first structured step toward improving outreach to the myriad of backyard and commercial poultry stakeholders in the state. The long-term goal is to create a robust network of resources and people that can facilitate outreach to backyard poultry enthusiasts in their social networks.

FOOD SAFETY FEATURED AT FARM-TO-FORK FESTIVAL

Volunteers from the school and the Western Institute for Food Safety and Security (WIFSS) tested the public's food safety knowledge at the "Farm to Fork" festival held on Sacramento's Capital Mall in September. The festival showcases where our region's food and drinks come from, and brought people face-to-face with those who are feeding our region and the world. It also provided an opportunity for school representatives to answer questions on a range of topics, like student admissions and pet nutrition, in addition to food safety. Programs at the school such as WIFSS, the Veterinary Medicine Teaching and Research Center and CAHFS do much to protect the food supply by addressing all stages in the food production system, and support agricultural producers and commodity groups.

SoAR ASSEMBLES SCIENTIFIC ADVISORY COMMITTEE

Dean Michael Lairmore has been selected by the Supporters of Agricultural Research (SoAR) Foundation as member of its Scientific Advisory Committee whose primary mission is to strengthen agricultural research and raise its profile within the broader science community. The committee focuses on increasing the participation of the nation's leading research institutions in AFRI and in the field of agricultural research; identifying additional opportunities for collaboration and cross-disciplinary work between agricultural research programs and other federally funded science programs; and providing advice and recommendations for advancing agricultural research as a whole.

WESTERN CENTER FOR FOOD SAFETY AND PARTNERS RECEIVE FDA CFSAN AWARD

The school's Rob Atwill, Jennifer Chase, and Ronald Bond, along with colleagues from UCCE, FDA's Center for Food Safety and Applied Nutrition (CFSAN), and RTI International received the FDA/ CFSAN Leveraging/Collaboration Award for outstanding contributions. The award is a result of collaborative research between the Western Center for Food Safety at the school, UCCE and CFSAN to determine pre-harvest transfer coefficients for E. coli O157:H7 from wildlife scat to produce based on its publication in the Feb. 2015 edition of *Journal of Food Protection*.

TESTING AT STATE FAIR LIVESTOCK COMPETITION ENSURES SAFE FOOD

A CA State Fair highlight for 4-H and FFA youth is the *Junior Livestock Market Competition* where animal education is put into practice through competing beef and dairy cattle, sheep, pigs, and market and dairy goats. The school partners with the fair through a high-quality residue testing program to ensure fair competition and a safe food product. No animal winning division or reserve champion can go to auction without undergoing testing for antibiotics and other prescription medication, including drugs for growth promotion and even enhanced performance. Jay Carlson, agriculture programs manager for the fair, says their goal is to demonstrate learning all aspects of raising an animal in the 'real world' – such as feeding, nutrition and budgeting. At the same time, he says, it's important that children understand that their animals will be sold and become part of the food chain, and they have a responsibility for producing safe food.

Paula Lee with UC Davis serves as the fair's residue clerk and directs and organizes the collection of urine samples under supervision of the fair veterinarian, with the help of animal sciences and veterinary medicine students. Following a chain of custody, samples are transported to the CAHFS diagnostic labs where they are prepared and extracted for analysis. While the lab primarily conducts residue testing for the horse racing industry, each summer it tests samples for half a dozen county fairs and is equipped to detect more than 1,800 drugs. If a sample is positive, the school works with the fair to ensure that the withdrawal period is met and the animal is free of antibiotics and other drugs before it enters the food chain. This testing helps to provide an equal and level playing field for everyone, and ensure that animal products are safe and wholesome to consume when the fair is over.

BUILDING COLLABORATIONS IN INTERNATIONAL FOOD SAFETY

Ensuring a safe animal-based protein supply for domestic and international markets in China was a chief topic of discussion at the school's Western Institute for Food Safety and Security (WIFSS)-Nanjing Agricultural University (NAU) Annual Symposium on One Health and Food Safety held in November in **Nanjing**. Discussions included use and misuse of antibiotics, methods used to prevent residues in human food, animal and plant pathogens involved in food safety, and preparing students for careers in clinical veterinary medicine. WIFSS is partnering with the International Veterinary Collaboration for China , funded by Zoetis, to launch a program through NAU to educate veterinarians and livestock and poultry producers in China on the prudent use of antibiotics.

