



SPRING 2018
NEW YORK STATE IMPACT

SEACO'S



Cornell University
College of Veterinary Medicine

SPRING 2018

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***SCOPES SPRING 2018**

Editor: Lauren Cahoon Roberts

Writers: Melanie Greaver Cordova, Olivia Hall,
Lauren Cahoon Roberts, Patricia Waldron

Designer: Wendy Kenigsberg, Brand Communications

Photographers: Matthew Fondeur, Jonathan King,
Sarah Nickerson, University Photography

**Cornell University
College of Veterinary Medicine**

S3-201 Schurman Hall
College of Veterinary Medicine
Cornell University
Ithaca, NY 14853-6401
Phone: (607) 253-3745
Fax: (607) 253-3740
E-mail: vetfriends@cornell.edu
www.vet.cornell.edu

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Diversity and Inclusion are a part of Cornell University's heritage. We are a recognized employer and educator valuing AA/EEO, Protected Veterans, and Individuals with Disabilities. Produced by Cornell University 5/18 QMC 8M

COVER & THIS PAGE: NEW YORK STATE IS THE NUMBER-ONE PRODUCER IN THE NATION OF YOGURT, COTTAGE CHEESE, AND SOUR CREAM, AND THIRD IN MILK SALES. READ HOW CVM ALUMNI AND CLINICIANS HELP TO KEEP THESE DAIRY HERDS HEALTHY (PAGE 22).





Lorin D. Warnick Ph.D. '94
Austin O. Hooey Dean of Veterinary Medicine

DEAN'S MESSAGE: NEW YORK IMPACT



This issue of 'Scopes is all about our college's home state of New York. Our circles of influence have an expansive reach, and in the next several issues of 'Scopes we plan to showcase each of those circles—starting right here with the work we do in New York state.

The College of Veterinary Medicine was established as part of a land-grant university, meaning that we were designated to receive land and benefits from New York in exchange for providing practical education in a field that would directly benefit the state, and in turn, the country. I cherish the time-honored story that's passed down about founder Ezra Cornell telling his partner, A.D. White, "Don't forget the horse doctor!" as he left for Europe to recruit Cornell University's first faculty members.

That horse doctor was of course James Law, a graduate of the Edinburgh Veterinary College in Scotland and founder of our college. Since Professor Law's first days at the helm, our college, with continued support of New York state, has been able to serve the public good through the education of veterinarians and scientists, promotion of agricultural productivity, preservation of species diversity, advancement of biomedical research, and continued vigilance against the spread of disease.

With the state's investment and private support, we completed our class expansion renovation last fall, which will help us meet the growing demand for veterinarians as well as increase the number of students we can admit from New York. Many of our graduates go on to practice here in New York, with roughly 45 percent of veterinarians in the state being Cornell graduates.

Our clinical programs continue to be a source of world-class veterinary service for the over 25,000 patients seen in hospitals and clinics, and over 50,000 animals seen on local farms. This service also educates the next generation of veterinarians and provides vital clinical research in all areas of animal and human health. Our research also yields key understanding and benefits to New York state's ecosystems and agriculture, helping us to preserve our native wildlife and improve the safety and sustainability of our food supplies.

We've also operated the New York State Veterinary Diagnostic Lab since 1912. The lab's 200 diagnosticians process more than 200,000 samples per year, working to protect the state's agriculture industry from outbreaks of high-impact diseases such as avian influenza, as well as from endemic diseases diagnosed every day by laboratory services.

Through our outreach that ranges from rabies prevention efforts to healthy pet clinics, from invasive aquatic species tracking to shelter medicine consultations, from Buffalo to Brooklyn, our college works tirelessly to give back to the state that so generously supports our programs.

I welcome you to look through this issue to learn more about the myriad ways our students, faculty, and staff help give back to New York—and stay tuned for future issues of 'Scopes in which we expand the lens on our circles of influence.

Lorin D. Warnick

Lorin D. Warnick DVM, Ph.D. '94
Austin O. Hooley Dean of Veterinary Medicine

A woman with brown hair tied back, wearing a red t-shirt, blue jeans, and pink safety glasses, is working in a blacksmith shop. She is using a large hammer to shape a piece of metal held in a vise. Sparks are flying from the point of impact. The background shows a workshop with various tools and equipment.

Cornell farrier program admits first all-female cohort

AFTER MORE THAN 100 YEARS IN EXISTENCE, THE CORNELL FARRIER PROGRAM HAS ADMITTED ITS FIRST ALL-WOMEN CLASS. PAIGE MAXXAM, KAHLAN SCHRAMM, AND KERRY SPAIN COMPLETED THE 16-WEEK PROGRAM IN APRIL. THE COURSE, DEVELOPED IN 1913 TO PRODUCE FARRIERS WHO HELP THE PUBLIC, PARTNERS WITH THE EQUINE HOSPITAL AND IS A FOUNDATIONAL PART OF THE UNIVERSITY'S LAND-GRANT MISSION.



**“IT’S EMPOWERING,
WE’RE BREAKING
A GLASS CEILING.”**

—KERRY SPAIN, A MEMBER OF THE FIRST ALL-FEMALE
COHORT IN THE CORNELL FARRIER PROGRAM

Avery August named vice provost for academic affairs

AVERY AUGUST

Avery August Ph.D. '94, professor and former chair in the Department of Microbiology and Immunology, has joined the Cornell administration as vice provost for academic affairs.

"I am extraordinarily excited that Avery has agreed to accept the position of vice provost for academic affairs," said Provost Michael Kotlikoff. "As department chair, he has demonstrated thoughtful and inclusive strategic leadership and has an unqualified appreciation for the need to engage and support our faculty. Cornell is fortunate to have his creative vision to guide our academic affairs."

"I am extremely honored, and excited, to be moving into this position," said August, who joined the College of Veterinary Medicine in 2010. "Our faculty are the core of the university, and I hope to contribute to continuing to make Cornell an institution where faculty, particularly faculty who bring their diverse perspectives to our students, want to come and stay for their careers."

The position, which started Jan. 1, 2018, is new for the university. August's responsibilities will include overseeing the Provost's Office of Faculty Development and Diversity, providing support and training for department chairs and associate deans, as well as overseeing faculty recruitment. He will also handle periodic review of academic departments in conjunction with the Faculty Committee on Program Review.

Animal Hackathon taps into student innovation

Students from across Cornell University competed this January to see whose idea could be the next big breakthrough in animal health at the second annual Animal Health Hackathon. Teams tackled everything from doggy goggles to cow finders. Co-hosted by the College of Veterinary Medicine and Entrepreneurship at Cornell, the event kicked off with a conference on emerging trends and the future of animal health and health care services.

This year's winning invention was decidedly low-tech and light-hearted. The idea? Hygena Pet—a waterproof, nontoxic spray for Fido's rear end that prevents the pesky problem of poop sticking to fur.

Four more groups won additional honors in the event's verticals. Encompass won the diagnostics and therapeutics vertical with an app that gathers clients' preferences and habits to help veterinarians customize their care. CATcher and Squeak tied in the customer experience vertical, each creating a smart trap for feral cats and mice respectively. CowFinder won the workflow vertical with a product that helps locate a specific dairy cow in a herd, and honorable mentions went to the ideas DoggoVision and Therashoe.

"The ideas they came up with are absolutely outstanding," said Steve Ireland, director of marketing for Pet Partners and one of the hackathon's judges. "I want to see some of them take it and run with it."



STUDENTS BRAINSTORM AT THE SECOND-ANNUAL ANIMAL HEALTH HACKATHON.

Colin Parrish honored as outstanding veterinary medical researcher of the year

A committee of his peers chose John M. Olin Professor of Virology Colin Parrish Ph.D. '84 as the recipient of the 2018 AAVMC Excellence in Research Award.

The Association of American Veterinary Medical Colleges established the Excellence in Research Award in 2010 to recognize an individual who, over the course of his or her career, has demonstrated excellence in original research, leadership in the scientific community, and mentoring of trainees and colleagues in any discipline of veterinary medicine.

Parrish is an internationally renowned virologist and a leading expert in the details of virus-host interaction. He began his tenure at the Baker Institute for Animal Health as a graduate student during the parvovirus crisis and returned to the Institute in 1984 as a faculty member, serving as director from 2010 to 2016. His recent work on influenza virus has identified how mutations arise during new outbreaks in dogs and cats.

"I am especially honored by this award from my peers in the veterinary community in recognition of the efforts of my laboratory and of the Baker Institute seeking to improve the health and well-being of animals—including humans—through basic and applied research," said Parrish.



RENATA IVANEK



JEONGMIN SONG

Renata Ivanek, Jeongmin Song win Annual Schwartz award

The annual Schwartz Research Fund for Women in Life Sciences, endowed by Joan Poynter Schwartz '65 and Ronald H. Schwartz '65, has awarded \$15,000 each to Renata Ivanek Ph.D. '08, associate professor of epidemiology, and Jeongmin Song, assistant professor of microbiology and immunology. The annual grants support female life scientists engaged in innovative, creative research.

