SPRING 2017

On Call

A MAGAZINE FOR FRIENDS OF THE UNIVERSITY OF WISCONSIN SCHOOL OF VETERINARY MEDICINE

Elsa's New Leg

Great Dane's complex limb surgery benefits from 3D printing

Officer's Best Friend

How UW Veterinary Care is helping animals who serve

Fighting Influenza

SVM research team's new technology bolsters vaccine production

School of Veterinary Medicine
UNIVERSITY OF WISCONSIN-MADISON

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YOU CAN BE A HERO

Every day at the UW School of Veterinary Medicine, we work to improve the lives of animals and people all over the world...

ACADEMIC EXCELLENCE

We consistently rank in the Top 5 among all schools of veterinary medicine in the nation.

RESEARCH LEADERS

Our scientists conduct 75% of the infectious disease research at UW-Madison (Ebola, Zika, influenza, etc.).

SPECIALTY AREAS

We opened our teaching hospital with 10 specialties. Today we accommodate more than 20 in the same space.

But we have reached a point where time is no longer the most critical factor in helping us find a cure or save a life...

LEARNING SPACE SHORTAGE

Our students do hospital rounds while crowded in hallways and lack small group collaboration areas.

GRANTS AT RISK

New research dollars have doubled in the last four years, but we've run out of room to work on critical projects.

OVER CAPACITY

Built to see 12,000 patient visits yearly, our hospital now sees more than 26,500, leading to longer wait times.

Space is the key.

We need heroes like you to help us build it.

AnimalsNeedHeroesToo.com

On Call

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Features

For the Dogs in Blue

UW Veterinary Care has entered into agreements with dozens of Wisconsin law enforcement agencies to give police dogs the best veterinary medical services possible at discounted rates, which helps relieve a major burden on budget-crunched K9 units.

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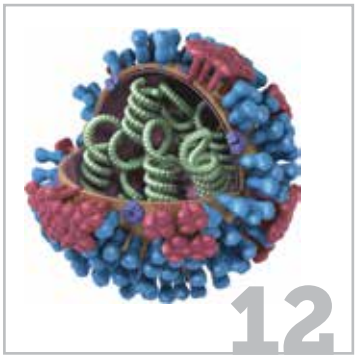

Virus Backbone

A team of SVM researchers has developed a new technology that could make the production of influenza B vaccines faster and more efficient.

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A New Dimension

With the help of 3D printing capabilities, the SVM's orthopaedic surgeons can plan and practice complex surgeries and greatly improve the chance of success.

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More

On the Cover

Elsa, a blue Great Dane, had a major limb deformity surgically repaired thanks to 3D printing capabilities at UW Veterinary Care. (Photo: Nik Hawkins)

School of Veterinary Medicine
UNIVERSITY OF WISCONSIN–MADISON

The SVM's Reach: Global, National, Regional, Local

BRYCE RICHTER

Mark D. Markel

Whether we are looking for new ways to fight infectious disease around the globe, providing veterinary medical treatment for our state's police dogs at reduced rates, or improving and expanding our infrastructure for serving the pets of Dane County's homeless population, the UW School of Veterinary Medicine (SVM) consistently demonstrates its extensive reach and impact on many levels.

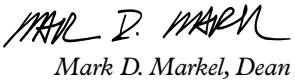
In this issue of *On Call*, we highlight how a team of researchers led by Yoshihiro Kawaoka, a professor of virology in our Department of Pathobiological Sciences, has developed technology that could improve the production of vaccines that protect people from influenza B. This novel method allows producers to grow vaccine viruses in high-yield mammalian cell culture as an alternative to current technology, which utilizes embryonated eggs. The goal is to speed up production and create more effective vaccines.

Another sign of the school's success is the receipt of a nearly $10 million grant from the Centers for Disease Control and Prevention. This major award was given to Lyric Bartholomay, an associate professor in the Department of Pathobiological Sciences who, in cooperation with Professor Susan Paskewitz in the UW College of Agricultural and Life Sciences, will establish the Upper Midwestern Center of Excellence in Vector-borne Disease on the University of Wisconsin-Madison campus. This regional collaboration of universities and public health agencies will work to improve the management, surveillance, prevention, and study of mosquito- and tick-borne diseases, including Zika, West Nile, and Lyme disease.

These efforts are global and regional, but our impact can be felt closer to home as well. For example, UW Veterinary Care, with assistance from the SVM's discretionary fund, has agreed to provide discounted veterinary medical services for police dogs around the state. These public servants deserve the very best care possible, and we are committed to assisting in any way we can to maintain their health.

Also, we have recently committed to expanding our WisCARES program, an outreach partnership that provides basic veterinary medical care, housing support, advocacy, and other support services to Dane County pet owners who are currently experiencing or are at risk of homelessness. We will be leasing new space to provide improved services to these at-risk people and their pets as well as more training opportunities for our students. Additional details will be available this spring.

These are just some examples of what we're doing to make our world, our country, our region, and our county better places. And on a hyperlocal level, we are working hard to make our building a better place for our students. I encourage you to read our forthcoming summer issue of *On Call* where we will give you an inside look at our new Renk Student Learning Center. When you have an opportunity, please stop in for a visit to see for yourself this amazing space dedicated to the education and support of our students.



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On Call SPRING 2017

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Ask a UW Veterinarian

Anesthesia for the Aged

*This issue's response comes from **Christopher Snyder**, clinical associate professor and board-certified specialist in veterinary medical dentistry and oral surgery, and **Lindsey Snyder**, clinical instructor, board-certified specialist in veterinary medical anesthesia and pain management, and certified acupuncturist.*

Question: I keep getting reminders from my vet to have my pug's teeth cleaned. However, my breeder said not to put a pug under unless it is absolutely required. My pug is going to turn 9 this year. As a more senior pug, is she at higher risk [for a bad reaction to anesthesia]? I brush her teeth a couple times a week, but she still has plaque. Her teeth were last professionally cleaned two years ago. I want to provide her the best life that I can, but I'm confused.

–Anna Vembu, Madison, Wis.

Answer: As pets age, they may develop chronic conditions that could increase anesthetic risk; and the better their overall health, the less their risk becomes. But with proper care — the right medication and dosage for the animal, as well as care from a board-certified veterinary anesthesiologist — patients of any age can be anesthetized safely.

You should feel confident in your primary veterinarian's assessment of your dog's mouth and oral disease state. Your answers to their questions about changes in chewing and play habits, preference for soft versus dry food, and symptoms such as nasal discharge can help them determine if dental disease is a concern.

Veterinarians can also help clients more fully understand the potential benefits of a dental cleaning that involves anesthesia. For example, giving a short course of appropriate antibiotics or pain medication to a pet may mask symptoms of oral pain, and he or she may start to be more social and active and return to playing with toys or eating treats previously avoided. But if prior behavior and symptoms return after the medication stops, it may be a sign of dental disease. While not a foolproof test, this may help clients realize the potential benefit of a cleaning, which they can weigh against the potential risks of the procedure.

Overall, work with your veterinarian to decide what is best for your pet and your family, and seek advanced expertise when appropriate. The involvement of a board-certified veterinary dentist or anesthesiologist can improve the chances for a successful outcome.

Questions

Have a question for our veterinary medical experts?
Please send it to Nik Hawkins, *On Call* editor, at **oncall@vetmed.wisc.edu**.
We cannot guarantee responses to all submissions. For any urgent pet health issue, please contact your veterinarian directly.

Socializing with the SVM

Friends of the school sharing their thoughts (and pets) on social media...

"Cricket at @uwvetmed "Is being nervous a thing? I like it here." Great visit today, thanks vet school!"

–Maureen Purcell (@mopurc)
Via SVM Twitter (@uwvetmed)

"Hocus in the back window on a much warmer day. He arrived here after having performed for a bunch of years in a Chicago-area magic act. He and two of his fellow avian residents are headed to Madison next week for a wellness exam at University of Wisconsin School of Veterinary Medicine."

