

### **Future Research STARS**

**S** ix local Davis High School (DHS) students performed summer internships with veterinary students and professors over six weeks to see first-hand what a career in veterinary medicine can offer. Participants in the inaugural year of the Jr. Students Training in Advance Research (STAR) program to promote STEM disciplines included Hillary Thompson, (left), and Mei Tanaka. They interned in Dr. Carrie Finno's lab, studying genetic variants for equine neuroaxonal dystrophy, a neurological disease in horses. Finno, a veterinary geneticist, said the experience was valuable for her graduate students as well, as it gave them an opportunity to serve as mentors. Thompson and Tanaka also had duties outside the lab, such as presenting articles in the "journal club," discussing the strengths and weaknesses of the research and attending weekly lab meetings, just like the veterinary students. Recent DHS grads Andrea Juarez and Kelsey Long interned with Dr. Munashe Chigerwe with dairy calves. Emma Juchau worked in Dr. Derek Cissell's lab on equine distal interphalangeal joint cartilage. She is headed to Colorado State University this fall to study equine science, with a career goal of working in equine-assisted therapy. Baylee Cox worked on a project in Dr. Joanne Paul-Murphy's lab on corticosterone concentration in captive parrot welfare during the social pairing process. At a wrap-up ceremony, the students shared they learned persistence, being open to new ideas, and getting over their fears—

life lessons that will take them far, no matter their future career choices.



Leading veterinary medicine, addressing societal needs

#### In addition to their many academic pursuits, the 140 students of the

Class of 2021 bring a wealth of experiences as athletes, a single engine pilot, a tennis instructor, a black belt in mixed martial arts, two Eagle Scouts, many dancers (Irish, belly, ballet, line, hip hop), a kickboxer, two gymnasts, an art student with two gallery showings, two Girl Scouts, four competitive equestrians, a motocross rider, at least nine scuba divers, three surfers, a white water rafter, two skydivers, a figure skater, a kayaker, five rock climbers, four bakers and one triplet!

This group has musical talent with a professional trumpeter, three pianists, a cellist, a taiko drummer, a

# **CLASS OF**

drummer and guitar player, two violinists, a clarinetist, three ukulele players, four chorus singers (one sang at President Obama's first inauguration) and a songwriter!

Class members have swum with sharks, been chased by an alligator, kissed a kangaroo, held a baby lion, trained dolphins and sea lions, swum with giant manta rays, kissed a bear, studied whales, flew hawks, been on safari, and also worked with elephants.

These students have an extensive international focus with experiences in 31 countries, visits to five or more U.S. national parks and one climbed Mt. Kilimanjaro.



**Compassionate Care** Scholarship

• anine companion, Ebony, is everything to recent graduates, Dr. Anjali → Daryani ('15) and Dr. Dustin Noack ('14)—she is their rock, friend and confidant. She and other animals have made a profound impact on their lives, showing the couple compassion, forgiveness, strength and unconditional love. Ebony has been a blood donor, a service dog and even a frisbee champion at UC Davis Picnic Day a few years ago. With her gentle nature, she has helped ease the pain of children with disabilities. To honor her and to express gratitude to the school,

Daryani and Noack established the Ebony Compassionate Care Scholarship.

"We are really hopeful that our gift will help veterinary students on their career paths," said Daryani, who aspired to become a veterinarian since childhood. "We want the scholarship to be awarded to students who demonstrate unique compassion and love, helping patients heal."

Daryani and Noack recall their jitters as newcomers to the veterinary profession, but soon found that their nerves calmed. They say that the school prepared them in the best way possible and value the wellrounded curriculum that provided them with the highest quality veterinary education, as well as courses in business, client communication and management of a veterinary team.

"On a daily basis, we feel blessed to be part of such an amazing profession and are so thankful for the education and support that we received from the school," Noack said. "From the day we became veterinarians, we knew we wanted to start giving back. We remember how much help scholarships provided us and knew that establishing a scholarship was the perfect avenue to give back to the community and the university." For information about supporting scholarships, please contact the Office of Development at 530-752-7024.

he late Dr. Peter Kennedy was world renowned for his pioneering contributions to veterinary pathology and had an accomplished career that spanned more than five decades at the school. A fellowship established in his name carries on his legacy and invests in future veterinary scientists pursuing advanced training in anatomic pathology.

