



Harnessing Hope and Healing

Aclaimed horse breeder and disabilities advocate Michael Muir has always been fascinated with genetics and breeding. As a child, he bred mice for different coat colors. By the age of nine, a family friend helped him start a small flock of sheep that he bred and raised for the local 4H in his hometown of Dixon, California. By the age of 12, with the money he earned from selling prized lambs, Muir bought his first mare who happened to be in foal, with a filly by her side.

More than 50 years later, Muir is still breeding horses and has relied on the expertise of the veterinary hospital's [Equine Field Service](#) to help care for them. Initially, he worked closely with Drs. John Hughes and Irwin Liu. Along with a rotating group

of students, they helped Muir in breeding more than a hundred mares annually in the 1970s.

"They would bring the students out to Allendale Farms in Dixon, and I learned right alongside them," said Muir, great-grandson of America's visionary conservationist John Muir. "They taught me a lot about breeding and general medical care."

By the time Muir reached his late 30s, the multiple sclerosis he was diagnosed with in his teens made it difficult for him to ride in the saddle, so he shifted his focus to carriage driving. He started breeding what he calls the [Stonewall Sporthorse](#)—a blend of strength, stamina, beauty, and gentle disposition.

"I didn't let my disease stop me from being a horseman, although I have a good deal of help," Muir said. "Driving is a lot of fun—it wasn't too hard to give up the saddle."

Muir credits Drs. Sharon Spier and Joie Watson with helping him to develop consistency in the Stonewall Sporthorse, a unique American warmblood with genetic contributions from European warmbloods, Percherons, Friesians and Thoroughbreds to add hybrid vigor to the breed. Although many of Muir's horses exhibit striking spotted coats, leading some to believe they are of mostly Appaloosa heritage, they owe their colorful markings to the Danish Knabstrupper.

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UPDATE

on the Veterinary
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UC DAVIS
VETERINARY MEDICINE

Leading veterinary medicine, addressing societal needs

Welcome Class of 2022

A new cohort of 150 students joined the UC Davis veterinary medicine family in August. Among the incoming Class of 2022, they've already climbed great heights in academics and in life—a couple of students have summited Mt. Whitney, the highest peak in the lower 48 states; many have lived and traveled throughout countries like Japan, Italy, Haiti, Nepal and Indonesia; several are first generation college graduates; dozens are competitive athletes; one has driven a team of mules at Bishop Mule Days; and at least one is an ambidextrous baby raccoon bottle feeder (which will come in handy if they become involved in the Orphan Kitten Project). Guest speaker Dr. Katrina Castaneda, '09, encouraged the new students to stretch themselves. "You will gain the academic and clinical skills to become a veterinarian, but to be a truly great doctor, you need to challenge yourself

to go beyond those," she said. "It's not always easy, but you've chosen the greatest profession in the world." The white coats and ceremony for this year's entering class were made possible, in part, by gifts in memory of Dr. Paul Miller, '71, and the California Veterinary Medical Association.

Melaney Mayes and Traci Hayward join the Class of 2022. ►



Homeless Animals Given *Second Chance*

Mika, once a homeless cat at the Yolo County SPCA, faced a bleak future. With a broken leg, her chances for adoption were slim. But thanks to generous support from Nestlé Purina PetCare, Mika received the necessary surgery to repair her leg through the [Fracture Program](#) at UC Davis.

The program partners with local shelters and rescue organizations that have a waiting list of animals

with one or more broken bones. Without surgery to repair a fracture, amputation may be necessary. Worse yet, euthanasia may be considered the only option. However, with proper treatment, a fracture can often be repaired so the animal may be adopted. Support from Nestlé Purina PetCare is making a difference in the lives of these animals.

For animals like Mika, this program allows them to begin their journey to healing and enjoying a long life. After recovering in the care of a foster family, Mika found a loving home with Allie Watson and her family.