–John P Jankowski
Via SVM Facebook (@uwvetmed)

CDC Awards $10 Million for Insect-Borne Disease Center at UW


Lyric Bartholomay

The Centers for Disease Control and Prevention (CDC) has awarded $10 million to a consortium of Midwestern universities to establish a new research and training program to stem the spread of disease carried by vectors like ticks and mosquitoes, and a faculty member from the UW School of Veterinary Medicine (SVM) will be at its helm.

The Upper Midwestern Center of Excellence in Vector-Borne Diseases, which will be led by University of Wisconsin–Madison medical entomologists **Lyric Bartholomay PhD'04** and Susan Paskewitz, is aimed at elevating the understanding of vector-borne diseases and improving public health response to diseases like Zika, West Nile, and Lyme disease.

Part of a larger push by the CDC to buttress the nation's public health infrastructure to thwart vector-borne diseases, the new center will involve scientists — public health entomologists, epidemiologists, virologists, and vector control experts — from UW–Madison, the University of Illinois, the University of Iowa, the University of Michigan, and the Minnesota Department of Health.

A key objective of the new center, says Bartholomay, an associate professor of pathobiological sciences at the SVM, is to foster collaboration not only among university experts but also with public health organizations at the local, state, and federal levels. The goal, she explains, is to boost surveillance, prevention, and response against the backdrop of a trend toward the emergence of new diseases and old diseases — like Zika and West Nile — in regions far from their places of origin.

The Midwest, according to Paskewitz and Bartholomay, is a "national hotspot for disease emergence and endemic transmission of vector-borne disease."

"There is a trend toward new emerging disease," says Paskewitz, who chairs UW–Madison's entomology department. "We're seeing invasions of new species and pathogens. It is these new things moving around."

For example, not only are new tick species such as the lone star tick showing up in places where they didn't live before, like Wisconsin, they are also carrying a wider variety of disease. When Paskewitz joined the UW–Madison faculty in 1991, Lyme disease was the only known tick-borne disease endemic to Wisconsin. Today, she says there are at least half a dozen diseases that can be transmitted by the blood-sucking arachnids found in the Badger State.

There are likely a number of reasons why new vector-borne diseases are on the rise in the Midwest. Changes to the landscape such as deforestation and urbanization, shifts in animal populations such as white-tailed deer, and changes in climate all are likely contributors, according to the Wisconsin scientists. Another possibility, says Paskewitz, is that scientists are simply getting better at finding new invasive species of mosquitoes and ticks as well as their bacterial and viral pathogens.

The new CDC-supported center will have three primary objectives:

- Grow the cadre of public health entomologists through increased opportunities for graduate training in the field and a new certificate program that will equip students to better identify vectors, conduct disease surveillance, and use the appropriate tools to reduce insect populations.
- Create a network of scientists, mosquito control experts, and public health officials at the local and state levels to better coordinate and facilitate surveillance and response to outbreaks of disease.
- Conduct research to improve and devise new methods to predict disease emergence and outbreaks and optimize surveillance networks and pathogen detection. Research will also focus on evaluating and improving methods for controlling disease vectors like mosquitoes and ticks, with the ultimate goal of reducing human risk and exposure.

"Our vision is to provide training at all levels, including the undergraduate, graduate, and professional levels," says Bartholomay. "We hope we can provide a conduit of really well-trained people who will be positioned to respond to outbreaks."

Terry Devitt


SUSAN PASKEWITZ

UW–Madison graduate student Xia Lee hunts for ticks.


ASPCA

Shelter cats at a quarantine facility in Queens, New York. The UW Shelter Medicine Program and Wisconsin Veterinary Diagnostic Laboratory helped identify the strain involved in an influenza outbreak among cats in a Manhattan animal shelter and helped manage the situation.

Shelter Medicine Program, WVDL Assist with Influenza Outbreak among Cats at NYC Shelter

In the closing weeks of 2016, staff from the Shelter Medicine Program at the UW School of Veterinary Medicine (SVM) and the Wisconsin Veterinary Diagnostic Laboratory (WVDL) teamed up to identify a rare strain of influenza infecting cats in a New York City animal shelter. They also helped local agencies manage the outbreak over the course of several months, an effort that saved hundreds of feline lives.

The first cases of influenza at New York City's Manhattan Animal Care Center (ACC-Manhattan) were reported in late November 2016 following tests by a private company, IDEXX Reference Laboratories. The shelter then approached **Sandra Newbury DVM'03**, clinical assistant professor and director of the UW Shelter Medicine Program, for more assistance given her team's experience in managing outbreaks of canine influenza that recently affected dogs and cats in the Midwest.

After assessing the ACC-Manhattan case, Newbury quickly ascertained that canine influenza was not the likely culprit. For verification, she approached **Kathy Toohey-Kurth**, virology section head at the WVDL. Her team conducted further testing and found additional positive samples. They also identified the influenza A strain involved as a rare subtype called low pathogenic avian influenza H7N2. This finding was verified by the U.S. Department of Agriculture's National Veterinary Services Laboratories.

"This is the first time H7N2 has been detected and transmitted among domestic cats," says Toohey-Kurth, who is also a clinical professor at the SVM.

Meanwhile, Newbury and her staff worked closely with ACC-Manhattan, the New York City Health Department, the American Society for the Prevention of Cruelty to Animals (ASPCA), and volunteers from several other agencies to manage the situation. This included establishing a quarantine facility for about 500 cats in Queens while the Manhattan center, as well as centers in Brooklyn and Staten Island, were disinfected. They also joined other volunteers in providing veterinary medical care for infected cats and assisted with the implementation of strict protocols to keep animals and responders safe. The sheltering and quarantine operation was made possible by funding from the ASPCA and Maddie's Fund.

The WVDL continued conducting tests to verify that cats were fully recovered, no longer contagious, and ready for adoption. Normal cat adoption services at all ACC facilities resumed in late February 2017.

"Thanks to this combined effort, we were able to save these cats and give them a chance to find permanent homes," says Newbury.

Commonly known as bird flu, avian influenza viruses like H7N2 can sometimes mutate and transfer to mammals, such as cats. Cats that contracted the strain in the New York City shelter displayed upper respiratory symptoms such as runny nose, congestion, persistent cough, and lip smacking. In the majority of cases, the illness was not severe, but a small number developed complications like pneumonia and had to be euthanized. No other animal species at the shelter have tested positive for H7N2.

The strain poses low risk to humans. There has been only one cat-to-human transmission associated with the outbreak, and there have been no cases of human-to-human transmission.

Nik Hawkins

Family Gift Leverages Match for $100,000 Impact on Building Project

In the Brager family, it is a long-held tradition to love and cherish animals. **Walter** and **Lois Brager** are no exceptions, and they preserved this heritage through the deep bond they shared with their Toy Poodle, **Abby**.

"The family joke is that my parents have a very large painting of Abby above their bed and only a small, five-by-seven picture of their three kids on a nightstand," says their son, **Jim Brager**. "So you know the importance of Abby in the family pecking order."

The family fondness for animals continues today with the newest generation, especially in Jim Brager's daughter, **Laura Bloomquist DVM'11**, whose passion guided her to a career in veterinary medicine. She now works as a veterinarian at St. Michael Veterinary Clinic in Minnesota.

During her training as a student at the UW School of Veterinary Medicine (SVM), Bloomquist witnessed first-hand the difference that the school can make in the lives of animals. So when Abby began to show signs of congestive heart failure, Bloomquist recommended that her grandparents take her to see the cardiology specialists at UW Veterinary Care (UWVC). Under their expert guidance, the Bragers were able to manage Abby's condition and extend her life while keeping her comfortable and happy.

"They gave my grandparents a lot of extra quality time with her," says Bloomquist.

UWVC had handed the Bragers a precious gift, and the family found a special way to say "thank you" through the CLM Park Foundation. Stemming from a foundation originally established by Lois Brager's aunt, Marion Park Deaver, and her husband, Harry Gilbert Deaver, the CLM Park Foundation's board meets each year to determine the charities it will support. The board membership includes Lois Brager as well as Jim Brager and his two siblings. Bloomquist and eight other grandchildren also help identify and select worthwhile causes for the foundation.