Ivanek is a veterinary epidemiologist who specializes in food safety and zoonotic diseases. She will use the funds to continue her research on the foodborne pathogen *Listeria monocytogenes*. Current control strategies aim to reduce *L. monocytogenes*, but Ivanek's preliminary results suggest that from a public health perspective, some exposure to *L. monocytogenes* may actually be beneficial.

Song's lab is focused on answering fundamental questions relating to *Salmonella Typhi*, the pathogen that causes typhoid fever. She plans to use the Schwartz award funds for pilot studies to better understand the relationship between *S. Typhi* and the human host, and why the pathogen is so successful in people.



COLIN PARRISH AND AAVMC PAST-PRESIDENT PHILLIP NELSON

"I AM ESPECIALLY HONORED BY THIS AWARD FROM MY PEERS IN THE VETERINARY COMMUNITY IN RECOGNITION OF THE EFFORTS OF MY LABORATORY AND OF THE BAKER INSTITUTE SEEKING TO IMPROVE THE HEALTH AND WELL-BEING OF ANIMALS—INCLUDING HUMANS—THROUGH BASIC AND APPLIED RESEARCH."

—COLIN PARRISH



STUDENTS TAKE THE VETERINARIAN'S OATH AT THE 2018 WHITE COAT CEREMONY.



Third-year veterinary students don white coats, begin formal clinical rotations

This March, third-year veterinary students at the Cornell University College of Veterinary Medicine gathered with family, faculty, staff, and friends for the White Coat Ceremony, which marks their transition from preclinical coursework to formal clinical training.

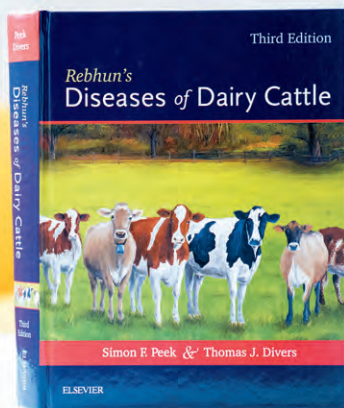
"This is your chance to integrate your hard-earned knowledge and skills and apply them in a clinical setting," said Dean Lorin D. Warnick Ph.D. '94 in his welcoming remarks to the crowd. "You are taking another step towards joining the veterinary profession and accepting the associated rights and responsibilities."

After the dean's introduction, each third-year student went on stage to don his or her white coat with the help of a mentor each student selected for the event. After the entire group was outfitted in their new sartorial symbol of clinical service, Susan Ackerman DVM '86, president of the college's Alumni Association Executive Board, took the stage to administer the Veterinarian's Oath.

At the event's culmination, keynote speaker Mitchell Kornet '76, DVM '79, chairman of the Veterinary College Advisory Council and the Annual Fund, reminded the students, "...be proud of yourself. You've sacrificed so much to get to this point and I can assure you that it is all worth it."

"...BE PROUD OF YOURSELF. YOU'VE SACRIFICED SO MUCH TO GET TO THIS POINT AND I CAN ASSURE YOU THAT IT IS ALL WORTH IT."

**—MITCHELL KORNET '76, DVM '79,
CHAIRMAN OF THE VETERINARY
COLLEGE ADVISORY COUNCIL
AND ANNUAL FUND**



Cornell clinicians and alumni collaborate on new dairy cattle textbook, honor a mentor

Cornell-affiliated veterinarians have authored the third edition of Rebhun's Diseases of Dairy Cattle, edited by Simon Peek Ph.D. '98 and Thomas Divers, the Rudolph J. and Katharine L. Steffen Professor of Veterinary Medicine at Cornell University. The book's cover showcases an original artwork painted by Laurie Peek DVM '96, featuring major breeds of dairy cows in a lush pasture.

The textbook serves as an all-in-one guide to dairy cattle disease management and covers all bovine body systems. The first edition of the book was authored by the late William C. Rebhun DVM '71, former chief of the Large Animal Hospital at the college and known as a tireless equine and bovine clinician with expertise in medicine, surgery, and ophthalmology. Many chapters in the third edition of the textbook are authored by alumni or colleagues of Rebhun.

Peek and Divers dedicated the third edition of Rebhun's textbook to another Cornellian, Robert Hillman DVM '55, CVM professor and renowned large animal theriogenologist, "generally considered one of the best large animal veterinarians to ever practice and teach at Cornell University."



AN INSTRUCTOR TEACHES A HONEY BEE LAB AT THE NEW YORK STATE VETERINARY CONFERENCE.

Changes in store for CVM continuing education offerings

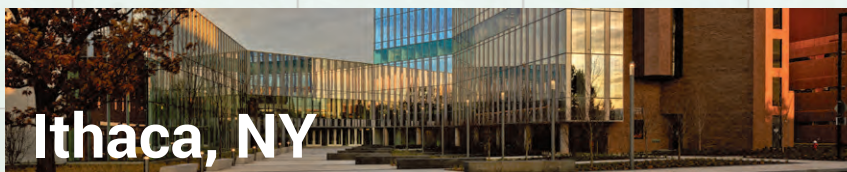
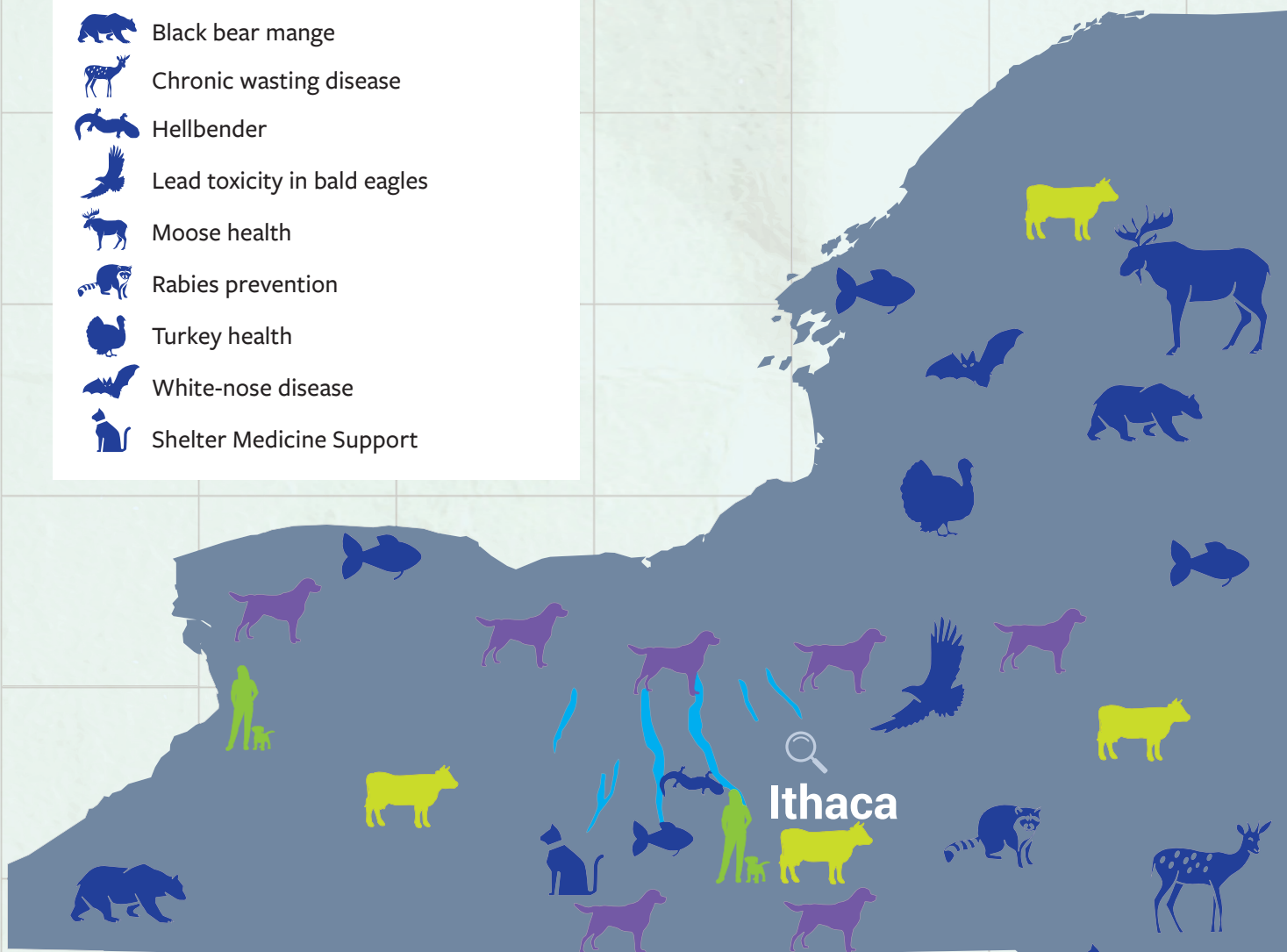
"Engage-Appl-Excel" will be the theme of this coming fall's New York State Veterinary Conference. Held in Ithaca, N.Y., on October 5-7th, the event will showcase the college's new approach to veterinary continuing education. "We're reimagining how we can deliver content in meaningful ways," says Jodi Korich DVM '97, associate dean for education.