"When we met Mika, we just knew she would be a good fit," Watson said. "She is so good with my 18-month-old daughter, Nora."

Mika is one of 600 companion animals to benefit from the Fracture Program and receive a second chance at life.

"While helping rescued animals, we are able to enhance learning opportunities for our residents and students," said Dr. Karen Vernau,

program faculty volunteer. "We are most grateful to Nestlé Purina PetCare for their support to help make this possible."

For information about helping other animals like Mika, please contact our [Advancement](#) team at 530-752-7024.



Moving Forward

Progress on the first phase of the UC Davis [Veterinary Medical Center \(VMC\)](#) is well underway, thanks to the support of generous donors. Construction began in summer on the Large Animal Support Facility (LASF), which will replace the existing hay barn and be built at the southwest corner of the Garrod Drive curve. Relocation of hay storage from the central veterinary hospital area will open space for future equine facilities.

The LASF includes plans for an open storage structure, a pasture and corral for blood donor animals, and bedding and vehicle storage. Facility design will maximize daylight and reduce energy consumption by providing skylights and lighting controls. Water from the bedding cart wash-down area will undergo organic filtration and flow into a rain garden. Expected completion of the project is February 2019.

The school has planned for phased construction of VMC projects to ensure the continued smooth operation of clinical services and patient care. Each project advances the ability to handle a growing caseload, allows for adoption of the latest technology and supports operational efficiency.



Renovation and expansion of the [Companion Exotic Animal Medicine and Surgery Service](#) is complete with three new examination rooms to enhance its capabilities for treating patients and provide examination space dedicated to exotics.

Renovations of the surgery observation room into two small animal examination rooms wrapped up in September. The observation room was originally built to provide students a venue to observe surgeries behind glass in a viewing gallery. Students now gain experience working alongside clinicians and utilizing video technology.

Read more about the school's vision for the new Veterinary Medical Center at vetmed.ucdavis.edu/giving/vmc.

Equine Research Provides Path to DVM

Briana Hamamoto is a familiar face to many at the veterinary school, having worked at the [Center for Equine Health \(CEH\)](#) for several years, conducted laminitis research with former Assistant Professor Alonso Guedes, and served as a technician in the hospital's [ICU](#). She joined the incoming Class of 2022 this August to pursue a DVM on the heels of nearly completing her doctoral research in pharmacology/toxicology under the mentorship of Dr. Heather Knych.

Hamamoto grew up in rural Atwater, California, and completed a bachelor's degree in Animal Science from UC Davis in 2014. She planned to go straight into veterinary school, although her path wasn't to be that direct, which was a blessing in hindsight. She wasn't admitted immediately to UC Davis, her first choice, but her persistence to gain further experience through her job at the CEH paid off. She was partnered with Guedes to work on his project looking at sEH (soluble epoxide hydrolases) inhibitors in treating painful laminitis in horses.

"That was a great mentor relationship," Hamamoto said. "He saw my research abilities before I did."

Guedes introduced Hamamoto to Knych, associate professor of Clinical Veterinary Pharmacology, who became her Ph.D. advisor. Hamamoto's dissertation is focused on improving pain management in horses. Current pain management centers on nonsteroidal anti-inflammatory drugs and sedation. Under Knych's leadership, she's exploring opioid-based methods of controlling pain, specifically using morphine. At the moment, she is conducting basic pharmacokinetic and *in vitro* studies, taking it back to square one and building from there.

"We need to better understand how long morphine provides pain relief in the horse," Hamamoto said. "This is an area that could use a lot of improvement and we need to increase the types of pain relievers that can be used safely for the best effect."



Briana Hamamoto with her mare, Almond Roca.

Critical Disease Testing

Equine herpesvirus-1 (EHV-1) is relatively widespread in horses; approximately 60 percent of healthy horses harbor the virus. Latent infection can be reactivated during periods of stress, causing clinical disease and viral shedding.