COURTESY JIM BRAGER

Toy Poodle Abby's positive experience with UW Veterinary Care inspired a $50,000 family gift, which became a $100,000 donation to the UW School of Veterinary Medicine's building expansion thanks to the BerbeeWalsh matching gift.

"My parents were very pleased with the care and attention that little Abby received," says Jim Brager. "When we had our annual meeting to discuss possible recipients for donations, we thought that the UW School of Veterinary Medicine would be a perfect choice."

Walter Brager passed away in 2015, so for Bloomquist, the gift was a tremendous way to honor her grandfather, celebrate her grandparents' connection to the SVM through Abby, and support her alma mater all at once.

"I thought it was a wonderful idea," she says. "I know that the teaching hospital can always use money for equipment and supplies. And I had a great experience at the school. The professors and clinicians were excellent, and some of my best friends today were my classmates. It was tough work, but definitely worth it. I'm just glad they gave me the opportunity to do what I've always dreamed of doing."

When Bloomquist approached the SVM about a gift, she and her family learned about a new matching opportunity, one that could turn their generosity into an even larger boon for the school's ongoing campaign for a building expansion. Themed Animals Need Heroes Too, the campaign aims to greatly expand the footprint of the crowded hospital, which sees more than 26,000 patient visits per year in a facility built to accommodate 12,000. This includes greater space for emergency and critical care, isolation areas, imaging and diagnostics, and dedicated teaching and learning spaces. The expansion also makes room for more basic and high-security infectious disease labs focused on global threats like Zika and dengue, among other major improvements.

To support this effort, UW–Madison alumni **Karen Walsh** and **Jim Berbee** pledged $3 million to match gifts of $25,000 or more toward the building campaign. The Bragers jumped at the opportunity, and a $50,000 gift from their foundation quickly turned into $100,000.

"We are very honored to participate in the building expansion, and we thank Jim Berbee and Karen Walsh for their match," says Jim Brager. "My aunt and uncle felt very strongly about the advancement of education, so this donation dovetails well with the founding principles of their foundation. We look forward to watching the new addition progress."

Nik Hawkins

Double Your Gift

Learn more about the BerbeeWalsh Match

Visit
AnimalsNeedHeroesToo.com

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608-294-7661
pat.bowdish@supportuw.org

Heidi Kramer, Director of Development
608-327-9136
heidi.kramer@supportuw.org

NIK HAWKINS

Harlow, a K9 with the Jefferson County Sheriff's Office, waits patiently during a follow-up examination at UW Veterinary Care.

FOR THE Dogs in Blue

The SVM helps Wisconsin's law enforcement agencies through discounted services for K9s

Story and photos by Nik Hawkins

NIK HAWKINS(2)

Resident Allison Leuin checks Harlow's joints while Sarah Ranallo DVMx'17 keeps him from wandering.

If you ask Deputy Jason Behm about his partner, Harlow, he'll tell you without hesitation that he's the perfect K9.

"He's the ideal blend of personality and — when it comes to work — intensity," says Behm, a 16-year veteran of the Jefferson County Sheriff's Office.

Off duty or on, the 5-year-old Belgian Malinois-German Shepherd mix is an affection hound. When **Harlow** trots into a room, he makes the rounds, imploring everyone with his eyes for a scratch or a rub. And if that fails, he uses his muzzle, his tongue, his paws, and so on. It's clear he thrives on interactions with people, and he returns the favor by making a difference in peoples' lives through his work.

A prime example — last year, Behm and Harlow were dispatched to a missing person case, where a dog's nose becomes invaluable. Harlow performed admirably, leading the search party through a forested county park where, sadly, they found a deceased individual. Despite a somber outcome, the bereaved family of the missing person was so grateful for Harlow's help that they mailed a thank you letter to the sheriff's office shortly after the incident. That Christmas, they sent a donation to the K9 unit.

Like so many police dogs, Harlow's contributions are remarkable. But in late 2016, his career was in danger of ending early. Harlow began experiencing severe stiffness in his joints as well as extreme lethargy. After initial treatments at his primary care clinic were not entirely effective, he was referred to the Small Animal Internal Medicine Service at UW Veterinary Care (UWVC).

Following an ultrasound, X-rays, and a series of blood and fluid tests by the clinical pathology team, clinical instructor **Hattie Bortnowski** and resident **Allison Leuin** confirmed that effusion (swelling) in multiple joints was causing his symptoms. More specifically, analysis of fluid samples from Harlow's joints made them suspect immune-mediated polyarthropathy, a condition in which a dog's immune system triggers an antibody response that causes arthritis in more than one joint. Fortunately, the treatment they prescribed, a course of a common steroid called prednisone, has worked well to reduce the swelling.

"It helped us save his career," says Behm. "He's bounced back to a point where he seems better than he was as a puppy."

In seeking help for Harlow, the Jefferson County Sheriff's Office benefited from a new effort at the UW School of Veterinary Medicine (SVM) to make care even more accessible to K9 units in Wisconsin.

"In the past, students, employees, and friends of the school have banded together to raise funds for protective vests for K9s," says **Ruthanne Chun DVM'91**, associate dean for clinical affairs and director of UWVC. "But, to really recognize the crucial role police dogs play in law enforcement, we wanted to be a more intentional sponsor for them, and in a formal way."

To that end, in late summer 2016, UWVC sent letters to nearly 130 law enforcement agencies throughout the state. Those in Dane County, UWVC's primary service area, were offered $5,000 in credit for services at regular rates and a 50% dis-

count on any service beyond that for each calendar year. Agencies outside of Dane County were offered a 50% discount.

UWVC has built the credited services into its budget, and the SVM covers all discounted costs using its unrestricted gift funds. As of February 2017, 45 agencies have taken advantage of the offer by signing agreements with UWVC.

"It's a tremendous help," says Behm, whose K9 unit has three dogs. "Without it, a more complicated health issue could break our budget."

For the Madison Police Department (MPD), which raises funds for its eight-dog unit through a non-profit organization called Capital K9s, the discounted services go a long way. In addition to veterinary medical care and training for their dogs, the unit has to fundraise for specially outfitted squad cars, computers, and other capital expenses. Any money they can save at the animal hospital can be redirected to these other areas.

"In this environment, where money is so tight, every penny matters," says Sgt. **Jeff Felt**, who supervises the MPD's K9 Unit. "From the standpoint of the care the dogs receive, which is first priority, and from an expense standpoint, it's been absolutely beneficial."

Other local veterinary medical clinics have also provided discounted services for the MPD, and several vendors have donated food as well. Without their generosity, and that of the SVM, the K9 Unit would not exist, Felt says. But the true beneficiaries are the communities the dogs serve.

K9s take part in a wide range of police duties. They are perhaps best known for tracking and locating armed suspects and missing persons. But they also prevent potential confrontations with suspects by barking warnings to officers or simply by encouraging a surrender through their intimidating presence.

Police dogs also help law enforcement agencies engage in better ways with their communities. Felt and the MPD K9 Unit give more than 100 public demonstrations each year, and nothing reaches people who may be skeptical or untrusting quite like a friendly nuzzle or a palm lick from a dog.

"These are challenging times for law enforcement," says Felt. "It's amazing how the dogs have the ability to break down barriers. It's quite powerful to make that connection."

A large portion of the work done by K9s is conducted behind the scenes. For example, prior to major events like concerts, athletic competitions, and visits from dignitaries, specially trained police dogs and their handlers sweep through venues, looking for bombs and other dangers.

"They make our jobs safer," says Felt. "But more importantly, they truly help us keep the community as safe as possible."

More SVM Support for K9s

The UW School of Veterinary Medicine (SVM) has found other ways to support local K9 units beyond credited and discounted services at UW Veterinary Care.