Veterinary Medicine Extension Director Rob Atwill and CE specialist Maurice Pitesky traveled to *Northwest Agriculture and Forestry University* in **Yangling, China**, and *Zhejiang Agricultural Academy* in **Hangzhou, China** to discuss collaboration on food safety projects between their faculty, WIFSS, and Veterinary Medicine Extension.

Atwill and Melissa Partyka, an ecology doctoral student, visited multiple regions of **Southern Thailand** to foster future research in food safety, zoonotic disease, and production issues in Thai aquaculture systems. Meetings took place with local farmers, research faculty, and government agencies, including seminars at the *Chulalongkorn University Veterinary School* for current veterinary students and members of the faculty on food safety in fresh produce, *Vibrio* spp. prevalence in shellfish production environments, and zoonotic disease in coupled human-monkey systems. Meetings also took place with members of the Fisheries Research and Development Center and local shrimp farmers in the provinces of Nakhon Si Thammarat and Songkhla where production is being limited by endemic and emerging diseases like White Spot Syndrome and Early Mortality Syndrome.

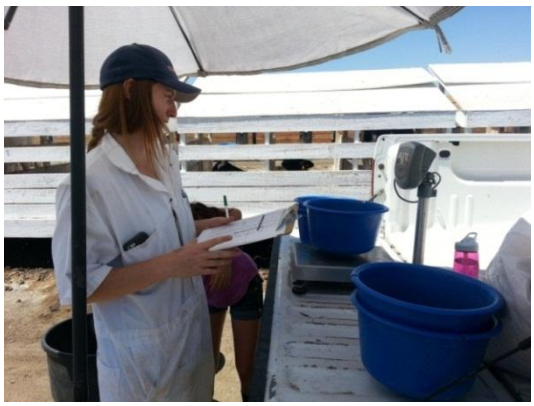
FOOD SAFETY AND ORGANIC FARMS

Researchers at the school have been awarded a grant from the USDA National Institute of Food and Agriculture (NIFA) Organic Research and Extension Initiative (OREI) to study food safety risks associated with manure and compost use in organic agriculture.

The project - led by co-PIs Alda Pires, a UCANR CE specialist at the school, and Michele Jay-Russell, program manager with the Western Center for Food Safety (WCFS) - will gather information and evaluate best practices in animal-based biological soil amendments and compost use on organic farms through stakeholder surveys and focus groups. A national industry workshop is also planned at UC Davis next year on this important topic for the growing organic food market.

Certified organic producers use animal-based soil amendments like manure and compost to improve soil fertility and quality. Currently the prevention of microbial contamination of crops has been based on waiting-period criteria between application of raw manure and harvest. However, according to the project co-PI Pires, the standards are based on little scientific information. The project is a collaboration with the Western Center for Food Safety and the Western Institute for Food Safety and Security, and will provide critical information to develop science-based guidelines for further research on reducing the risk of foodborne pathogens in organic agriculture. It will also help inform and guide policy such as the FDA's proposed Produce Safety Rule that is recommending more research on waiting periods between raw manure application and harvest.

VMTRC INTERN FOCUSES ON DAIRY NUTRITION AND FEEDING SYSTEMS



The school's Veterinary Medicine Teaching and Research Center – Tulare recently welcomed Kelly Mitchell as an intern focusing on dairy nutrition and feeding systems.

Funded in part by the California Dairy Research Foundation (CDRF), the goal of this first-time program at the VMTRC is to train future leaders in feed manufacturing, dairy feeding systems, nutrient management and feed/food safety so they can better understand feeding cows, identify potential industry issues, and troubleshoot problems in the feeding process. Under the guidance of Dairy Nutritionist Heidi Rossow, Mitchell will partner with feed manufacturers, feed companies and nutrition consultants to gain valuable hands-on experience. Through research projects with BIOMIN America and Stuhr Enterprises – animal nutrition companies – she will have the opportunity to work at a calf ranch and dairy to study dairy nutrition and feed management.