While the more common form of EHV-1 can cause respiratory illness as well as abortion, it is rarely fatal. However, a neurological strain of this virus, also known as equine herpes myeloencephalopathy (EHM), can kill 30 to 50 percent of affected horses.

“That’s why it’s critical that we are able to differentiate between strains,” said Dr. Beate Crossley, a virologist with the school’s [California Animal Health & Food Safety Laboratory \(CAHFS\)](#). “Our laboratory is able to use PCR testing for this disease and quickly confirm suspected cases.”

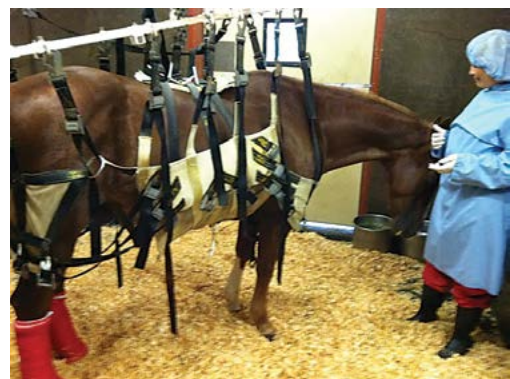
EHV-1/EHM acts like any other virus in that it can be passed quickly from one individual to another in crowded environments, such as horse shows and facilities. In one of the largest incidents to date, an EHV-1/EHM outbreak at the 2011 Western National Cutting Horse Event in Ogden, Utah potentially exposed the virus to at least 2,106 horses at 242 equine facilities in 19 states (including California) and one Canadian province, and forced the cancelation of horse shows from coast to coast.

By the time the outbreak eased, 90 horses were infected with EHV-1 (57) or EHM (33), with another 72 suspected cases (EHV-1: 62, EHM: 10). Thirteen of the 33 EHM-infected horses died.

That event prompted the [California Department of Food and Agriculture \(CDFA\)](#) to classify EHM as a regulatory rather than a monitored condition. This gave CDFA and other state entities a more prominent role in preventing the spread of the virus through their ability to impose quarantine and movement restrictions.

The CDFA continually monitors for EHM cases. When a horse is suspected, samples are sent to CAHFS—the state’s reference lab—for confirmation. In the case of a horse’s death, CAHFS performs necropsies to confirm the presence of EHV-1.

“CAHFS is here to help keep California’s horses healthy and safe,” Crossley said. “Suspect EHV-1 cases are prioritized for testing and the PCR assay will provide accurate results within a few hours of receiving the sample. The fast turn-around-time and the accuracy of the test, including the ability of detecting very small amounts of virus, allows CDFA to initiate quarantine early for a confirmed case of EHM and to alert other horse owners to increase their biosecurity to protect their horse from contracting this often-deadly disease.”



Recovery from EHM requires significant supportive care.

Healing Burns with Fish Skin

Treating burned wildfire victims is nothing new at the [UC Davis veterinary hospital](#), unfortunately. But the way those animals are treated may take a drastic turn thanks to the ingenuity of Dr. Jamie Peyton. Following the lead of physicians in Brazil who pioneered the procedure on humans, Peyton is using tilapia fish skin as bandages to help heal burns. She has successfully used the technique on five animals to date—three bears, a mountain lion and a horse.



It all started in the fall of 2017 when the [California Department of Fish and Wildlife \(CDFW\)](#) received two bears and a mountain lion after they were burned in Southern California’s Thomas Fire. CDFW’s senior wildlife veterinarian Dr. Deana Clifford reached out to Peyton, chief of the hospital’s [Integrative Medicine Service](#) and a board-certified critical care specialist with extensive experience in pain management. Peyton suggested using sterilized tilapia skin sewn onto surrounding healthy tissue as a “biologic bandage.” The skin contains two types of

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At times, Muir sends mares to the [UC Davis veterinary hospital](#) where they are carefully monitored for the optimal time to inseminate with frozen sperm—even if that is 3:30 in the morning. Most recently, the [Equine Reproduction Service](#) was pivotal in the pregnancies achieved with frozen semen from Great Britain with the stallion Palousa San Sebastian. “Pregnant by FedEx,” Muir calls it.