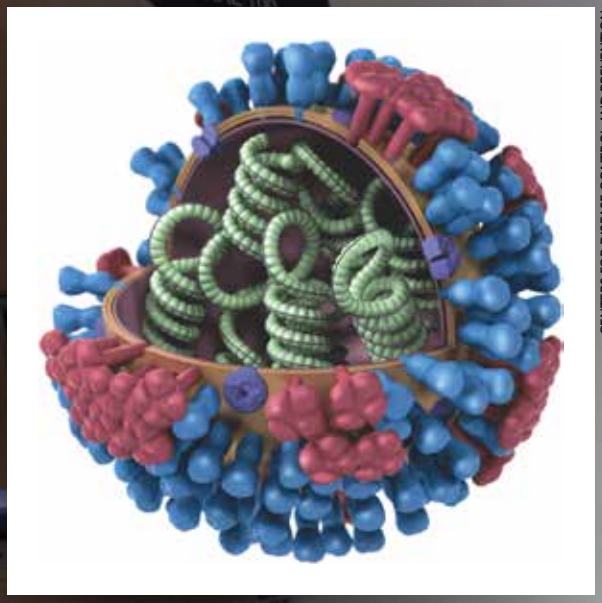
For example, police dogs suffer stab or gunshot wounds in the line of duty each year, but many law enforcement agencies do not have the additional funds necessary to purchase canine body armor. In recent years, students, staff, faculty, and friends of the SVM have pooled together donations to fund protective vests for five different police dogs from the Adams County Sheriff's Office, Madison Police Department, and the University of Wisconsin–Madison Police Department.

This effort helps keep K9s out of harm's way, but injuries are inevitable in a line of work as dangerous as law enforcement. So knowing how to perform basic first aid on a dog in the field could be a critical, life-saving skill for police officers and emergency medical technicians.

Recognizing this, the Dane County Sheriff's Department reached out to the SVM for veterinary medical training for their deputies and medics. In February 2017, **Jonathan Bach**, clinical associate professor of emergency and critical care, volunteered his time to demonstrate basic first aid as well as triage techniques.

He walked deputies through the fundamentals of injury assessment and treatment, such as checking vital signs, recognizing bloating and heat stroke, and responding to more serious trauma, such as tourniquet application. For medics, Bach discussed airway management, administration of intravenous access (IV), chest compression techniques, the use of splints and backboards to secure long bone fractures, and wound treatment. He also covered ways to prevent heat exhaustion, proper dosages of anesthetics, and how to use Narcan to combat an overdose in the event a drug-sniffing dog is exposed to an opioid.

K9 Odin, sporting his new vest, and his handler, Sgt. Brent Plisch, pose during a visit to the UW School of Veterinary Medicine. Students, staff, faculty, and friends of the school raised funds to purchase Odin's protective vest.



CENTERS FOR DISEASE CONTROL AND PREVENTION

Illustration showing the different features of an influenza virus, including the surface proteins hemagglutinin (blue), which bind to receptors on the surface of human respiratory tract cells, and neura-minidase (red), which play a role in virus replication.

By Kelly April Tyrrell Photos by Jeff Miller

VIRUS 'BACKB

SVM TEAM DEVISES NEW, MORE EFFECTIVE STRATEGY FOR PRODUCING FLU VACCINES

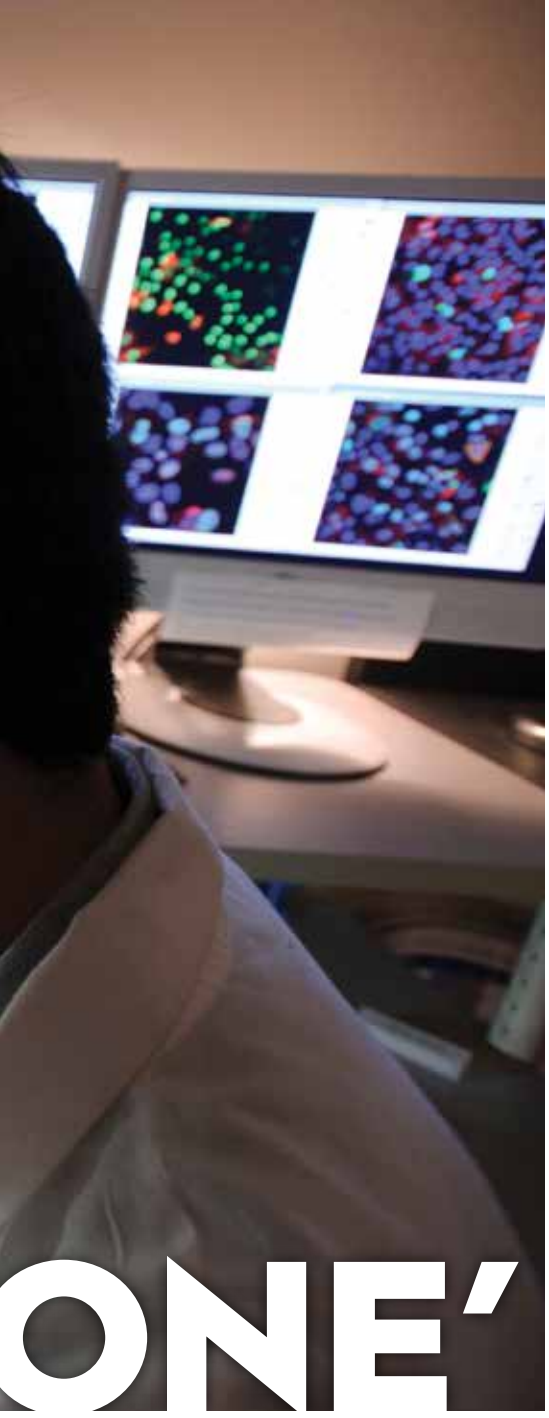
Yoshihiro Kawaoka

A team of researchers led by **Yoshihiro Kawaoka,** professor of pathobiological sciences at the UW School of Veterinary Medicine, has developed technology that could improve the production of vaccines that protect people from influenza B.

That technology is an influenza B vaccine virus "backbone" that would allow producers to grow vaccine viruses at high yield in mammalian cell culture rather than in eggs. Using the backbone as a template to add vaccine-virus-specific components, it would offer protection against both lineages of influenza B that circulate in the human population.

"We want to provide a system that produces influenza vaccines that are more efficacious," says Kawaoka. "It is better to produce influenza viruses for vaccine production in cells instead of eggs, but the problem is that influenza virus does not grow well in cell culture compared with embryonated eggs."

The new technology may overcome that challenge. The team published its results in early December 2016 in the *Proceedings of the National Academy of Sciences*.



JEFF MILLER (2)

ONE'

Each year, the U.S. Food and Drug Administration, in collaboration with the Centers for Disease Control and Prevention (CDC) and the World Health Organization, decides which strains of influenza virus to include in the seasonal flu vaccine. It typically includes two influenza A strains and two influenza B strains.

Growing vaccine viruses in high-yield cell culture should improve the ability of seasonal vaccines to protect against influenza A and B because vaccine viruses grown in mammalian cell culture are less likely to mutate compared to those grown in eggs. Mutations can lead to vaccine viruses that no longer match the intended strains of influenza.

"It may still not be perfect, but it will at least be substantially better than current vaccines," says Kawaoka, who notes no one else has successfully tried to produce high-yield influenza B vaccine virus before now. Last year, his research team created a high-yield influenza A vaccine virus candidate for cell culture production.

Per the CDC, growing vaccine viruses in high-yield cell culture may also enable faster and potentially greater production of vaccine. This could improve the ability of health officials to respond during an influenza pandemic.

To develop the influenza B vaccine virus backbone, Kawaoka's team screened influenza B viruses for random genetic mutations that led to improved replication.

Using these mutants as templates, the researchers attached the genes that code for the surface proteins that trigger the human immune response (and thus offer protection in vaccinated individuals) — HA (hemagglutinin) and NA (neuraminidase). They selected the combinations of backbone mutations that supported better growth in cell culture, identifying two candidate backbones that led to higher amounts of vaccine virus.