The conference will offer a variety of new interactive learning sessions designed to complement the more traditional lectures, allowing attendees to engage with the material, presenters, and each other. Using evidence-based teaching methods, attendees will apply what they are learning in collaborative settings with real-time feedback from veterinary experts.

"We have a unique opportunity at Cornell to leverage our educational expertise," says Korich. "We will be using what we know about how people learn and use new technology to enhance the CE learning experience."

Research and Outreach Programs

-  Aquatic Species
-  Black bear mange
-  Chronic wasting disease
-  Hellbender
-  Lead toxicity in bald eagles
-  Moose health
-  Rabies prevention
-  Turkey health
-  White-nose disease
-  Shelter Medicine Support



Ithaca, NY

- 100K** samples tested at Diagnostic Center
- 51K** patients treated at regional farms
- 26K** patients treated at CUHA
- 3,000** veterinarians attend Cornell CE events
- 591** ticks tested at Diagnostic Center, > 1/3rd infected with Lyme disease
- 45%** of CVM students are NYS residents
- 30** continuing education events (CE) hosted
- 3** MPH public health programs targeting food security & nutrition in Tompkins County
- 2** MPH public health programs targeting vector-borne disease education in Tompkins County





Cornell Veterinary Medicine State Impact

For 150 years, the Cornell University College of Veterinary Medicine and New York state have helped each other. With those first tracts of land and continuous funding through the years, New York has enabled the college to provide scientific discovery, world-class education, and dedicated veterinary medical care and outreach ever since. The college's efforts now touch every county of the state, enriching New York's animals, ecosystems, and citizens, and serving the state's unique needs in a changing world.

Partnerships Across New York



Quality Milk Production Services: Canton, Cobleskill, Ithaca, Warsaw



State District Attorney animal abuse forensics training program



Student-run healthy pet clinics



Human-canine cancer research



NYC Area & Long Island



Bronx, Brooklyn, Queens—Healthy pet clinics



Eastport—Cornell University Duck Research Lab



Elmont—Cornell Ruffian Equine Specialists



2,750 Samples tested from live poultry markets

WILDLIFE WATCHERS:

HOW CVM RESEARCH AND SURVEILLANCE PROTECTS NATURE IN NEW YORK STATE

BY MELANIE GREAYER CORDOVA

“WE ARE SEEING MORE DISEASES NOW AND THAT MAY BE BECAUSE WE HAVE A LOT MORE STRESSORS ON WILDLIFE THAN WE’VE HAD BEFORE.”

**—ELIZABETH BUNTING, CVM
WILDLIFE VETERINARIAN**

MANGE IN FOXES IS WELL-DOCUMENTED. RESEARCHERS AT CVM ARE MONITORING ITS POSSIBLE SPREAD TO BLACK BEARS.



It was fungus that tipped the scale for the New York State Department of Environmental Conservation (DEC)—fungus that encircled the nose of the little brown bat, and swiftly decimated the species' population after the first confirmed occurrence in 2006.

"White nose syndrome was a devastating disease that has resulted in the death of approximately 80 percent of hibernating bats in parts of the United States," says Elizabeth Buckles '92, associate clinical professor at the College of Veterinary Medicine and a leading researcher on the disease. No one had ever seen it before, she says, and the state lacked the infrastructure to respond.

The DEC sent samples to Ithaca, where Buckles performed necropsies on the bats. Over and over, she saw the same symptoms—low weight, damage to wing membranes, and of course the disturbing white ring of fungus around the animal's nose.

A partner at the National Wildlife Health Center ultimately cultured the bat-killing fungus: *Pseudogymnoascus destructans*, spread by contact—either bat-to-bat or from hikers who transport infected soil in their shoes.

"We were at the epicenter," says Buckles, "and we realized that we needed a structure."

When the fungus struck, the DEC was already working with the college to monitor and advise on cases of avian influenza, chronic wasting disease in deer, West Nile virus, rabies, and so much more.

"They felt like they were going to keep getting hammered and they needed help," says Elizabeth Bunting, wildlife veterinarian at the college. "We are seeing more diseases now and that may be because we have a lot more stressors on wildlife than we've had before."

The college has long been a source of knowledge and impact for New York's wild animals and ecosystems. CVM researchers constantly monitor and study the ecological health of the state's environment. As they watch over New York's forests, streams, and skies, they're hunting for powerful solutions and interventions wherever they can.

A unique partnership

After the devastation wrought by white-nose syndrome and the looming threat of other diseases, the DEC approached the college and pitched a partnership that would become the New York State Wildlife Health Program. The program works to develop high-quality scientific information about disease ecology in wildlife species through surveillance and research, with the goal of protecting and sustaining future wildlife populations. They do this by centralizing and assessing information. The DEC sends many of the wild animals their field biologists find to the lab at Cornell where Bunting, Buckles, and the rest of their team catalogue and analyze cause of death. Those animals that aren't sent to the lab are still logged by DEC researchers who perform the necropsies on their own and send in the samples. The program explores research questions using the data collected and in this way provides the backbone for policies and procedures implemented by the DEC.

Having a diverse field of expertise is critical to its success—everyone from veterinarians and disease ecologists to anatomic pathologists and more are involved.

"Most states don't have veterinarians working for them, especially in the Northeast," says Bunting, who was among the first to facilitate this partnership in 2010.

"The program has good synergy because we can wrap our heads around things from different angles," adds Krysten Schuler, wildlife disease ecologist and senior extension associate with the Wildlife Health Program.

Bunting and Schuler have worked together since the start of the program to spearhead training for those who come into contact with animals in the field, such as biologists, law enforcement officials, and even taxidermists. Implementing their procedures has not only improved the quality of the samples returned to them at the lab, but it has created a baseline of knowledge for research into disease. This research is then translated for the public or for use by the DEC in policy decisions.

"If the DEC wants to look at whether something that's being introduced is different, then we need to know what's normal," says Bunting.

What's normal in other states might not be normal for New York, according to Schuler. "Wild animals don't obey lines on a map," she says.

**“PEOPLE TEND TO THINK THAT
DISEASES ARE STATIC, BUT THINGS
CAN CHANGE. THEY CAN MUTATE.”**

**—KRYSTEN SCHULER, CVM WILDLIFE DISEASE
ECOLOGIST**



**A “MUGGED” MOOSE THAT WILL BE TESTED AND TRACKED AS PART OF THE CORNELL
WILDLIFE HEALTH PROGRAM’S SURVEILLANCE PROJECT.**

Nowhere is this more apparent than with white-tailed deer, which are integral to the hunting industry in the state. The Wildlife Health program is working to keep the state's deer populations safe from chronic wasting disease (CWD). Widespread across the rest of the country and difficult to spot, a single case of CWD could have social, ecological, and economic consequences as serious as those of the decimated little brown bat. Currently, wild cases of the disease have shown up in 25 states already.

CWD is caused by a prion—a protein that folds in dangerous, infectious ways—that destroys the brain in infected cervids like deer, elk, moose, and caribou. Live animals spread it through contact or through their saliva, feces, or urine. It causes difficulty in movement, increased anxiety, walking in obsessive patterns, and weight loss. It is universally fatal, though it may take time for the animal to succumb, giving the disease more time to spread to others.

“People tend to think that diseases are static, but things can change. They can mutate,” says Schuler. “When we first started, the science certainly showed that CWD was bad. Then we learned it could stay in the environment for 16 years, and now there are troubling signs of it being able to jump to humans.”

The prions that cause CWD can bind to soil or be taken up in plants, where they remain infectious for years. Infected deer population decline heavily, and although there have been no human cases, CWD is similar to mad cow disease and the Centers for Disease Control and Prevention advises against eating venison from animals testing positive for the disease.

Thanks to the baseline of knowledge created by the Cornell Wildlife Health Program, Bunting and Schuler can examine conditions in New York over time and compare them to changes in other states. The threat of CWD was so great that in 2013 they compiled their extensive research to support a New York State Department of Agriculture and Markets ban on the import of live captive deer and elk. They provided an economic analysis which demonstrated that the wild white-tailed deer herd brought a yearly value of \$1.5 billion to the state. The governor approved the ban.

This level of precaution has made New York one of the few states not to see a reoccurrence of CWD within its borders after an initial discovery in 2005. “We’re trying to help people understand that prevention is the most cost-effective tool we have,” says Schuler. “The disease almost certainly would have affected us by now.”

Policymakers were able to rely on the program for the scientific data they needed to make informed decisions. Bunting and Schuler are continuing to leverage their rich data archive from the last eight years. In 2017, they launched an interactive website that displays each animal case that DEC field biologists input from across the state, complete with notes and mapping capabilities. Currently, the site provides state government officials with information on state-wide projects and includes sophisticated case data and analytics. “I don’t know of any other system that people are using like this,” says Schuler.



CVM WILDLIFE DISEASE ECOLOGIST KRYSTEN SCHULER HOLDS A WHITE-TAILED DEER FAWN.