His horses have established world sales records at auction; earned National Grand Championships in the United States, Canada, Australia and New Zealand; set world records in racing (as well as sire and produce records); earned national titles in jumping and performance; and qualified seven times to represent the United States in World Championship carriage driving competitions in Great Britain, France, Austria, Germany and Hungary.

Perhaps more important than all of the success Muir has had in breeding horses is the impact he’s had on the lives of people with disabilities since 2005 when he founded [Access Adventure](#). From a home base at Rush Ranch on 2,070 acres of open space in Solano County adjacent to Suisun Marsh, Muir structures the program to provide outdoor recreation, open space access, education and equine therapy. The free program is now America’s premier therapeutic driving program, serving hundreds of participants each year.

“We focus on what is possible, not on what we have lost,” said Muir, who has twice driven a team

with a wheelchair accessible carriage across the United States to promote equine sports for people with disabilities. “Our horses are the bridge that compensates for our lost function. Disability does not mean inability.”

Muir acknowledges the pivotal role that the field service team and the staff at the UC Davis veterinary hospital have played in his life with horses over the past half century.

“I am deeply grateful for what they have done in helping me to develop and maintain the unique Stonewall Sporthorse.”

Read more about Access Adventure and the history of Stonewall Sporthorses at [access-adventure.org](#).

▼ Michael Muir drives a sister team of Stonewall Sporthorses along Rush Ranch trails.



◀ Before and after images of the bear cub from the Carr fire taken by our Wildlife Health Resident Dr. Andrew Di Salvo, who has been working with CDFW in Sacramento for his first year of residency.

collagen that promote faster healing, provides steady pressure, keeps out bacteria and lasts longer than synthetic bandages.

Much to the delight of all involved, the experimental treatment worked. The bears were returned to the wild and GPS tracking shows them doing well. The mountain lion cub made a similar recovery but was too young to release into the wild, so he now lives at a wildlife rescue and care center in Sonoma County.

Veterinarians in England heard about the success of using fish skin bandages to aid in healing, and asked Peyton to travel to the UK to help them with a severely burned foal earlier this year. More recently, Peyton and Clifford used the procedure on a cub rescued from the 2018 Carr Fire near Redding. She’s healing well and is expected to make a full recovery to resume living in the wild.



Back on the Track

A leg injury can quickly spell the end of a racehorse's career. But thanks to advances in regenerative medicine pioneered at UC Davis, two California racehorses returned to the track—and ultimately the winner's circle.

In 2016, Irish Streetsinger, a 3-year-old female Thoroughbred, exhibited lameness while training and was brought to the [veterinary hospital](#) for evaluation. Radiographs showed marked sclerosis in both carpal joints and minimal osteoarthritis in her left radiocarpal joint. Nuclear scintigraphy of her forelimbs revealed potential lameness stress points in several areas of her front left leg.

Drs. Larry Galuppo and Mathieu Spriet agreed she was a good candidate for a [PET/CT](#) scan to help pinpoint her injuries. The scan narrowed the injured areas to specific points in her leg to help the veterinarians focus their care and recommend a course of action. Irish Streetsinger's owner chose to enroll her in a clinical trial—offered through the school's [Veterinary Institute for Regenerative Cures \(VIRC\)](#)—evaluating the use of allogeneic or donor stem cells to assist with joint injury.

In December 2016, Irish Streetsinger received injections of allogeneic stem cells and platelet-rich plasma, known to support healing and pain relief in joints. A follow up



Irish Streetsinger (5) returned to racing after receiving stem cell and plasma therapies to treat her carpal and radiocarpal joints.