AVIAN MEDICINE FACULTY AND RESIDENT RECOGNIZED BY AAAP

H. L. Shivaprasad, professor of avian pathology and Silvia Carnaccini, resident in avian medicine with CAHFS Tulare and Turlock branches have won awards at an American Association of Avian Pathologists conference held in Boston. Shivaprasad received the 'Lasher-Bottorff' Award in recognition for his significant contributions as an avian pathologist to the Poultry Health Programs in North America. Carnaccini won the 'Best Field/Case/Diagnostic Report' for her presentation on "Hemorrhagic Hepatopathy Syndrome in Salmonella Enteritidis Vaccinated Pullets in California, 2013-2014."

PREVENTING PINKEYE IN CATTLE

Pinkeye – or infectious bovine keratoconjunctivitis – is the most common eye disease of cattle in California and throughout the U.S. causing economic losses to cattle producers, as well as pain and suffering in affected animals that negatively impacts overall animal welfare. Caused by infection of the cornea with *Moraxella bovis* bacteria, pinkeye results in painful corneal ulcers and inflammation of the eye and skin surfaces lining the eye. Another organism, *Moraxella bovoculi*, first reported in 2007 by the school's John Angelos and his research team, is also frequently isolated from cattle with pinkeye. At this time *M. bovoculi* has not been proven to cause pinkeye, however, it is possible that this organism is a risk factor for the disease.

If not properly treated, corneal infections can result in corneal scars or even eyeball ruptures leading to permanent blindness. Pinkeye is most common in summer with increased exposure to sunlight, and dry, dusty conditions. Angelos has spent more than 15 years researching causes and potential treatments for this costly disease and is commonly used as an editorial resource for trade media publications on prevention and treatment tips.

STUDY IN CALVES OFFERS HOPE IN RESPIRATORY-DISEASE TREATMENT

Studies with calves are helping advance the search for therapeutic drugs in children with RSV disease. Respiratory illnesses are quite routine for young children and usually pass as quickly as they appear. But respiratory syncytial virus or RSV poses a far more serious threat. While there are no preventive vaccines or therapeutic drugs for RSV, a recently published study of calves with RSV, conducted by the school, is providing valuable information needed to move a potential treatment into human clinical trials. Results from the study, published in the journal *Antimicrobial Agents and Chemotherapy*, showed that an experimental antiviral compound was effective in blocking the virus from binding with the animal's cell membranes, thus decreasing the level of infection in the treated calves. The air spaces in the lungs of those treated animals also were less likely to fill with inflammatory cells produced by the infection than were the lungs of untreated animals, the study found.

The study demonstrated that since bovine RSV in calves is almost identical to the human form of the disease in terms of symptoms, lung pathology and progression of the disease, treatment with an effective antiviral drug can benefit both bovine and human patients, according to Professor Laurel Gershwin, the study's lead author and a veterinary microbiologist. The study was funded by Gilead Sciences, which developed the experimental antiviral drug that has since moved into clinical trials in adult human patients. It is hoped that the new therapeutic will be available soon to treat RSV in infants and children.

RESPONSE TO REFUGIO OIL SPILL

The Oiled Wildlife Care Network, a program of the UC Davis One Health Institute, which has been caring for wildlife in oil spills since the 1990s, was called into action this spring when a coastal pipeline ruptured in Santa Barbara, threatening the lives of many sea lions, pelicans and more. Researchers placed satellite tracking devices on 12 brown pelicans affected by the Refugio Oil Spill, which dumped 100,000 gallons of thick crude oil along the area's coast. The pelicans were rescued and cleaned for several weeks after the spill before being released back into the wild. The tracking devices will monitor the birds' survival and help scientists see if they return to normal behaviors (like breeding) after having been oiled. To help prepare for future spills anywhere in the state, the Network works regularly with more than 35 related organizations; they train, conduct drills and exercises; and have built 12 facilities for oiled wildlife. The team is expanding response efforts to cover inland oil spills as well, in response to the rapid rise of oil transport by rail in the wake of fracking.