Data gathering

In addition to white-tailed deer, this surveillance system tracks virtually every kind of wild animal in the state. Moose, for example, had returned to the Adirondack region in the 1980s after an absence of 120 years. The DEC has tracked moose numbers since the species' return to the state, while Bunting and Schuler's team examines and tests moose samples to assess reproductive status, infectious disease exposure, parasite load, and cause of death. Currently, moose populations are declining across North America, including in New York. The Cornell team might have discovered why.

The program gathered blood samples from 26 live moose and necropsied dozens of others. Getting samples from live moose is no small task; moose are dangerous creatures and live in remote areas. The capture crews must perform “moose muggings” to get in and out safely. From a helicopter, two “muggers” locate and immobilize a moose using either a net or chemicals. They land, attach tracking collars, and collect samples for the scientists.

The samples collected from the mugged moose showed evidence of deer brainworm and giant liver flukes. Brainworm, like its name implies, is a parasite that affects the victim's brain tissue and causes a higher mortality rate in moose than deer. Giant liver flukes feed on the host's blood and cause liver damage, which opens up the possibility for more infections. “A lot of animals have parasites,” says Bunting. “We work to determine at what level they get problematic.”

These surveillance efforts will help the program develop a risk map for moose across New York, and will support population management programs.

The program also studies the threat of mange in New York state black bears—the second leading cause of death for the animals after instances of trauma. In addition to severe hair loss, mange inflicts skin damage that leads to secondary infections and deadly hypothermia. The microscopic mites that cause the disease burrow into the animal on contact, which can come from interacting with another bear that has mange or even just walking by a mite in the environment.



IN THE MORE THAN 300 BALD EAGLES SURVEYED, 83 PERCENT HAD LEAD EXPOSURE, AND 17 PERCENT DIED FROM LEAD TOXICITY.



CORNELL RESEARCHERS VISIT BLACK BEAR DENS (LEFT) TO GATHER SAMPLES. A HARRIER HAWK DIAGNOSED WITH RODENTICIDE TOXICITY UNDERGOES AN EXAM AT THE JANET L. SWANSON WILDLIFE HEALTH CENTER. PHOTOS ON THIS PAGE: CORNELL WILDLIFE HEALTH PROGRAM.

While field biologists have seen mange for years in red foxes throughout New York, mange in bears is a relatively new phenomenon.

The program gathers as much information as possible about these cases, tracking reports of affected bears to determine the distribution and progression of the disease across the state. They're also drilling deeper to discover how the bear mange mite is similar to the red fox mite. All of this information will guide management and treatment recommendations for bears in New York, just as such research contributed to their success with chronic wasting disease prevention.

"We can do all the research we want about wild animals and diseases," says Buckles, whose work with the program has contributed to these endeavors, "but if someone isn't in a position to use that knowledge to help the population, then what use is it? You want to see your work make a difference."

Raptors at risk

In early January, students at Syracuse University witnessed a wildlife war on campus. A red-tailed hawk slowly circled on an updraft, eyeing its prey below to time a dive-bomb into the bushes. But this was no ordinary enemy—it was a northern harrier, lethargic and struggling through the foliage in the hawk's territory.

Before the hawk could deliver the final blow to this trespasser, an amateur ornithologist rushed in and saved the harrier, retrieving him from the bushes and taking him to Cornell's Janet L. Swanson Wildlife Health Center. Veterinarians there discovered a low red blood cell count and poor ability to clot where they sampled his blood. The harrier was suffering from a severe case of anticoagulant rodenticide toxicity—rat poisoning.

All too frequently, chief of service at the center Sara Childs-Sanford DVM '99 and her clinical teammates see wild raptors suffering from human-made causes—including state-classified

threatened species such as this northern harrier or bald eagles half-dead from lead poisoning. These patients are just the tip of the iceberg. "Many, many more die in the wild without anyone knowing," says Childs-Sanford. "We expect to continue to see a rise in the number of cases affected by toxins in the environment."

While the clinicians at the Janet L. Swanson Wildlife Health Center focus on the individual patients, Bunting and her colleagues at the Wildlife Health Program monitor population trends. In 2016 alone, the program examined 1,135 animals, performing 900 necropsies on everything from hawks to raccoons. They saw 602 birds total that year, 27 percent of which were raptors. Although rodenticides are meant for rodent pests, the creatures that eat such pests often suffer collateral damage—the dosage adds up over several meals, eventually killing a raptor just as easily as it will kill a mouse. In an effort to better tackle this issue, Bunting and her team have developed two of the first rodenticide-related coagulation tests for use in live birds.

The team also tracks lead poisoning, particularly in bald eagles. They've tapped into a DEC archive of 300 bald eagles in the last 22 years, finding that 83 percent had exposure to lead and 17 percent died from lead toxicity. "Eagle populations have rebounded, but lead is still a risk particularly to the adult, breeding-age birds," says Schuler. The program has found that lead poisoning is second only to trauma as the cause of death in adult eagles.

While the federal government instituted a national ban on the use of lead shot for waterfowl hunting in 1991, lead is still routinely used in some ammunition and fishing tackle. Bald eagles and other scavenging birds ingest spent lead from the environment or in carcasses harboring lead ammunition. To better understand the issue, the Wildlife Health Program will pool data with multiple state and federal agencies to analyze spent lead ammunition as a potential source of poisoning in bald eagles, as well as its long-term impact on the species.

A photograph of three students in winter clothing (hats, scarves, gloves) crouching outdoors in a snowy, rocky area. They are using a manual water pump to collect water from a bottle. One student is holding a small bottle, another is operating the pump, and a third is holding a larger bottle. The background shows a snowy landscape with some trees.

“SEEING FIRSTHAND HOW INVASIVES CAN AFFECT FISHING AND BOATING, AS WELL AS THE ENVIRONMENT AND THE ECONOMY, HELPS STUDENTS UNDERSTAND THAT SCIENCE HAS A REAL IMPACT ON DAILY LIFE.”
—DONNA CASSIDY-HANLEY Ph.D. '74, SENIOR RESEARCH ASSOCIATE

BOYNTON MIDDLE SCHOOL STUDENTS COLLECT WATER FROM ITHACA FALLS TO SEND TO THE CVM FISHTRACKER PROGRAM.

Armed with this information, the Cornell researchers hope to influence policy and public awareness around manmade toxins, as they did with CWD in white-tailed deer.

Currently, they're conducting information campaigns with the DEC to make people aware of the threats that rodenticide and lead pose to their pets, themselves, and the state's environment. Recently, they helped Audubon in New York City produce brochures on the reach and consequences of rodenticide. "Assistance like this is a huge part of what we do," says Bunting.

Schuler adds, "Our hope is that awareness increases around this issue, as there is definitely more work to be done."

Childs-Sanford and her team at the center see first-hand the effects human choices and policies can make. "Legislation regarding the use of these toxic substances by people has a major impact on the frequency and severity with which they affect wildlife," she says.

CSI: Upstate New York

It's a calm Friday night in 2006. Two DEC fisheries technicians are relaxing after work at the Cape Vincent Fisheries Station just north of Watertown. The water below their dock is placid, the early May air just a bit crisp. All is as it should be after a busy work week.

But something makes the employees take a closer look at the water around them. Perhaps it's a muted splash or the way the water darkens. When they stoop to examine, they suddenly realize there is death beneath the surface: hundreds of dead and dying round gobies just below their dock.

DEC staff aren't easily startled. They deal with all sorts of wildlife on a daily basis, and have seen round gobies—an odd-looking invasive species—many times before. But this is a massive die-off happening before their very eyes. They scratch their chins, wondering at the cause and hoping the man who can solve the mystery is still at his post 150 miles away in Ithaca.

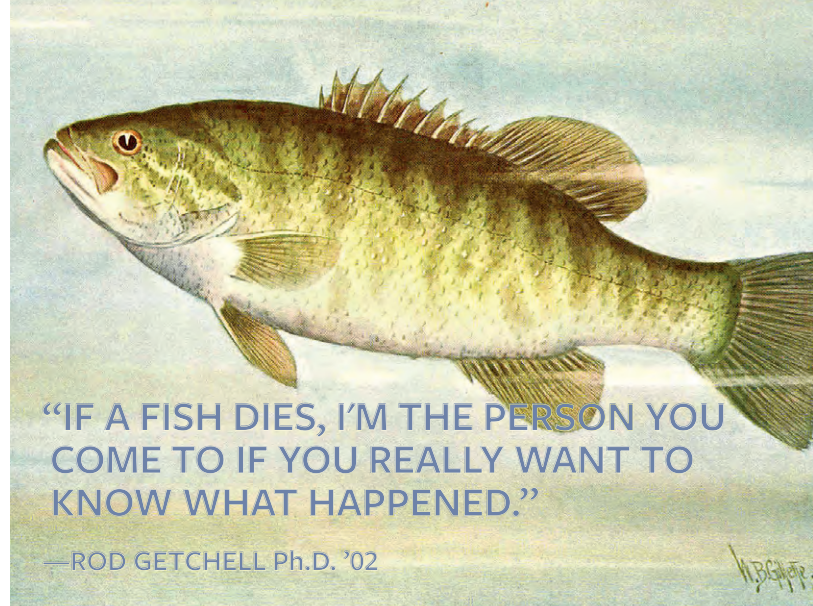
Enter Rod Getchell Ph.D. '02, assistant research professor: "If a fish dies, I'm now the person you come to if you really want to know what happened."