The team identified the characteristics of each backbone that contributed to their improved yield and also found the backbones to be genetically stable. However, Kawaoka points out that more testing is required to discern whether they would increase vaccine virus yield under industrial conditions.

Several companies and federal agencies have already contacted him about the influenza A and influenza B backbones, Kawaoka says, and he is hopeful the systems can be adopted by vaccine manufacturers and grown in cell culture facilities already available in the United States and Japan.

Kawaoka's goal is to help develop more effective vaccines to protect people from influenza infection. According to the CDC, influenza sickens millions, hospitalizes hundreds of thousands, and kills tens of thousands of people each year in the U.S.

"This is something we have to do," Kawaoka says.

> ...high-yield cell culture may also enable faster and potentially greater production of vaccine. This could improve the ability of health officials to respond during an influenza pandemic.

Kawaoka credits the Wisconsin Alumni Research Foundation for the support to complete this work. "Without that, we couldn't get it going," he says.

In addition to WARF, the current study was funded by the National Institute of Allergy and Infectious Diseases, Center for Research on Influenza Pathogenesis; Scientific Research on Innovative Areas from the Ministry of Education, Culture, Sports, Science, and Technology of Japan; the Strategic Basic Research Program of the Japan Science and Technology Agency; and the Leading Advanced Projects for Medical Innovation from the Japan Agency for Medical Research and Development.

Feature photo: A researcher uses a fluorescence microscope to analyze cells in a laboratory at the Influenza Research Institute at the University of Wisconsin–Madison. In the background, a computer monitor displays cellular imagery.

UW Veterinary Care's 3D printer in the process of rendering a canine limb model made from a plastic polymer.

NIK HAWKINS

A NEW DIMENSION

By Nik Hawkins

3D printing gives orthopaedic surgery at UW Veterinary Care a leg up

The Gremers and Great Danes have gone hand-in-paw for almost a generation.

The first time **Carrie Gremer's** family brought home a member of this tall, regal breed, she was in middle school. Years later, when she was dating her now-husband, **Steve Gremer**, that dog made such an impression on him that he gave a Great Dane to his parents as a gift. Eventually, the Gremers found themselves with two of their own "gentle giants" — first Frasier and then Edison.

For two years, the dogs were great buddies; but age took its toll on Frasier, and he passed away after a bout of major health issues. A year and a half later, with the grief of Frasier's passing less keen, the Gremers visited a breeder, and they came home with a sweet, silly, slightly nervous Great Dane puppy named **Elsa**. She and Edison became fast friends.

"It was amazing how happy Edison was when we brought Elsa home," says Carrie Gremer. "He literally had a smile on his face. They get along incredibly well."

The Gremers were looking forward to some healthy puppy years with Elsa. But when she was around five months old, it became clear she would need special care. Her left front forelimb showed signs of abnormal growth that made it difficult for her to walk. The Gremers soon learned from a veterinarian that one of her growth plates had closed prematurely. To keep the deformity from getting worse while Elsa grew, a veterinary surgeon in Chicago removed a segment of her ulna, the thinner and longer of the two forelimb bones.

Suspecting that Elsa would need a second, more complicated procedure, the surgeon referred her to the Small Animal Orthopaedic Surgery Service at UW Veterinary Care (UWVC). The orthopaedics team decided to monitor Elsa's growth for a couple of months and then follow up with more diagnostic imaging and physical examinations of her limbs.

"Her bones continued to grow in length, and the deformity was not getting any worse," says **Jason Bleedorn MS'15**, clinical assistant professor of orthopaedic surgery. "So we opted to wait until Elsa was closer to full growth — one year for a Great Dane — before proceeding with a definitive surgical correction."

Bleedorn anticipated a highly complex procedure, one that would benefit from advanced planning and practice. He turned to UWVC's in-house 3D printing machine for help. This cutting-edge technology lets surgeons convert diagnostic imaging scans, like computed tomography (CT) and magnetic resonance imaging (MRI), into three dimensional models composed of a plastic polymer. The highly accurate models have numerous advantages. For

CARRIE GREMER

Elsa at home, recovering in her cast. "When it was time to pick Elsa up after surgery, Dr. (Rebecca) Csomos and the veterinary technicians had decorated her leg wrap with hearts," says Carrie Gremer. "Dr. Csomos gave our daughter some extra wrap to add more decorations at home."

example, they allow surgery teams to make better assessments of complex bone deformities and injuries. They also give surgeons the chance to take a practice run through difficult procedures.

"I typically print at least two copies of a limb," says Bleedorn. "This allows me to have one unaltered model and one model that I use for a surgical rehearsal. I bring them both into the operating room during surgery so I know what the optimal repair should look like when we're done."

UWVC first acquired its 3D printing machine more than a year ago with a grant from the UW School of Veterinary Medicine's Companion Animal Fund. But some of its surgeons have been using the technology for more than three years through a partnership with the UW College of Engineering. Besides limb deformities like Elsa's, 3D printing is used at UWVC for complex fractures, limb salvage procedures, orthopaedic research, and teaching. Bleedorn has recently printed a spine model for a neurology case and skull models for dentistry and ophthalmology cases.

In Elsa's situation, the technology worked extremely well. Bleedorn and his team, which included surgery residents **Rebecca Csomos** and **Ben Yarnall**, performed a surgical rehearsal using a bone model of Elsa's forelimb. Taking advantage of 3D printing in yet another way, they used the model to pre-contour a specially ordered plate that they could use to correct the angulation and torsion of Elsa's bones.

"All of this allowed us to make any final adjustments to her surgical plan prior to the real deal," says Bleedorn. "Pre-contouring the bone plate also cut down on the duration of the procedure."

The procedure itself lasted six hours. The surgery team first used a small arthroscope to address a mismatch in the surfaces of Elsa's radius and ulna where they meet at the elbow joint. Next, they cut a wedge from both bones and turned them to eliminate their improper rotation, one of the characteristics of her limb deformity. Finally, they used the pre-prepared plate to fix the two pieces of Elsa's radius together. After a short stay in the hospital, Elsa went home in a splint for her recovery. She continued to show excellent progress in weight-bearing at every re-check and at each appointment in UWVC's rehabilitation clinic with physical therapist **Courtney Arnoldy**. In the end, her leg bones healed in the new position.

Elsa will likely never have a completely normal range of motion in her affected limb, which will also be prone to develop arthritis down the road. But the Gremers have noticed a major difference in her quality of life.

"Her care and treatment at UWVC have made a tremendous and positive impact on the way she can walk, run, and play, and her leg is now straight," says Carrie Gremer. "Watching Elsa finally play in the yard with Edison, and being able to enjoy walks and outings, makes all that we've gone through worth it. We felt the team went above and beyond for our family."


JASON BLEEDORN

3D PRINTING AVAILABLE TO VETERINARIANS

UW Veterinary Care can print 3D models of limbs, spines, and skulls for use by off-campus individuals in clinical cases and research.

"For a simple limb like Elsa's, it probably takes me one to two hours to do the segmentation to make the 3D software model and set it up on the printer," says Jason Bleedorn, clinical assistant professor of orthopaedic surgery. "The actual print time is anywhere from 10 to 40 hours. This varies based on the size of the model and the quality of the print. We have printed entire limbs, spines, skulls, and radiation therapy models for clinical cases and research."

The material used in the production of 3D models is inexpensive, but the machine, maintenance, and software are very costly. For example, the site license for 3D planning software, which is shared by 10 campus researchers, costs $10,000 per year.