NEW GRANT FOR CRAB GEAR RECOVERY

The California Lost Fishing Gear Recovery Project - a program of the SeaDoc Society, which is part of the Karen C. Drayer Wildlife Health Center at the school - recently received a $170,000 grant from the National Oceanic and Atmospheric Administration (NOAA) as part of its annual Community-based Marine Debris Removal grant competition. The funds will be used to expand work with commercial Dungeness crab fishermen to recover tons of lost fishing gear. Left in the water, the gear not only catches and kills crabs, but also entangles diving birds and marine mammals, including whales. A major goal of this phase of the program is to expand a gear buyback program to additional California ports, with the ultimate goal that the project becomes a financially self-sustaining operation run by the crab fishermen themselves.

CALIFORNIA ANIMAL HEALTH AND FOOD SAFETY LABORATORY SYSTEM (CAHFS)

Richard Breitmeyer, director of CAHFS, was awarded the United States Animal Health Association's (USAHA) Medal of Distinction. The annual award recognizes one or more distinguished USAHA members who have demonstrated outstanding leadership, provided exemplary service, and have made significant contributions to the advancement of the association.

Highlights from the December CAHFS Connection e-newsletter include:

Bovine

- ***Mannheimia haemolytica* pleuropneumonia** was diagnosed in cows and calves on eight calf ranches, one dairy and five beef operations.
- **Nitrate toxicosis** was diagnosed on four beef operations. Sudan hay was the suspected source in 10-month-old steers.

Equine

- **Cutaneous habronemiasis** was diagnosed in biopsy samples of lesions from the mouth region, eyes and prepuce of multiple horses.

Small Ruminant

- **Bluetongue virus** serotypes 10, 11 and 17 were identified in seven separate sheep flocks between August and October.
- **Johne's disease** resulted in the death of an adult male Boer goat. The clinical signs included weight loss despite a good appetite, fading of the hair coat color and general weakness.

Pig

- **Salt toxicosis** /water deprivation was diagnosed in a 10-week-old pig from a group where 10 of 11 pigs in the same pen were found dead.

Other Mammalian

- ***Trichinellosis*** was diagnosed in two wild black bears submitted for surveillance necropsies. The pathogenesis of *Trichinella sp.* in bears is poorly understood. The main concern is its potential transmission to humans, specifically hunters and their families, through consumption of undercooked meat.

Poultry and Other Avian

- **Infectious laryngotracheitis (ILT)** caused by herpesvirus was diagnosed in 18-day-old brown broiler chicks with a history of respiratory signs - unusual to see in such young birds.
- **Ornithosis** caused swelling over the eyes in 13-week-old, female turkeys. Ten percent of 36,000 birds were affected.
- **Aspergillosis** was diagnosed in a six-month female show pigeon which was experiencing respiratory signs for several days before death, and in a 16-week-old female Red Tailed Hawk from another premise which had a prolonged history of anorexia, loss of weight and death.

CONTINUING EDUCATION

2015 APPLIED REPRODUCTIVE STRATEGIES IN BEEF CATTLE SYMPOSIUM HELD IN AUGUST- School faculty were speakers at this symposium held at UC Davis and attended by cow-calf producers, bovine veterinarians, industry representatives, students and extension personnel. Six general sessions covered a variety of topics, from physiology to genetics to management, and the latest information on reproductive technologies in beef cattle.

UPCOMING- **The 2016 LIVESTOCK SYMPOSIUM will take place January 9** at the school's Gladys Valley Hall. Speakers from the school and UC Berkeley include Drs. Gertrude Buehring, Rosie Busch, Meera Heller, Joan Rowe, Jeffrey Stott and Betsy Vaughn. Topics include pain management in ruminants; potential impact of bovine leucosis virus in public health; the veterinary feed directive; parasite control in livestock; and an update on the foothill abortion vaccine.

Backyard Poultry will be a featured track at the **2016 WINTER CONFERENCE held February 20-21** at the school's Gladys Valley Hall. More information at http://www.vetmed.ucdavis.edu/ce/symposia_and_events/small_animal/winter-conference.cfm