Getchell operates the Fish Disease Laboratory, a service lab providing disease diagnostic assistance to the aquaculture community, research community, and fish hobbyists in New York. Many times these diagnostic inquiries lead to more in-depth research investigations in fish health issues, and this clutch of round gobies—23 of which the employees retrieved from the chilly waters of the Upper St. Lawrence River—proved to be no exception.

Getchell suspected that the fish's death knell was likely due to viral hemorrhagic septicemia virus (VHS), undiagnosed as yet in the area.

"The fish had all these little hemorrhagic spots in the muscle and the organs," says Getchell. "I thought, wow, that looks just like VHS. There were reports that VHS had been detected by Canadian scientists the previous year, but I didn't think it would ever show up here."

At that point, only two other cases had been confirmed in North America, both in the Great Lakes or connected rivers. Here it was now in the Fish Disease Lab like a harbinger of



doom; the Great Lakes would face widespread die-offs for the next two years due to VHS. The prognosis for other wild fish species wasn't looking good; the round goby is a fish that crowds out other species, and it had now brought a disease that could prove fatal to its native neighbors. Symptoms of VHS vary, though most cases include hemorrhaging in major organs and body surfaces like skin and fins.

Getchell's mentors Paul Bowser '70 and James Casey spent over a decade leading a team of students studying all aspects of VHS and this deadly virus. For Casey, an associate professor of microbiology and immunology, the potential to track VHS in the Great Lakes with advanced technology was what drew him into environmental studies.

"Technology needed to be developed to look at viruses in the Great Lakes. VHS was an amazingly large outbreak and devastated the fish community," he says. "I got hooked."

This curiosity led him to develop the genetic tests the college uses to assess water samples from across the state. He's looking for environmental DNA, also known as eDNA, traces of life in the water that come from creatures passively shedding cells. "We—mammals, humans, fish, amphibians—all shed skin cells," says Casey. "If a deer is drinking in a stream, when you collect water downstream you can tell."

Tracking wildlife with citizen science

To develop a surveillance network of New York's waterways, Casey and his colleague Donna Cassidy-Hanley Ph.D. '74, senior research associate in the Department of Microbiology and Immunology, decided to put eDNA technology in the hands of New York students by creating the FishTracker Program. Supported in part by a USDA HATCH grant, the program enables teachers and their middle- and high school-aged students to collect eDNA samples from local waterways that will help Casey and Cassidy-Hanley track where invasive species show up.

When they first started, they thought they'd only get five or six schools interested in the program. "We had 70 schools involved within the first few collection seasons, and the

AFTER TAGGING HELLBENDERS, RESEARCHERS RELEASE THEM INTO STREAMS WHERE WILD POPULATIONS ARE STILL FOUND. SOME ARE KEPT IN LARGE CAGES TO PROTECT THEM FROM PREDATORS.

A photograph showing three researchers in a stream. Two women are standing in the water, one holding a clipboard and the other a bag. A third person is inside a large wire cage in the water, which appears to contain a large animal. The background is a lush green forest.

“FIGURING OUT WAYS TO MAKE THE ANIMALS RESILIENT IN THE ENVIRONMENT IS IMPORTANT FOR THEIR LONG-TERM SURVIVAL.”

—ELIZABETH BUNTING, CVM WILDLIFE VETERINARIAN

numbers continue to climb,” says Cassidy-Hanley. “At this point we’ve worked with over 2,000 high school students.”

Armed with eDNA kits, students go to their chosen source of water and collect samples for examination. Cornell does the complicated genetics testing and shares the results with the students. They learn what species are present in the water sample and whether invasives have popped up in their area yet.

“This is real science, science that will make a difference, and the kids know that,” says Cassidy-Hanley, noting that activities like this spark a love of science in many students. “Seeing firsthand how invasives can affect fishing and boating, as well as the environment and the economy, helps students understand that science has a real impact on daily life.”

The Cornell team has created a website that maps each sample site, credits the school involved in the collection, and presents the test results for individual species in a visual, intuitive format. The maps represent a rich archive of data that will aid researchers in tracking the spread of round gobies and other invasive fish species.

“This program is such a quantum leap forward in terms of the real impact it has on the environment,” says Casey. “It’s advanced science that can be translated to a wide variety of other fields.”

The FishTracker Program currently tracks up to eight invasive species. This year they’re adding two endangered species. “They go hand in hand,” says Cassidy-Hanley. “Endangered species are often endangered because of invasives.”

When filtering for round goby, the FishTracker map shows their considerable progress along the state’s waterways. Here and there, like pockmarks on the face of New York, positive invasive fish spottings flare up in red. It was only a matter of time, researchers knew, that one would become a hotspot for VHS or another deadly disease.

When VHS showed up again, it was in Getchell’s backyard—literally. He lives on Cayuga Lake, where there was another die-off of round gobies in May 2017. He collected the samples in the spring and summer last year, and like Casey and Cassidy-Hanley, enlisted the help of a younger generation.

“I had the neighborhood kids catching round gobies for me,” he says. “We submitted a few others from around the lake to see if the disease was widespread.”

Getchell’s lab had the DNA of these fish sequenced. The results showed that the virus in Cayuga Lake was nearly identical to the Lake Erie strain. It fit with evidence that round gobies had migrated down the Erie Canal from Buffalo. Those neighborhood kids, wildlife detectives in the making, did their part to solve the case.

“THERE ARE FEWER BOUNDARIES FOR COLLABORATION HERE, AND WHEN YOU’RE DEALING WITH WILDLIFE ISSUES, YOU NEED TO BE ABLE TO BUILD A TEAM.”

—ELIZABETH BUCKLES ’92, ASSOCIATE CLINICAL PROFESSOR

DAVID O. BROWN



A HELLBENDER IN THE LAB.

Hell-bent on saving hellbenders

The Wildlife Health Program has dipped a toe in aquatic research and tracking as well, developing eDNA tools for the detection of ranavirus and amphibian species of concern, like the eastern hellbender. Living longer than 25 years and growing to be over two feet long, hellbenders are one of three giant salamanders in the world, and the only ones found in North America. They reside in the frigid waters of two river drainages in New York, their territory stretching down through Tennessee.

In the past decade, the New York population has declined by 40 percent. Manmade threats like pollution, dams, and the siltation resulting from agricultural practices and construction work all have contributed to the giant salamander’s decline.

The hellbender project started as a partnership between the Buffalo Zoo and the DEC, who were raising hellbenders in captivity but having little success with their survival when they were released. The Wildlife Health Program joined the team in 2014, designing a project to systematically monitor small groups of these animals to uncover the hellbender’s secrets and pinpoint why they were dying. .

Their trials showed hellbenders in this captive family became infected with a deadly fungus, *Batrachochytrium dendrobatidis*. Within weeks of release, a majority of them died.

“Last summer we tested alternate release strategies with vaccinated and unvaccinated hellbenders,” says Bunting. “The goal is to assess long-term survival through radio tracking.”

After tagging the hellbenders, researchers released them into streams where the wild population is still found. Some of the animals moved freely while others were in large cages to protect them from predators. The program is currently analyzing the data collected from these releases and will continue the work this summer with another group in the Susquehanna River.

“Figuring out ways to make the animals resilient in the environment is important for their long-term survival,” says Bunting.



DAVID O. BROWN

NIKKI DEAN, WILDLIFE PROJECT ASSOCIATE, WORKING WITH HELLBENDERS IN THE LAB.

Vital collaboration

While some puzzling questions continue to drive in-depth investigations into the mysteries of wildlife, it is the atmosphere of collaboration at the college and Cornell at large that turns questions into projects, projects into results, and results into policy.

“There are fewer boundaries for collaboration here,” says Buckles, “and when you’re dealing with wildlife issues, you need to be able to build a team.”

The health of our state’s environment and the creatures that comprise its ecosystem have never had more at stake than at this moment. With an anticipated population of over 21 million in New York by 2040, human actions alone could be enough to crush delicate creatures like hellbenders and spread invasive species like round gobies. Yet, human action also stands among these animals’ only hope. The college’s foundational work in the last decade has already generated protective measures for our state’s precious wildlife. If we’re lucky, those protections are just the beginning.

“THE ROLE OF THE VET ISN’T JUST PALPATING COWS AND RESPONDING TO EMERGENCIES. A LARGE PART IS MEETING WITH THE HERD MANAGER TO DISCUSS BIOSECURITY AND HERD HEALTH.”

—NEIL REJMAN ’97

GUARDIANS OF FOOD AND TABLE

CVM KEEPS NEW YORK AGRICULTURE SAFE

BY PATRICIA WALDRON





**“BECAUSE WE WORK
INTIMATELY WITH THE
FARMERS AROUND HERE,
WE IDENTIFY REAL FARMER
AND CONSUMER-BASED
NEEDS AND DO TOP-SHELF,
PEER-REVIEWED SCIENCE,
THEN TURN THAT BACK
AROUND AND PUT IT INTO
ACTION ON FARMS.”**

—DARYL NYDAM DVM '97, Ph.D. '02



Farmers aren't the only ones who get up with the chickens. Cornell veterinarians see a lot of sunrises as they head out along country roads to visit farms from Watkins Glen to Skaneateles—and quite a few sunsets as well.