Sparked by his lifelong interest, Kennedy published numerous research papers on reproductive and fetal diseases. He co-founded the veterinary pathology department during the 1950s and was instrumental in building a tradition of excellence in training graduate students in anatomic pathology.

"Peter was an iconic veterinary pathologist. He mentored and inspired many through his book and publications," Dr. Bill Spangler (PhD '75) said. "He wrote *the* pathology book (Jubb and Kennedy, Pathology of Domestic Animals) that I studied in both veterinary



a museum fixture).

# Investing in Future Veterinary Pathologists

Dr. Bill Spangler (left) and Dr. Peter Kennedy are pictured in front of Spangler's airplane in 1999 at an Oregon airport, adjacent to an aviation museum. They flew there to duplicate a 50+ year-old Berkeley newspaper photo of Kennedy, in his original leather flight jacket, standing by his P-38 Lightning (now

school and graduate school. In addition, he was one of a generation of true American heroes, serving as a World War II fighter pilot. We shared a love of flying, and he was often in the right seat of my airplane."

In 2002, Spangler and Dr. Jim MacLachlan (PhD '82), professor in the Department of Pathology, Microbiology and Immunology, spearheaded the initial endowment campaign. Since then, 13 fellowships have been awarded, helping recipients to succeed as leading scientists in government laboratories, educational institutions and major corporations.

The school's goal is to increase the endowment so that annual earnings can fully fund the cost of education and training for one or more graduate students each year. For information about supporting the Peter C. Kennedy Endowed Fellowship, please contact the Office of Development at 530-752-7024.

Dr. Mathieu Spriet performs a PET scan on a horse's front limb.

### Decoding Genetic History

From high-profile crime cases to parent identification and diagnostic tests for genetic diseases, the school's <u>Veterinary</u> Genetics Laboratory (VGL) is internationally recognized as a pioneer and expert in DNA-based animal testing. Laboratory technicians can perform genetic testing on at least 17 species of wild and domestic animals, including dog, cat, horse, sheep, pig, cattle and primates.

For several decades, VGL has been a leader in equine genetic research and, more recently, in the international equine gene map project. The laboratory has developed and currently offers diagnostic tests for a number of equine genetic diseases and coat colors, and has an active research and development program.

Recently, the laboratory investigated squamous cell carcinoma (SCC) in Haflinger horses and determined that a recessive mode of inheritance explains some of the genetic components involved in the development of this cancer, the second most common type of tumor in the horse and the most frequent tumor of the horse's eye. They also discovered a DNA marker that identifies horses at higher risk to develop limbal and/or third eyelid SCC.

Other new tests available include dog coat color panels, brindle coat texture in the American Quarter Horse, skeletal atavism in Shetland ponies and American miniature horses, and canine genetic diversity.



The Veterinary Genetics Laboratory processes thousands of tests every year.



# Hospital Equipment

#### **Advances Treatments**

The acquisition of some of the most advanced medical equipment available allows the <u>veterinary hospital</u> to stay at the forefront of diagnostics and treatments. Through grants, donations, and facility upgrade allocations, new equipment helps faculty clinicians lead the way toward new discoveries and exceptional treatment.

An anonymous donation provided the Cardiology Service with a state-of-the-art fluoroscopy unit. The equipment supports interventional cardiology procedures by providing live motion radiology to help guide the cardiologists during surgeries. The use of "live x-rays" by the Soft Tissue Surgery Service also assists surgeons in minimally invasive procedures. This technology has made surgeries quicker and safer, and in some cases, offered viable surgical intervention where there were previously no treatment options. The hospital's interventional radiology surgery suite is equipped with the latest in fluoroscopy, and is one of the most advanced surgical settings in veterinary medicine.