PET/CT scan at six months showed marked healing of her injuries. Based on this information, Galuppo recommended a return to training in hopes of bringing the equine athlete back to racing. Throughout 2017, she made a gradual improvement and returned to racing in October. By February 2018, Irish Streetsinger ran seven races with one victory at Golden Gate Fields.

Another racehorse to show improvement with stem cell treatment was P Club, a 4-year-old male Thoroughbred. He was not responding

to treatment of rest and shock wave therapy after hitting his front legs together in a race in early 2016. Prior to his injury, he won two races, with two places and one show. Galuppo diagnosed him with superficial digital flexor (SDF) tendonitis.

SDF tendonitis can be a common cause of lameness, with only a fair chance to return to racing with conservative therapy. P Club's owner was eager to try an injection of allogeneic stem cells in the SDF tendon to treat the persistent injury. The Thoroughbred received a series of injections once a month throughout the summer. By 2017, P Club was back on the track with 10 starts, winning one race and placing in another.

Galuppo is currently conducting four clinical trials through VIRC to assess the value of stem cells as a viable therapy to treat the following: tendon and ligament injuries; tendonitis and desmitis; intra-articular lesions; and laminitis. These trials are great examples of research and clinical faculty working together to apply "bench to bedside" translational medicine.

Knights Landing – One Health in Practice

When Dr. Tom Campi ('89) and his wife, Jeanine, visited the [Knights Landing One Health Center](#) in the spring, they were impressed by the dedication of veterinary students and faculty to provide free basic veterinary care to this underserved and mostly agricultural community, just 30 minutes from Davis.

"We saw firsthand that collaboration lies at the heart of the center," Campi said. "Students receive a broader view of the world at large—it's an excellent learning experience. If it were in existence when I was a veterinary student, I surely would have volunteered."

For the past five years, UC Davis veterinary students have made possible a monthly clinic to offer preventive health care for pets of individuals who otherwise wouldn't be able to afford it. In conjunction, students from the [School of Medicine](#) offer a clinic for human patients. Together, the students and their faculty mentors provide wellness services and educational resources that tie in the One Health focus, giving students and the community an understanding of the relationship between animal, human and environmental health.

Campi, a member of the school's Dean's Leadership Council, first learned about the center at a council meeting and was intrigued with its One Health approach and community

New Hope for TMJ Disease

A first-ever tissue implant to safely treat a common jaw defect, temporomandibular (TMJ) joint dysfunction, has been successfully tested in animals by researchers from UC Davis and UC Irvine. This regenerative medicine technique provides hope for 25 percent of adults worldwide—90 percent of them premenopausal women—that experience painful issues due to degeneration in the cartilage disc where the upper and lower jawbones hinge together.

“We hope this will lead to new treatments for humans,” said Dr. Natalia Vapniarsky, a veterinary pathologist at [UC Davis’ School of Veterinary Medicine](#), where the surgery was done. “Most medical management approaches for TMJ disc issues currently aren’t curative but palliative. Patients come back needing further help, but by that time, the disc and joint are destroyed beyond repair, so all that can be offered is a prosthetic. We wanted to explore an earlier, regenerative solution.”