During these long hours, the staff of Cornell's Quality Milk Production Services (QMPS), the Ambulatory and Production Medicine Clinic group, and extension veterinarians visit hobby farms, large-scale dairy operations, and everything in between to support New York farmers. Whether they are consulting on farms, conducting cutting-edge research, or training the next generation of production veterinarians, the Cornell University College of Veterinary Medicine has an outsized effect on animal-based agriculture in the state.

"We are geographically blessed," says Daryl Nydam DVM '97, Ph.D. '02, professor and director of QMPS. "Within an hour's drive of Cornell there are about 100,000 lactating cows. Because we work intimately with the farmers around here, we identify real farmer and consumer-based needs and do top-shelf, peer-reviewed science, then turn that back around and put it into action on farms."

Cream of the crop

When most people think about animal-based agriculture in New York, they think about dairy. There are approximately 5,000 dairy farms in the state, which in 2015 hired around 20,000 people and brought in \$2.5 billion in direct farmgate sales. New York is first in the nation in the production of yogurt, cottage cheese, and sour cream, and ranks third in milk sales.

For all questions related to milk, QMPS serves as a resource for dairy farms statewide. They operate four laboratories, strategically located in Ithaca, Cobleskill, Canton, and Warsaw, which places them within an hour's drive of about two-thirds of the state's 600,000 cows. Their primary goals are controlling disease, optimizing milk production, and ensuring judicious antibiotic use in dairy cows. They offer comprehensive milking assessments on farms, as well as a courier service that collects milk samples to test for a common udder infection called mastitis. Cows with mastitis often require antibiotic treatment, which renders the milk unfit for sale.

"WE REALLY LOOK AT THE WHOLE FARM SYSTEM AND WORK THROUGH BIG CHALLENGES."

—DARYL NYDAM DVM '97, Ph.D. '02



JESSICA MCART DVM '07, Ph.D. '13, SECTION CHIEF OF THE AMBULATORY AND PRODUCTION MEDICINE CLINIC

As both consumers and government regulatory groups have called on farms to reduce antibiotic use, Cornell researchers have begun looking for smarter ways to approach mastitis treatment. In some cases, using no antibiotics is the smartest option—Nydam has found that only about one third of all mastitis cases require the drugs. For many cows, the infection will clear up on its own, or the offending bacterium is not one that can be cured with antibiotic treatment. Farmers that use the QMPS diagnostic service or a similar service can reduce antibiotic usage by 60 percent, and dump less milk with antibiotic residue.

QMPS veterinarians also help farmers come up with management strategies that cover everything from worker training to milking parlor efficiency. Paula Ospina DVM '03, Ph.D. '12, an extension veterinarian with QMPS, offers trainings in Spanish, as the majority of dairies hire Spanish-speaking employees, many of whom are immigrants from Central American countries.

"We really look at the whole farm system and work through big challenges on farms," says Nydam.



DAIRY COWS STAND ON A ROTARY MILKING PARLOR AT SUNNYSIDE FARMS.



A PARLOR WORKER PREPARES A COW FOR MILKING.

On-farm solutions

On the way to a recent QMPS extension survey at Twin Birch Farms outside of Skaneateles, it's early enough, but too cloudy to see the sunrise. Matthias Wieland, an extension associate in the Department of Population Medicine and Diagnostic Sciences, Kerry Case, an extension aide with 25 years of experience, and Valeria Alanis Gallardo, a graduate student in animal sciences, have arrived in time for the morning milking. They will perform a comprehensive assessment of the farm to ensure that healthy cows are producing safe, quality milk. While trying to stay out of the way of the lightning-fast workers,

the team checks the vacuum levels and massaging action of the milking units, times the milkers to ensure that the cows receive enough stimulation to start the milk flowing, and checks hundreds of teats for cleanliness and good health.

As a break from the hectic pace of the milking parlor, Wieland walks every cow pen. He's checking that the cows have sufficient bedding so that when they lay down, waste goes into the alleys, where it won't come into contact with their teats and potentially lead to mastitis. He is pleased to see rows of well-positioned cows lying on a cushy layer of bedding.

The team also carefully dips into the stainless steel milk tanks for a sample to screen for organisms that cause mastitis, such as *Staphylococcus aureus* and *mycoplasma* species. Later, after all the results have been analyzed, Wieland will meet with the herd manager and give recommendations for any areas where the farm could increase efficiency or reduce disease risk.

For farmers who want to monitor mastitis-causing organisms through their own on-farm testing, Rodrigo Bicalho Ph.D. '08, associate professor in the Department of Population Medicine and Diagnostic Sciences, has founded a company called FERA Animal Health that provides veterinarians and farmers with a simple, overnight test. "Our product allows the dairy farmer to quickly and accurately identify the 33 percent of cows that should be treated and at the same time, surveys the herd for dangerous pathogens," says Bicalho. "This alone can save the use of literally tons of antibiotics."

Bicalho also founded a startup company called Bactana Animal Health that is developing a bacterial strain that can colonize the guts of newborn calves to protect them from harmful bacteria, while also promoting growth. In clinical trial, calves that received the bacterium, named *Faecalibacterium prausnitzii*, had lower rates of diarrhea and death and gained about 13 percent more weight than untreated calves. Bicalho estimates that the product will be on the market in three to four years.

Creatures great and small

For all other production animal health problems, local farms can rely on Cornell's Ambulatory and Production Medicine Clinic. With students in tow, these veterinarians help with difficult deliveries, perform pregnancy checks, and treat common cow issues like a displaced stomach and a metabolic disorder called ketosis. Along with seeing individual patients, the vets also make recommendations for improving whole herd health. About 85 percent of their work focuses on dairy cows, but they also treat horses, backyard pigs, sheep, and goats from fiber and dairy farms, and even the occasional camel or emu. The clinic sees more than 51,000 patients on farms each year.

Jessica McArt DVM '07, Ph.D. '13, assistant professor in the Department of Population Medicine and Diagnostic Sciences and section chief of the Ambulatory and Production Medicine Clinic, enjoys the incredible variety in her job. "We get to do a whole range of things, from helping 4-H kids grow up with animals to making management plans for an entire herd, as well as ensuring a good, safe, and wholesome food source in the way of milk."



JESSICA MCART, CHIEF OF CORNELL'S AMBULATORY CLINIC, GETS SUPPLIES OUT OF THE SERVICE TRUCK DURING A FARM CALL.

Sunnyside Farms, a dairy in Scipio Center, N.Y. with 4,400 cows, has used the ambulatory service for its primary veterinary care since 1995. "The role of the vet isn't just palpating cows and responding to emergencies," says owner Neil Rejman '97. "A large part is meeting with the herd manager to discuss biosecurity and herd health." In the past two decades, many students and residents have visited the farm for training. McArt was once a student on the farm. Rejman even happened to meet his wife, Elizabeth, while she was an intern for the ambulatory clinic.



CALVES CUDDLE IN A GROUP HOUSING PEN AT SUNNYSIDE FARMS.

Rejman also makes his cows available for research, which has the potential to benefit both his farm and the industry in general. Cornell faculty work with several local farms for research projects on milk quality, animal nutrition, zoonotic diseases, mastitis prevention, and lameness detection, just to name a few. One recent study, conducted at Sunnyside Farms by McArt, found that supplementing cows that have just given birth with calcium to prevent hypocalcemia, or “milk fever,” which occurs when blood calcium levels drop, was unnecessary with modern nutrition. Rejman estimates that he now saves up to \$15,000 each year by cutting out calcium supplements. With farmers facing low milk prices three years in a row, any cost-saving measure can help.

Good eggs

Dairy isn't the only significant agricultural operation in the state. New York is home to 10 commercial egg-laying operations, 350 smaller broiler and egg farms, and countless backyard flocks. Small farms that specialize in organic and pasture-raised eggs and broilers fill an important niche market in the state. The New York poultry industry produces approximately \$86 million of processed poultry products.

Disease outbreaks are few and far between in the biggest poultry operations, thanks to advances in breeding and the extensive use of vaccines, some of which were developed at Cornell, says Jarra Jagne DVM '90, a senior extension associate in the Department of Population Medicine and Diagnostic Sciences. Jagne leads the Avian Health Program, which provides disease testing, telephone consultations, and extension services for flocks of all sizes. The program also includes a duck research laboratory led by Gavin Hitchener for production of duck vaccines located on Long Island, N.Y., which was once a major duck farming area.

Salmonella enteritidis is the main disease concern with chickens because they can transmit the bacteria to humans



CORNELL UNIVERSITY DUCK RESEARCH LABORATORY

through eggs, causing severe food poisoning and occasionally death. The Animal Health Diagnostic Center (AHDC) on campus screens for the bacterium on all farms with more than 3,000 egg layers, in accordance with Food and Drug Administration guidelines.