Requirements

CT or MRI scans for 3D data
Scans can be sent electronically or on disc
Copies of the 3D model are sent by mail

Costs

$100 to $300 for time and materials

Contact and Details

Jason Bleedorn
jason.bleedorn@wisc.edu
608-890-2081

SVM Study Affirms Value of Common Method for Tracking Progression of Multiple Sclerosis

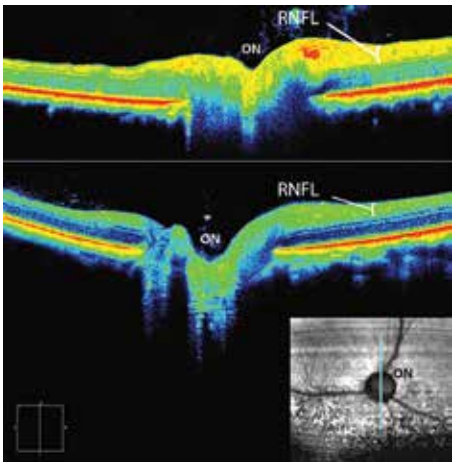
An accurate method for measuring the progression of a disease, as well as the effects of any therapies, is a crucial part of a medical treatment plan. However, one of the most common practices for tracking the development of multiple sclerosis (MS) — measuring the thickness of the retinal nerve fiber layer (RNFL) using optical coherence tomography (OCT) — is used largely based on a long-held assumption rather than clear evidence. But a new study by scientists from the UW School of Veterinary Medicine (SVM) confirms the underlying premise for the method.

Past research has shown that MS causes axons — the long, threadlike parts of nerve cells that conduct electrical impulses — in the optic nerve to die off as it progresses. Consequently, this axon loss can be used as a way to track the development of the disease. But current technology makes it difficult to measure optic nerve axon loss in a living patient. However, there is one work-around method involving the RNFL, a band of neurons that receive visual information from photoreceptor cells in the eye and transmit it to the optic nerve.

Medical professionals have long assumed that a thinning RNFL is a sign of axon loss in the optic nerve. And OCT, a non-invasive imaging test that uses light waves to take cross-sectional pictures of the retina, can effectively measure the thickness of the RNFL. As a result, this method has been established as a surrogate measurement of axon loss in the optic nerve.

"OCT is used extensively in clinical neurology in people to get an indication of loss of axons in the central nervous system," says **Ian Duncan**, professor of neurology in the Department of Medical Sciences and lead investigator of the study. "But it was always guesswork until there was a model in which it could be tested."

This is precisely what the team of SVM scientists set out to do, according to the study's first author, **Leandro Teixeira**, assistant professor of anatomic pathology in the Department of Pathobiological Sciences and director of the Comparative Ocular Pathology Laboratory of Wisconsin.



LEANDRO TEIXEIRA

OCT scans of the retina and optic nerve of unaffected (top) and affected (bottom) dogs. Note the thinning of the RNFL (yellow) and deep and excavated optic nerves (ON) of the affected dog. Inset: Image of the fundus of the eye. The vertical line represents the area of the fundus sampled on OCT.

Using a canine model of Pelizaeus Merzbacher disease (PMD) — a developmental disorder of myelin formation

Continued on page 19

From the CBMS Director

Graduate Program Earns Top Ranking, Fellowship Funds for Students

In the last issue of *On Call*, I highlighted several of our program's successes from the previous academic year. Now I have more wonderful news to share.

As it has for many consecutive years, the Comparative Biomedical Sciences (CBMS) graduate program has once again ranked in the top 10 for the veterinary medical sciences discipline for its research performance in 2015-16, according to the Academic Analytics Database. CBMS is one of 53 programs of its kind nationwide, so this is a notable achievement.

I am also pleased to report that CBMS has received the competitive Biological Sciences Fellowship Funds from the University of Wisconsin–Madison Graduate School, which will support our efforts to recruit graduate students of the highest quality. Fellowships were awarded to graduate programs based on quality of incoming students, outcomes and impacts of students in the program, the degree to which programs are investing in graduate student recruiting, and efforts and success in recruiting underrepresented students.

Our recruitment efforts, in addition to day-to-day operations, are overseen by our graduate student coordinator. This vital staff member serves as the first point of contact for current and prospective students and engages with highly competitive applicants. As I mentioned previously, **Kathy Holtgraver** recently retired from this position after playing a major role in our program's success, and **Susan Thideman** has stepped in as her successor for a seamless administrative transition.

We are off to an outstanding start in 2017, and we expect to build on our success to further enhance our graduate student training.

Suresh

M. Suresh
Professor, Department of Pathobiological Sciences
Director, Comparative Biomedical Sciences graduate program

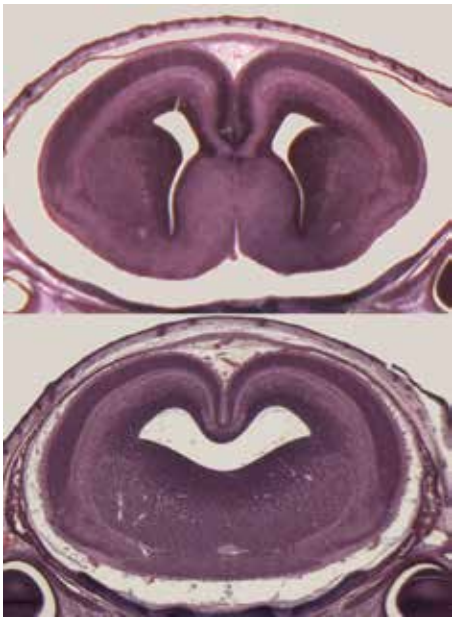
Researchers ID Gene Mutations, Chemicals Behind Birth Defect

As one of the most common defects in human development, holoprosencephaly (HPE) causes mild to severe malformations in the brains and faces of those it afflicts. While the condition is relatively rare in live births, affecting about 1 in 10,000 babies, its prevalence is much greater (1 in 250) among human embryos and typically leads to loss of pregnancy. For many surviving patients, the effects are devastating, including severe intellectual disabilities and impaired movement.

In most cases, the cause of HPE cannot be completely explained, although scientists suspect the complex interaction between genetic and environmental influences can determine the condition's severity in any given individual. The specific factors at play, however, have so far eluded science. But a team of researchers from the UW School of Veterinary Medicine has demonstrated how mutations in a specific gene can cause the defects associated with HPE while increasing sensitivity to particular chemicals found in the environment, which can lead to more severe abnormalities.

"Our findings show how a genetic predisposition, in combination with a particular environmental exposure, can result in a severe birth defect," says **Robert Lipinski**, assistant professor of comparative biosciences and the study's senior investigator. "This discovery could be very important in developing prevention strategies for HPE."

Previous studies of humans and mice have linked chemical and genetic disruptions of a specific cell signaling pathway called Hedgehog (Hh) to HPE. Cell signaling is part of the molecular system that regulates critical processes in the body, including human growth and development. One of several known pathways, Hh signaling plays a vital role in the formation of the forebrain and midface during prenatal development. Prior research has also shown that a



CAL MELBERG

A histological section through a normal mouse forebrain (top) illustrates proper division of the cerebral cortices, the outer layers of the forebrain. The other section (bottom) through the forebrain of a mouse with holoprosencephaly (HPE) shows continuity between the ventricles (cavities that help the brain communicate properly), creating one "holosphere" rather than two separate spaces, which is the defining feature of HPE.

specific gene, *Gli2*, acts as the primary activator of the Hh pathway.

Knowing all of this, the research team suspected that mutations leading to loss of function in *Gli2* may be an underlying cause of HPE. They tested this by breeding mice lacking both *Gli2* alleles (in other words, both copies of the gene) and found that these animals developed severe malformations characteristic of HPE. The finding points to a causative link.

But the research team also encountered the unexpected finding that mice with one working *Gli2* allele developed normally, in contrast to humans with only a single functional allele, who tend to develop abnormally. This prompted them to test whether that usually "silent" genetic mutation in mice alters the animal's response to teratogens — chemicals, drugs, radiation, or infections that can disrupt an embryo's development — and leads to severe cases of HPE. They found that mice with only one copy of *Gli2* were dramatically more affected by low doses of a specific teratogen than their littermates with two functional copies, indicating that their genetics make them more sensitive to the influence of certain teratogens.

"This gene-environment interaction provides a basis for taking steps to potentially reduce the incidence of HPE in people who are genetically predisposed to the condition," says **Galen Heyne DVMx'19**, co-lead author of the study.