Positron Emission Tomography (PET) has been in use in the Large Animal Clinic for more than a year. PET is still at its infancy in veterinary medicine, but UC Davis is at the forefront with the first equine PET program in the world. This cutting-edge imaging modality will offer exciting opportunities for the Small Animal Clinic also, with the introduction of the PET "mini-Explorer" project. Through a collaboration with UC Davis School of Medicine and the College of Engineering, the school will soon be equipped with a prototype of the most advanced PET scanner ever built.

The Dentistry and Oral Surgery Service advances oral and maxillofacial diagnosis and treatment planning with its cone-beam computed tomography scanner-the only academic veterinary facility in the world to utilize this technology. Additionally, the hospital has invested in new endoscopes, portable ultrasound and radiography equipment (especially convenient for field service crews treating animals off campus), as well as some of the latest anesthesia units.

For more information about <u>supporting equipment needs</u>, please contact the Office of Development at 530-752-7024.

# Are Common Antiseptics Safe?

∧ ntiseptics found in everyday Ahousehold products—such as toothpaste, mouthwash, nasal spray, eye drops, shampoo, lotion, intravaginal spermicidal sponges and cleanersmay be doing more harm than good. A recent in vitro study by UC Davis researchers published in Environmental *Health Perspectives* indicates that some of those antimicrobial agents, a class of chemicals known as 'quats,' inhibit proper cellular energy production and interfere with the estrogen response.



A 3-D representation of mitochondria, free-floating organelles in the cell.

Quats are a group of compounds that have been widely used as topical antiseptics and disinfectants since the 1940s. Other antiseptic compounds, such as triclosan, have been withdrawn from the market after research in animal models at UC Davis by molecular biologist Isaac Pessah showed they may impair muscle function.

"Disinfectants that we are putting on and in our bodies, and using in our environment, have been shown to inhibit mitochondrial energy production and the cellular estrogen response," said biochemist Gino Cortopassi. "This raises concern because exposure to other mitochondrial-inhibiting drugs is associated with Parkinson's disease."

Mitochondria are critical cell structures that generate energy. Like a train delivering its payload among stations, electrons pass through five stations of the mitochondria to produce maximal cell energy. If the train is derailed at any of those stops, it can't deliver its payload of energy down the line for the cell to use. The team showed that quat compounds, cetylpyridinium chloride (CPC) and

#### **OWCN Expands Training Inland**

When the Oiled Wildlife Care Network (OWCN) team is deployed to a spill site, the common assumption is that an accident has occurred off the coast. However, the risk of a spill inland has increased with more oil moving across the continent via train and pipelines. To prepare for such an event, the OWCN team hosted an oil spill drill this year in the Feather River Canyon outside Quincy, about 100 miles inland. The team learned to quickly set up tent headquarters for a response site and did a mock drill that involved washing stuffed animals and transporting them from the 'derailment' site to the fairgrounds. Trainees learned to react on the fly to animals being 'captured' in the field, as well as unforeseen circumstances introduced throughout the day. OWCN's mission can be broken down to four R's: Readiness, Response, Research and Reaching Out. Thankfully, massive spills don't happen often, but when they do, this team will be ready-by land or sea.





benzalkonium chloride (BAK), tested in vitro, blocked mitochondrial complex 1, the first step of energy production. The group also found that quats (at the same concentrations) inhibited estrogen signaling in cells.

"Because exposure to quats is interrupting the sex hormone estrogen response in cells, it could also potentially cause reproductive harm in animals or humans. Other researchers have shown that quats cause reproductive toxicity in animals," Cortopassi said.

While the work at UC Davis has been

conducted in cells, not mammals, another research team accidently discovered a few years ago that quat exposure through a laboratory disinfectant caused reproductive toxicity and reduced fertility in mice. They also recently demonstrated a link between quats and neural tube birth defects in both mice and rats.

"Ours is a preliminary study with information at the most basic cellular level indicating that these compounds may be unsafe, but we need further investigation of the underlying mechanisms and potential consequences of chronic exposure to these compounds in consumer products," Cortopassi said.