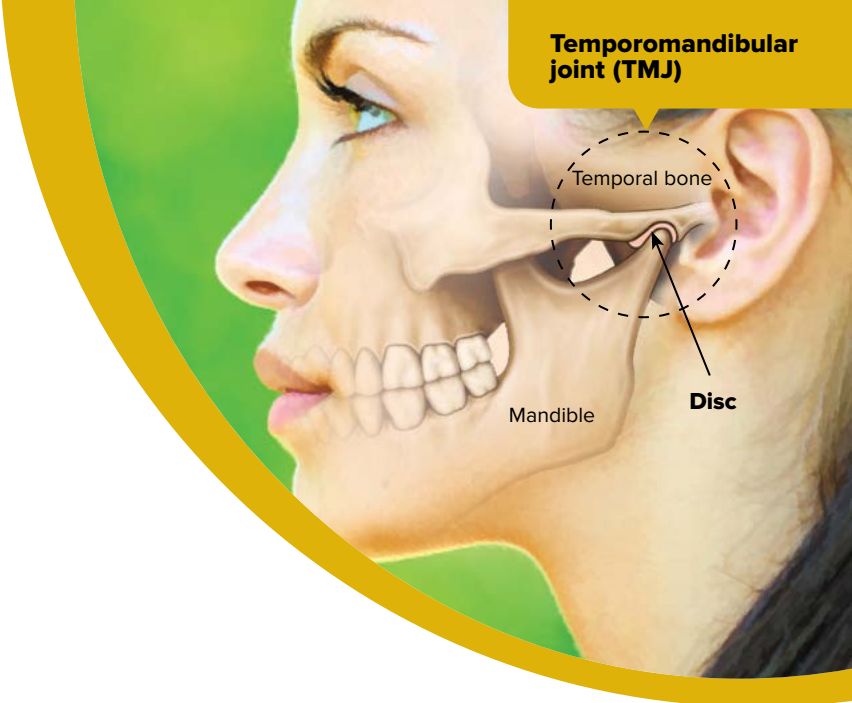
Vapniarsky, who is first author on the study, completed a Ph.D. in the lab of Dr. Kyriacos Athanasiou while he was at UC Davis. Athanasiou, who has been working on the condition for nearly two decades, joined UC Irvine last year after several years at [UC Davis’ Department of Biomedical Engineering](#).

The team, which also included researchers at the University of Texas School of Dentistry at Houston, removed a tiny bit of existing rib tissue, isolated its cartilage cells and utilized them to tissue-engineer jaw disc cartilage via a “self-assembling” process. They then surgically inserted the new cartilage into the faulty hinge

point of the jaw joint of another animal. Two months later, the defects were completely gone.

The experimental work was done in mini pigs because they are omnivorous and have comparable dentition to humans with a similar mechanical loading of the joint components. The next steps will be to ensure long-term effectiveness and safety of the implant in animal studies, leading to clinical trials in humans.

“This is the first time that cogent healing has been shown in the TMJ area and, I dare say, the first time anyone has shown successful biomechanical healing in any joint,” said Athanasiou, senior author on the study published in [Science Translational Medicine](#). “It’s key that we can achieve regeneration of an ailing tissue with our engineered implant, one that’s mechanically suited to withstand stresses. We believe this represents an important first in all joint healing studies.”



outreach. The Campis were inspired to make a gift because of the center’s life-changing work.

“We are most grateful to Dr. and Mrs. Campi for their gift,” said Dr. Paulina Zielinska Crook, director of the [Office for Global Programs](#) and mentor for the Knights Landing center. “Because of their generosity, we can continue helping the community by providing important healthcare services for their pets. Our students are greatly appreciative and excited about the new developments their gift will bring.”

If you’d like to partner with our students in this community outreach, please contact our [Advancement](#) team at 530-752-7024.



UC Davis veterinary and medical students, Jeanine Campi and Dr. Tom Campi (top center back) and mentors, Dr. Jonathan Dear (top far left) and Dr. Paulina Zielinska Crook (top far right) at the Knights Landing One Health Center.

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Calendar

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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/

One Health Symposium

November 3 • UC Davis

33rd Annual Charles Heumphreus Memorial Lecture

February 9 • UC Davis

Winter Conference

February 9-10 • UC Davis

Wildlife and Exotic Animal Symposium

March 9-10 • UC Davis

Feline Medicine/Orphan Kitten Management

April 27 • UC Davis

Veterinary Center for Clinical Trials

The 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:

- Lung tumors in dogs
- Myxomatous mitral valve disease in dogs
- Primary glaucoma in American cocker spaniels
- Chronic gingivostomatitis in cats
- Diabetes in cats
- Acute kidney injury in horses
- Bilateral corneal stromal loss in Friesian horses

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



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