The team has also identified several chemicals present in the environment that have the same properties as the teratogen employed in the study. They are now collaborating with a research team at the National Institutes of Health to examine the implications in human patients with HPE.

"We're investigating whether maternal exposure to these environmental chemicals is a risk factor for HPE in humans," says Joshua Everson, co-lead author of the study and a doctoral student in molecular and environmental toxicology.

Published in the September 2016 issue of the journal *Disease Models and Mechanisms*, the study's co-authors include **Lydia Ansen-Wilson MS'16, DVMx'18**, **Cal Melberg DVMx'19**, Dustin Fink, Kia Parins, Padyeh Doroodchi, and Caden Ulschmid.

Nik Hawkins

In Memoriam

Robert S. Cook PhD'66 passed away peacefully on Sept. 27, 2016. During his post-doctorate career, he served as a professor of environmental science at the University of Wisconsin-Green Bay, deputy director of the U.S. Fish and Wildlife Service in Washington, D.C., and head of the Fishery and Wildlife Department at Colorado State University.

ASH DEE STIFTER

UW–MADISON CONNECTIONS IN BUFFALO COUNTY

24 UW students

139 UW alumni

4 UW employees

Source: University of Wisconsin Service Center

Small Animals, Big Dreams

It all started with baby mice. When **Margaret Meier Jones DVM'96** was a child in Mondovi, Wis., she and her sister stumbled upon a nest of mice. Feeling that something was wrong with one of them, she rushed it back to her mother for help.

Jones's mother kindly informed her that it was probably best to return the baby mouse to its mother, who could care for it better than she could. Not only did the experience encourage Jones to pursue a career in veterinary medicine, but it also served as the inspiration for a college essay titled, "Of Mice and Me."

After graduating from the UW School of Veterinary Medicine (SVM), Jones first practiced in Wisconsin Dells at the Dells Animal Hospital, where she was one of five veterinarians. Having always wanted to practice in her hometown, however, she later accepted the position of small animal veterinarian at the Buffalo Valley Veterinary Center. But there was still something else that she wanted to accomplish.

"In high school, I was really active in Future Business Leaders of America, and I was elected a secretary for the state of Wisconsin," says Jones. "And that was actually the platform I ran on: that I was going to be a veterinarian, and I was going to open my own practice in the Mondovi area."

In October 2001, Jones made good on her campaign promise by founding the Animal Wellness Center of Buffalo Valley, where she treats small animals. Her practice distinguishes itself by being the only clinic in the area that provides chiropractic, acupuncture, and traditional services.

Jones credits her experience at the SVM with giving her the tools and self-confidence to open her own practice.

"I do believe they provided me with the best veterinary medicine education," says Jones. "The faculty was very much like an extended family. Madison also gave me the desire for lifelong learning."

Ben Corey

Editor's Note

This article originally appeared on the University of Wisconsin–Madison's comprehensive campaign website, **allwaysforward.org**, as part of a series of profiles highlighting connections between the campus and each of Wisconsin's 72 counties. The series featured several alumni of the UW School of Veterinary Medicine. We highlighted **Kurt Hallgren DVM'02** in the September/October 2016 issue of our *Alumni E-news*, and we will feature other alumni in the coming months.

Tracking Multiple Sclerosis from page 16

in which there is chronic axon loss in the optic nerve, like in MS — they took measurements of retinal thickness and eye function in control and affected dogs using a variety of existing methods, including OCT. They also measured the size and shape of various components of the optic nerve and retina, with emphasis on the RNFL, using light and electron microscopy and histomorphometrics, which is computer-assisted analysis of microscopic tissue images.

After comparing the results, they found a strong positive correlation between the morphometric measurements and OCT measurements of RNFL thickness. In addition, the histological analysis of the retinas and optic nerves, in combination with OCT measurements of the RNFL, showed that the loss of optic nerve axons in the PMD model resulted in moderate RNFL thinning, essentially confirming the long-held assumption of medical professionals.

"These findings provide clear evidence that OCT measurements of the RNFL can be good surrogate measurements of the progression of MS and other demyelinating diseases," says Teixeira. "It appears to be a quick and accurate way to see if therapeutic approaches are working, which is important for both clinical care and research."

Other co-authors of the study, published in the September 2016 issue of *Investigative Ophthalmology & Visual Science*, include the SVM's **Joshua Mayer**, **Richard Dubielzig**, **Chelsey Smith**, and **Abigail Radcliff DVM'12**, and James Ver Hoeve of the UW–Madison School of Medicine and Public Health.

Nik Hawkins

In Memoriam

Winifred M. Morenz DVM'88 passed away surrounded by her loving family on Jan. 23, 2017, after a courageous battle with cancer. She founded Park Place Veterinary Hospital in North Swanzey, N.H., in 1990, which she grew to employ four veterinarians and a staff of 15 people. She leaves behind two daughters, one son, and a beloved husband.

A Message to DVM Alumni

On, Wisconsin!

Last year the Wisconsin Foundation and Alumni Association (WFAA) created profiles of 72 UW–Madison alumni and friends — one in each of Wisconsin's counties — to highlight the impact of the campus on the state and to show that the UW and Wisconsin are "Boundless Together." (To learn more, visit **boundlesstogether.org**.)

UW School of Veterinary Medicine (SVM) alumni make up less than 1 in 100 of all UW–Madison alumni living in Wisconsin. So we were thrilled to see that, out of 72 profiles, the WFAA chose to feature four SVM alumni and a former UW Veterinary Care employee in their campaign. This reflects the importance of the work you do in your communities, and we've been proud to share links to these stories in our monthly messages from Dean Markel, our *Alumni E-news*, and now, in this edition of *On Call*.

The impact of SVM alumni on Wisconsin is clear. The state veterinarian and the assistant state veterinarian both received their DVM degrees from UW–Madison. The current president and immediate past president of the Wisconsin Veterinary Medical Association (WVMA) are graduates. And half of the practicing veterinarians in the state are our alumni as well. I doubt any other school or college can say that about any other profession in Wisconsin!

We are extremely proud of the roles our alumni play in their communities and as leaders in their respective fields, not only in Wisconsin but also around the country. We work diligently to provide an exceptional education to ensure that our students can follow in your footsteps and that the value of your UW–Madison degree remains strong. And, of course, to give you one more reason among many to proudly say "On, Wisconsin!"

Kristi V. Thorson

Kristi V. Thorson
Associate Dean for Advancement and Administration

CATHERINE GOSLIN

Bieneke Bron PhDx'17, presents at the inaugural UW One Health Day Colloquium on Nov. 3, 2016. UW School of Veterinary Medicine students played a key role in organizing the event.

SVM Students Organize Inaugural UW One Health Day Colloquium

To keep people, animals, and the environment as healthy as possible, it takes collaboration among different disciplines and across geographic boundaries. That's the argument at the heart of the concept of "One Health." And veterinarians across the globe are a key part of the equation.

"Veterinarians are considered at the forefront of One Health because it is the only profession that regularly operates at the interface of its three components — the health of domestic animals and wildlife, of humans, and of the environment," says **Kurt Sladky DVM'93**, clinical associate professor of zoological and wildlife medicine at the UW School of Veterinary Medicine (SVM).

It's fitting, then, that veterinary medical students took the lead in organizing the University of Wisconsin–Madison's inaugural One Health Day Colloquium. Held on International One Health Day (Nov. 3, 2016) at Union South, the event was co-sponsored by the SVM and the UW Global Health Institute and was planned with assistance from students at the UW School of Medicine and Public Health.

The colloquium featured a series of talks by students, faculty, staff, and members of the community showcasing One Health projects on campus and across the globe. Topics ranged from Ebola infections in Sierra Leone to the zoonotic diseases associated with bird feeders in Quebec to the use of traditional medicine in Guatemala, and more.

According to Sladky, the close proximity of schools of veterinary medicine, medicine, nursing, pharmacy, and engineering, as well as institutes for global health and environmental studies, on one campus make UW–Madison uniquely qualified to tackle challenges related to One Health. "This allows us to easily collaborate and meet to discuss multidisciplinary approaches to understanding One Health issues," says Sladky.