Other collaborators include Sandipan Datta, Alexey Tomilov and Sunil Sahdeo of the Department of Molecular Biosciences in the veterinary school, along with Gouchun He and Michael Denison of the Department of Environmental Toxicology at UC Davis.

Funding for this study was provided by the National Institutes of Health.



In June 2009, a train carrying tank cars full of ethanol derailed near the Rock River in Cherry Valley, Illinois, resulting in one of the largest fish kills in Illinois history.

### Growing a Community of Teachers

The traditional lecture and note-taking style of instruction has been augmented by new learning methodologies and technologies. Smartphones and tablets now allow facts and formulas to be accessed rather than memorized and the field of education has developed new evidence-based methods for

increased learning success. As a result, teachers must adapt and evolve their approach for knowledge transfer.

To promote the best practices as veterinary educators, the school's faculty are engaged in both a Regional Teaching Academy (RTA) and a local teaching academy. The RTA was formed as an initiative of the Consortium of West Region Colleges of Veterinary Medicine consisting of five veterinary schools (from California, Oregon, Washington and Colorado), with support from an industry partner, Zoetis Inc. The RTA's 55 members (15 from UC Davis) seek to generate innovative concepts to advance veterinary education, develop and disseminate best practices, and promote instructional scholarship and educational leadership. Through these initiatives, the RTA will collectively build greater expertise at the individual schools and across the region, fostering shared resources and a true community of veterinary educators.

"All of us come with expertise in veterinary medicine, but most of us lack an academic background in the discipline of education," said Joie Watson, professor of equine medicine. "Forming a community of teachers around the science of teaching and learning has been an exciting opportunity for us."

At UC Davis, the faculty developed and implemented a new curriculum based on learning outcomes and core competencies, with plenty of case-based discussions, problem-based learning sessions, lectures, laboratories, and clinical experience to prepare the entry-level DVM graduate. Students also have a broad array of externships, research training programs and community outreach opportunities to enhance their educational experience. Additionally, the school has invested in career, leadership and wellness programs and continues to build a robust scholarship endowment to help off-set student debt. These efforts provide a strong educational experience and foundation of support for students.

The school's local teaching academy activities include a journal club, invited speakers and discussion sessions, faculty development, and summer book clubs. Last year, the group read and discussed "How Learning Works - 7 Research-Based Principles for Smart Teaching," which focused on learning theory and strategies for teachers based in the best evidence. The faculty discussed factors that motivate students to give effective feedback, and the impact of the classroom climate on learning. This summer, more than 35 faculty read "How We Learn" by Benedict Carey, which focused on factors affecting knowledge storage and retrieval strength, spacing study sessions, and how testing improves learning.

Through the regional and local teaching academies, the faculty are embracing new ways to foster engagement in the classroom, assist with deep understanding and promote successful life-long learning.

# All in the Family

n this family, being called "Dr. Lee" can get confusing, since three of them are DVMs and Jennifer will graduate with the Class of 2019. Byron, who graduated in May 2017, didn't set out to follow in his parents' footsteps—especially after a field trip to his dad's small animal clinic in kindergarten when Jennifer claims he fainted. After shadowing at his dad's clinic during his junior year at USC, Byron gained a new appreciation for veterinary medicine and later found himself in veterinary school at UC Davis. In addition to his studies, he was active in volunteering with the Mercer Clinic for Pets of the Homeless throughout his four years. Jennifer says the highlight of her time at Davis so far has been the day she was able to shadow Byron in his last rotation through community medicine. "It was the first time I got to see him interact with clients and I realized he is going to make a great veterinarian!"

## Hands-On Experience

#### at the Ranch

soup of two veterinarians and four students recently Atraveled to the Eden Valley Ranch to perform pregnancy checks on 94 head of cattle. This field visit presented a wonderful hands-on opportunity for students to gain real-life experience working with livestock.