The program also monitors farms and necropsy submissions for avian influenza. Birds are the main host for avian influenza, but some strains jump species and cause severe illness and death in humans as well. In Jagne's time, there have been no avian influenza outbreaks in the state, though occasionally the AHDC detects the less-virulent strains in poultry sold at the live bird markets in New York City. They screen about 2,750 samples from these markets annually.

This dedicated surveillance is a wise investment; an avian influenza outbreak would wreak havoc on the New York poultry industry. “In 2015 in the Midwest there was a devastating outbreak of highly pathogenic avian influenza and 48 million birds died or had to be destroyed,” says Jagne. The U.S. government spent close to \$1 billion to control the outbreak. “We stay on high alert all the time.”



DUCKS AT THE CORNELL UNIVERSITY DUCK RESEARCH LABORATORY

“AS A PRACTITIONER JUST TWO HOURS AWAY FROM CORNELL, I THINK IT’S A WONDERFUL RESOURCE, NOT ONLY TO HAVE STUDENTS, BUT ALSO FOR CONTINUING EDUCATION AND THE FRIENDS THAT I HAVE THERE, WHICH HELPS ME SERVE MY CLIENTS WELL.”

—MICHAEL CAPEL '96, DVM '00

The Cornell network

Cornell's biggest impact on animal-based agriculture in the state is likely to be the steady stream of highly trained veterinarians who are tapped into the most current research. Half of all veterinarians in New York graduated from the Cornell College of Veterinary Medicine, and along with owners and herd managers who studied animal science at the university, these alumni form a strong network for sharing information and ideas.

Michael Capel '96, DVM '00, a dairy veterinarian practicing in Perry, N.Y., stays active in this network by hosting student interns and participating in research on mastitis and ketosis with Cornell faculty. He also serves as chairman of the advisory board for QMPS and is a member of the College of Veterinary Medicine Advisory Council. "As a practitioner just two hours away from Cornell, I think it's a wonderful resource, not only to have students, but also for continuing education and the friends that I have there, which helps me serve my clients well."

Cornell faculty, students, and alumni also contribute to a culture that supports agriculture in myriad smaller ways. Each year at the Great New York State Fair in Syracuse, veterinary students are on deck at the Dairy Cow Birthing Center, ready to answer visitors' questions as they watch the birthing process. Many veterinarians also volunteer with local 4-H groups. Blake Nguyen DVM '12, director of Cornell's Teaching Dairy Barn, gives tours at this state-of-the-art dairy facility to visiting groups, such as Girl Scout troops, dairy consultants from China, and Cornell alumni.

Isabelle Louge '14, DVM '18 works at the Teaching Barn, where in 2016 she served as the student chief. She oversaw the milking workforce and offered training and advice on proper procedures—a skill that will serve her well as a dairy veterinarian. During her time at the college she has conducted research on hypocalcemia, attended Cornell's Summer Dairy Institute, and spent six weeks going out on calls with the ambulatory service.

Louge fell in love with cows while volunteering on farms in the Ithaca area where she grew up, and is excited that being a dairy veterinarian will let her work with individual patients while also making recommendations at the farm level that can have a positive impact for thousands of cows.

When she graduates in May, Louge will join the vast network of Cornell alumni in the state. She already has a job lined up with Bentley Veterinary Practice in the Hudson Valley where she'll work with livestock on farms of all sizes. "I really like the idea of being able to help the farmers have a good year so that they can make more investments that benefit their cows and their families," says Louge.



The Rise of Backyard Poultry

Households across New York state are installing chicken coops and raising their own farm-fresh eggs. But with the rise of backyard flocks has come the return of poultry diseases once thought to be under control.

Backyard chickens don't receive the same vaccinations or veterinary care as in commercial operations, because most poultry veterinarians work for large companies. "When I was in vet school, no one cared about chickens as patients," said Jarra Jagne DVM '90, a senior extension associate in the Department of Population Medicine and Diagnostic Sciences. "But chickens have become the new pets and there are lots of vets who have little knowledge about chicken diseases because it was not a part of the curriculum."

Jagne diagnoses many chickens with preventable infections, such as Marek's disease, a highly contagious tumor virus which is avoidable through a vaccine developed by emeritus faculty Bruce Calnek DVM '55 and Karel Schat Ph.D. '78. Backyard flocks may also carry Salmonella, but without testing, no one knows whether they pose a human health risk.

Jagne collaborates with Cooperative Extension county educators and serves as a resource for backyard poultry owners. She also teaches a course on poultry medicine and gives invited lectures in the hope that all veterinary students will leave Cornell with at least a little poultry knowledge.



PHOTOS BY JORDAN WHITT

WITH THE RISE OF BACKYARD CHICKEN FLOCKS COMES THE RETURN OF POULTRY DISEASES ONCE THOUGHT TO BE UNDER CONTROL.





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Healing the Homeless:

How Maddie's Fund® Helped Establish Shelter Medicine at Cornell

BY LAUREN CAHOON ROBERTS

Tommy has had it rough. The silver-coated, semi-feral cat suffered a leg fracture so serious that the shelter veterinarians working with him had no choice but to amputate his limb. Twenty years ago, Tommy would not have survived. Viewed as a nuisance and public health hazard, he would have died in the wild or been euthanized. Today, Tommy and millions of shelter animals like him receive care, comfort, and a chance at finding a forever home thanks to the groundbreaking efforts of Maddie's Fund®, a \$300 million family foundation established in 1994 by David A. Duffield '62 (Engineering), MBA '64, and his wife Cheryl in honor of their beloved Miniature Schnauzer, Maddie.

With support from Maddie's Fund®, the College of Veterinary Medicine launched the Maddie's® Shelter Medicine Program at Cornell in 2004 to advance the then-nascent discipline of shelter medicine and prepare a new generation of veterinarians and veterinary students to provide medical and behavioral outreach to animal shelters. Since then, Maddie's Fund® has made two additional grants to sustain and grow the program, bringing its funding for the university to more than \$3 million. The Maddie's® Program at Cornell serves as a model for how universities can partner with local agencies to promote lifesaving care for animals and a no-kill nation for all homeless dogs and cats.

Building a program

Around the same time the Duffields founded Maddie's Fund®, Janet Scarlett, professor



TOMMY, A SEMI-FERAL RESCUE, GETS EXAMINED.

of epidemiology (now professor emerita), attended a conference in the Bay Area focused on the high rates of euthanasia in stray cats and dogs. "People knew that many homeless cats and dogs were dying, but they didn't know how many," says Scarlett. "I told a colleague—how can I be in the middle of



MADDIE'S® SHELTER MEDICINE PROGRAM TEAM GATHERS AT THE TOMPKINS COUNTY SPCA FOR A FULL DAY OF SURGERIES.

my professional career and know so little about this area of veterinary medicine?” She returned home determined to begin filling the knowledge gap—starting at Cornell.

Scarlett's first step was to develop coursework on shelter medicine education. However, “as a professor of epidemiology, I hadn't been in clinical practice for years,” she says. “I could teach population medicine, but I needed someone with applied, clinical knowledge to help begin training students.” She connected with Lila Miller '74, DVM '77, who worked for the ASPCA as a shelter clinician, and in 1999, the two developed the first courses on shelter medicine in the country. Their work led the way for Maddie's® first grant to establish the Maddie's® Shelter Medicine Program at Cornell. The comprehensive program has since expanded beyond just DVM courses, adding a clinical rotation for fourth-year veterinary students and an internship program for veterinarians looking for hands-on training in shelter medicine. In two decades, Scarlett's goal of filling the knowledge gap has become a reality. “I am eternally grateful to Maddie's Fund®,” she says. “Our program would not be what it is today without their foundational support and ongoing commitment.”

Dave Duffield's daughter, Laurie Peek DVM '96, works on Maddie's® executive leadership team and devotes her time specifically to supporting veterinary schools that seek to advance professional training in shelter medicine. “As a veterinarian myself, I know how important it is to enable

professional training in shelter medicine, and how vital it is to the Maddie's Fund® mission,” says Peek. “It's been hugely gratifying to see the level of impact Cornell's program has had in educating the next generation of veterinarians.”

Indeed, Cornell's Maddie's® Shelter Medicine Program has made shelter medicine education at the College of Veterinary Medicine second to none. The third grant from the organization, in 2017, was made expressly to allow the college to hire an instructor who would teach this specialty. Erin Henry, a graduate of the University of Pennsylvania's School of Veterinary Medicine and former shelter medicine intern at Cornell, filled the position last summer.

Henry affirms the value of training students in the art of caring for companion animals in shelters. “My training at Cornell as a shelter medicine intern was invaluable. It gave me all of the tools and more that someone entering the shelter veterinarian field could want. It helps students learn about shelter medicine's many facets, which often require thinking outside the box, and offers a combination of ‘in the trenches’ shelter work with the intellectual support of a state-of-the-art academic facility. It takes new doctors just beginning their career and transforms them into veterinarians ready to take on the world of sheltering,” she says. “After my training with Maddie's® Shelter Medicine Program, I was able to perform at a high level.”



2017 SHELTER MEDICINE INTERN, LISA RODRIGUEZ, EXPLAINS A DENTAL PROCEDURE TO A CORNELL VET STUDENT DURING HER SHELTER MEDICINE CLINICAL ROTATION



SHELTER STAFF AND CORNELL VETERINARIANS AT WORK AT THE TOMPKINS COUNTY SPCA.