And these collaborations among health field professionals can be encouraged by starting conversations among students, says **Laurel Myers DVMx'19**, one of the lead planners of the colloquium.

"Interprofessional dialogue will be key to addressing many of the challenges faced by our generation," says Myers, who plans to apply her interests in infectious disease research, ecology, and public health to One Health policy and education initiatives. "We aim not to reinvent the wheel but to synthesize these views to more effectively solve problems. The inaugural One Health Day Colloquium sparked connections, and I see this as the promising beginning of a One Health community here in Madison and at UW–Madison."

Nik Hawkins

Awards & Honors

Carey Elected AAAS Fellow

Hannah V. Carey, a professor of comparative biosciences at the UW School of Veterinary Medicine, was elected a Fellow of the American Association for the Advancement of Science (AAAS) in November 2016.

Election as an AAAS Fellow, a tradition begun in 1874, represents recognition by peers for distinguished contributions to advancing science or its applications. Carey's election acknowledges her exceptional work in the field of biology, notably in studies of the physiology of mammalian hibernation and the microbiome.

Carey is joined by four other faculty members from the University of Wisconsin-Madison who have been elected as AAAS Fellows in 2016. They are David A. Brow, professor of bimolecular chemistry in the UW School of Medicine and Public Health; Ann C. Palmenberg, professor of biochemistry; Snežana Stanimirovic, professor of astronomy; and John W. Valley, professor of geoscience.

Founded in 1848, AAAS is the world's largest general scientific society. It includes nearly 250 affiliated societies and academies of science, serving nearly 10 million constituents.

Adapted from an article by Terry Devitt

SVM Resident Wins Young Investigator Award

Katherine Irvine, a clinical pathology resident at the UW School of Veterinary Medicine (SVM), received the 2016 Young Investigator Award from the American Society for Veterinary Clinical Pathology (ASVCP) in December 2016.

The award honors outstanding oral presentations of original clinical or experimental research by residents or graduate students in the field of veterinary clinical pathology. Irvine earned distinction for her presentation, "Validation of Two Point-of-Care Meters for Measuring Triglyceride Concentration in Chicken Whole Blood and Plasma." The SVM's **Kristen Friedrichs DVM'91**, clinical associate professor of clinical pathology, and **Christoph Mans**, a clinical assistant professor of zoological medicine, served as co-investigators on the project.

The award was announced at the American College of Veterinary Pathologists (ACVP) and ASVCP Concurrent Annual Meeting in New Orleans.

Ashley Voss

Suresh Named Vilas Associate

M. Suresh, professor of immunology in the Department of Pathobiological Sciences at the UW School of Veterinary Medicine, was given the Vilas Associate Award by the Divisional Research Committees of the Office of the Vice Chancellor for Research and Graduate Education in January 2017.

The Vilas Associates Competition is open to tenure-track assistant professors and tenured faculty who are within 20 years of their tenure date. The award recognizes ongoing and emergent research of high quality and significance. Winners are selected based on nomination and the submission of a detailed research proposal. This year's recipients are provided partial research salary support for the summers of 2017 and 2018, and an additional $12,500 in flexible research funding for both fiscal years. For the summer of 2017, Suresh has been awarded a budget of just under $40,000.

AnnaKathryn Kruger

Heidari Receives Neuroscience Award

Moones Heidari, a postdoctoral researcher at the UW School of Veterinary Medicine, has received the Mark Rowe Award from the Australasian Neuroscience Society (ANS).

The award is given annually for the best publication by an early career researcher member of the ANS. Heidari earned the recognition for her paper, "Brain Iron Accumulation Affects Myelin-related Molecular Systems Implicated in a Rare Neurogenetic Disease Family with Neuropsychiatric Features," which was published Jan. 5, 2016 in *Molecular Psychiatry*.

As a postdoctoral researcher in the lab of **Ian Duncan**, professor of neurology in the Department of Medical Sciences, Heidari works on studies related to myelin and demyelination.

Nik Hawkins

Student Awards

Sarah Appleby DVMx'18
Merck Animal Health/American Association of Equine Practitioners Foundation Scholarship

Rachel O'Leary DVMx'19
2016-17 Auxiliary to the AVMA Legacy Scholarship

Jennifer Reinhart PhDx'17
2017 American Kennel Club Canine Health Foundation Clinician-Scientist Fellowship

From Space to Spays

Tom, a stray cat, purrs happily as Lissa Ong DVMx'18 gives him a physical examination at the UW School of Veterinary Medicine.

When **Lissa Ong DVMx'18** visited Costa Rica as part of a biology research program in high school, she often found herself in the dim and quiet of the jungle, gazing upward. Removed from the flood of urban light, the skies in such places reveal celestial wonders that city-dwellers have never seen. And in one of these places, Ong's fascination with astronomy was born.

Her attraction to all things space continued into her undergraduate years at Williams College, where she majored in astrophysics. She later completed a master's degree in earth and planetary sciences at the University of California, Santa Cruz, and moved on to a doctoral program in planetary sciences at the University of Arizona. With fellowship support from the National Science Foundation and the National Aeronautics and Space Administration, she began working as a visiting scientist at Los Alamos National Lab.

"I was part of a project using old Department of Defense code that simulates explosions to examine the effects of asteroid impacts on the moon," says Ong. "But I found myself spending a lot of time in the lab."

Although her planetary sciences career was thriving, she decided to pursue a little more work-life balance and began volunteering at the Humane Society of Southern Arizona in 2008. "It got me out, got me on my feet, got me talking to people more," says Ong. "And I strongly believe in giving back to the community and having balanced interests, so it was a good choice."

Gradually, her responsibilities as a volunteer grew. She began helping with animal restraint in exam rooms; taking temperature, pulse, and respiration readings; and spending entire Saturdays observing in the surgery suite. During this time, the shelter veterinarians took her under their wings, explaining the ins and outs of veterinary medicine in greater detail. One particular veterinarian, **Jennifer Wilcox DVM'08**, Ong says was particularly influential, especially in describing her experience switching from working as a post doc in bacterial genomics to pursuing veterinary medicine.

"Lissa is a unique combination of an extremely smart person who also works very hard in the trenches," says Wilcox, now director of veterinary services at Pima Animal Care Center, a county animal shelter in Tuscon, Ariz. "We've worked in some crazy places together."

Wilcox's advice proved useful as Ong contemplated her future. "Eventually, I found I was looking more forward to my Saturdays at the shelter than going to the lab," she says. "I found a new passion that was incredibly interesting to me. I love that veterinary medicine combines some of the scientific training and analytical thinking that I already had with a tangible, hands-on approach to helping animals."

In December 2012, after much deliberation, Ong withdrew from her PhD program. The following month, she registered for the prerequisites she needed for veterinary medical school, courses that were not required of an astrophysics undergraduate major. After three semesters, she applied for admission at the UW School of Veterinary Medicine (SVM) and embarked on her new education in fall 2014.

Even as a veterinary medical student, Ong's fascination with the planetary sciences continues as a pastime, but she now looks forward to a career helping homeless animals — the very creatures who helped guide her toward her ultimate career choice. And she is well prepared for the endeavor. She has completed shelter medicine courses in the SVM curriculum and has already worked at shelters and humane societies from the Dakotas to Belize. For her fourth year of veterinary medical school, she has lined up numerous externships at shelters and spay and neuter clinics across the country.

Outside of school, Ong lives with a large, furry reminder of her passion for shelter medicine and her time at the Arizona humane society that changed her life. While she was a volunteer there, she adopted her now 13-year-old Huskie Shepherd Mix, Isis, whose previous owners surrendered her following a serious injury. Isis rounds out Ong's small but growing family, which also includes her husband, Galen, and their infant daughter, Kaia.

Isis has proven to be a valuable source of veterinary medical education for Ong and her fellow students. "She's old and big, so she's seen pretty much every service in the clinic," says Ong with a smile.

Nik Hawkins

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