The most efficient way to diagnose a pregnancy is to perform a manual palpation. Since the uterine wall sits against the rectum, the test is done transrectally, where the clinicians and students feel for certain indicators of a pregnancy. If a pregnancy is in an advanced stage, the easiest thing to palpate is the fetus itself. However, early pregnancies are determined by palpating the fremitus (uterine artery), which grows as the fetus ages. Another indicator is the placentome, which is where the fetal blood supply is attached. Using a combination of these techniques, pregnancy can be confirmed and accurately staged within about two weeks, starting after 30 days.

The students took turns performing the pregnancy examinations and administering vaccinations to the cattle. Each cow was vaccinated for respiratory and reproductive viruses, bacterial reproductive diseases, and clostridial diseases. Faculty member Bret McNabb and resident Muzafar Makhdoomi conferred with each student about their findings and confirmed with their own examinations. The group efficiently finished the entire herd in under four hours.

Throughout the examinations, McNabb and Makhdoomi continually asked the students questions about different

#### **VETERINARY MEDICAL CENTER – LEADING THE WAY**

Livestock and Field Service Center





Veterinarians and students traveled to a large beef cattle operation to perform herd health examinations.

aspects of herd health. Nearly every minute of interaction with the students was used as a teaching opportunity. The students were inquisitive and eager to learn as much as they could on the trip.

In addition, the students examined the overall health of the herd, noticing the flesh tone, body position, and coat appearance. Also checked were their feet, legs and eyes. As each cow exited the chute, its gait was analyzed for lameness issues. Based on all of these observations, the herd was deemed in good health, and displayed no signs of systemic illness.



The future Veterinary Medical Center will bring together our community of scholars, clinicians, veterinary students, clients, ranchers and animal patients in facilities designed to provide efficient patient care with immediate access to state-of-the-art technologies.

The Livestock and Field Service Center (rendering pictured) has been designed in consultation with Temple Grandin, PhD, a fellow in the Society of Biological and Agricultural Engineers and well known for her groundbreaking work in engineering humane animal facilities. Dr. Grandin partnered with the planning team to refine preliminary ideas and design the best possible environment for livestock patient handling, care and clinical teaching emphasizing modern concepts in animal welfare.

Basic technical skills and knowledge of livestock and the roles of livestock in our society are an important part of the student educational experience. Students and residents working and learning in the Livestock and Field Service Center will participate in surgeries such as castrations, common abdominal surgeries, C-sections and leg fracture repairs. They will also gain experience with radiology, ultrasound, endoscopy, and even laparoscopy, CT and MRI.



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(VMDN) School of Veterinary Medicine University of California One Shields Avenue Davis CA 95616–8736

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#### Veterinary Continuing Education

Calendar

530-752-3905 Fax: 530-752-6728 ddmorrissey@ucdavis.edu

The school is committed to lifelong learning through its Veterinary Continuing Education by providing nearly 20 annual offerings.

For a complete listing of events, visit: www.vetmed.ucdavis.edu/CE/

**October 13-15** Fall Festival, UC Davis

**February 3, 2018** Winter Conference, UC Davis



### Veterinary Center for Clinical Trials

he Veterinary Center for Clinical Trials is dedicated to accelerating the identification and development of diagnostics and therapeutics for the benefit of veterinary and human patients. There are more than 50 ongoing veterinary clinical trials in different specialties and species, including:

- Corneal endothelial dystrophy in dogs
- Subvalvular aortic stenosis in bullmastiffs
- Pemphigus foliaceus in dogs
- Lymphoma in cats
- Hypertrophic cardiomyopathy in cats
- Lameness in horses
- Squamous cell carcinoma in Haflinger horses

For more information on these and other ongoing clinical trials, visit: <u>www.vetmed.ucdavis.edu/clinicaltrials</u>.





#### **Attention Alumni!**

Fall Festival <u>Alumni</u> Reunion Celebration is October 13-15, 2017, honoring the classes of 1957, 1967, 1977, 1987, 1992, 1997 and 2007. For information, please contact the Office of Development at 530-752-7024 or <u>svmreunion@ucdavis.edu</u>.



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