Multifaceted medicine

Henry now teaches these high-level skills at the SPCA of Tompkins County, just a few short miles from the College of Veterinary Medicine. On a sunny Tuesday morning in late February, she leads a group on daily rounds—an efficient review of each animal which takes into account their individual needs as a patient and the overall shelter population. The group comprises two fourth-year veterinary students, a shelter medicine intern, the veterinary technician for Cornell's Maddie's® Program, and the shelter's medical and adoption coordinators. Walking through the shelter, they review each animal's health status. Animals on the adoption floor are healthy, thus the group chats mostly about ways to ensure they move through the shelter as quickly as possible. "There will always be a few lingerers," says Henry, referencing animals that remain unadopted for longer periods, "so we're always thinking of ways to make them more adoptable and their stay as comfortable as possible."

Here, Henry and her team are applying their knowledge of herd health—the cornerstone of shelter medicine that Scarlett recognized as a need years ago. "Shelter medicine is really population medicine," Scarlett says. "Small animal veterinarians don't typically have to think about herd health the same way large animal practitioners do. In shelter medicine, we expose our students to thinking about the animal as a member of a larger population and keeping the entire population healthy."

Elizabeth Berliner DVM '03, the Janet L. Swanson Director of Shelter Medicine at the College of Veterinary Medicine, agrees. "In shelter medicine, you're not just treating individual animal conditions—you're also treating a population, and working to ensure the best welfare for each animal and the population as a whole." Thus, shelter vets must evaluate communicable diseases like gastrointestinal or upper respiratory infections as potential risks to an entire group of animals.

As Henry leads the group through the adoption center, they pass volunteers sitting and playing with cats in cozy rooms with big windows. Through the window beyond, another volunteer walks an enthusiastic pit bull mix across the lawn. It is clear that animal mental health is prioritized as well. "We need to know how to maintain animal welfare in captivity," says Berliner. "Behavioral enrichment is a huge part of what we do."

In addition to imparting population and behavioral health expertise, Cornell's Maddie's® Program helps students and trainees hone hands-on clinical skills. Shelter veterinarians must perform hundreds if not thousands of sterilization surgeries as a mainstay of shelter animal management. Its team spends two days a week at the SPCA of Tompkins County performing surgeries—procedures ranging from spays and neuters to dental extractions, limb amputations, and more.

A life-saving partnership

For Jim Bouderau, executive director of the SPCA of Tompkins County, collaboration with Maddie's® Shelter Medicine Program is a huge win-win. "They've taught me how to view our shelter as an 'animal pipeline' and helped me understand how to keep the pipeline moving efficiently. Not only do we get the highest standard of care for our animals, but we also work with a wide range of residents, interns, and students interested in shelter medicine who bring their own interests and areas of specialization to the program and our facility," he says. "Being able to provide a practical learning environment for these doctors and students is a highlight of what we do."

That mutually beneficial partnership is evident as Henry and her team walk to the intake, exam, and isolation facilities. They check on several cats receiving and recovering from treatments—including Tommy, the semi-feral gray cat that underwent a leg amputation. Henry and Shelter Medicine Intern Meagan Wentworth examine Tommy, who is doing remarkably well. "Cats can adapt very well to life with three legs," says Henry. "If we let go of him right now, he'd run out of here as if he was on four." When fully recovered, Tommy will go back to the woman who brought him in for treatment. This is the happiest outcome an animal like Tommy could hope for. In the past, "he would absolutely have been euthanized due to his personality and injuries," says Wentworth. "Even today, at many shelters, that would be the case. We're very lucky to have funding that enables us to save animals like Tommy."

Henry notes that this caliber of care has extended far beyond the local SPCA. "The impact on animals, direct and indirect, is immense. Our program provides primary care for around 2,000 animals per year through our work here, but it also extends well beyond that as interns and student graduates move on in their careers and work in shelters improving the lives of animals in need all over the country and abroad."

Helping shelters in New York and beyond

Since the SPCA of Tompkins County began collaborating with Scarlett and Cornell in the 1990s, its euthanasia rate has plummeted by more than 50 percent. By 2002, it was saving 100 percent of healthy dogs and cats, and became the second no-kill shelter in the nation. “Simply put, our success today would not have been possible without the Maddie’s® Program’s help,” says Bouderau. “Their expertise is invaluable in helping shelters raise the bar for the standard of care for our animals.”

Berliner cites a number of specific tactics as key to keeping the rates where they are. High volume spay and neuter efforts have significantly decreased unwanted litters of kittens and puppies. Additionally, controlling infectious disease is essential. “Preventing animals from becoming ill is a big part of the work we do,” says Berliner, noting the multiple variables they monitor and assess, including handling, pathway planning, biosecurity, and behavioral welfare. Efficient adoption is also key. “Less time in the shelter means less disease,” says Berliner. “A big focus of shelter medicine practice is decreasing the length of time these animals stay in the shelter.”

With help from Maddie’s Fund®, Cornell’s Maddie’s® Shelter Medicine Program reaches out to other facilities and veterinarians through educational forums and events like the

annual ASPCA Cornell Maddie’s® Shelter Medicine Conference, and an annual two-day disaster response workshop for CVM students and regional shelter staff. Additionally, Maddie’s® Shelter Medicine Program veterinarians conduct on-site consultations at regional organizations and phone consultations with shelter management and veterinarians across the country via their hotline. “We provide both targeted and broad-scale consultation services regarding any and all topics,” says Henry. “From outbreak response and management to facility design analysis, we help each organization provide the best possible care for their animals.”

This outreach helps meet a growing need for shelter veterinarian expertise. “We struggle to keep up with the demand for knowledge and support,” says Berliner. “More and more shelters are recognizing the importance of having a vet on site, either part or full-time. It used to be rare that a vet practiced in a shelter. Now many facilities are realizing the benefits of having shelter vets on-site for involvement in daily operations and management.” In the last two years, Maddie’s® Shelter Medicine Program at Cornell has seen a rapid rise in the number of animal shelters and humane organizations requesting their support. “We have served roughly 80 animal shelters and humane organizations in New York state in the



CARING FOR COMPANION ANIMALS, BOTH THOSE WITH AND WITHOUT OWNERS, HAS ALWAYS BEEN A PASSION FOR LAURIE PEEK DVM '96. SINCE GRADUATING FROM THE COLLEGE, SHE HAS PRACTICED SMALL ANIMAL MEDICINE AND SURGERY, AND ROUTINELY PROVIDES SPAY/NEUTER AND WELLNESS CARE THROUGH WORK WITH SEVERAL ANIMAL WELFARE ORGANIZATIONS IN HER COMMUNITY.



past year alone; when you look across the country and the globe, the number grows to more than 150 organizations,” says Berliner. “We are excited by this growth and proud of our ability to help shelters improve the care they provide. We expect the number of shelters in our circle to keep increasing with growing awareness of our program and ongoing support to sustain this critical work.”

Achieving dreams

As shelter medicine has become a greater priority, there has been an impressive decline in euthanasia rates across the nation. In 1999, 18 million animals were euthanized—today that number is down to 1.7 million—bringing the Duffields’ goal of a no-kill nation within reach. “Maddie’s Fund® is one of the main drivers of this change, and it’s been a hard road for sure,” says Berliner.

While Maddie’s Fund® and the Maddie’s® Shelter Medicine Program have been highly effective, there is always more to be done. “I would love to see the program help as many shelters as it can,” says Bouderau, noting that telemedicine and teleconferencing could be leveraged to enable Maddie’s® Shelter Medicine Program experts to consult with other shelters and do remote training.

Henry hopes to see the program continue to grow and inspire students and interns alike to pursue shelter medicine as a career path. “This program doesn’t only touch students who

enter vet school with an interest in shelter medicine; it often inspires students towards a path they may not have considered previously,” she notes.

“It’s a win-win all around—for organizations, veterinarians, animals, and communities—to have highly- trained veterinarians entering shelter practice,” says Berliner. “We are honored and proud to be a part of what has been a revolution in companion animal care in this country over the last two decades, and incredibly grateful to Maddie’s Fund® for their vision and support.”



JAN SCARLETT, FOUNDER OF MADDIE’S® SHELTER MEDICINE PROGRAM AT CORNELL (FAR RIGHT), DISCUSSES THE IMPORTANCE OF STUDY DESIGN WITH SHELTER MEDICINE INTERNS.

“WE ARE HONORED AND PROUD TO BE A PART OF WHAT HAS BEEN A REVOLUTION IN COMPANION ANIMAL CARE IN THIS COUNTRY OVER THE LAST TWO DECADES, AND INCREDIBLY GRATEFUL TO MADDIE’S FUND® FOR THEIR VISION AND SUPPORT.”

—ELIZABETH BERLINER DVM ’03, THE JANET L. SWANSON DIRECTOR OF SHELTER MEDICINE AT THE COLLEGE OF VETERINARY MEDICINE



CORNELL VETERINARY STUDENT TYLER JUNCO LISTENS INTENTLY AS ELIZABETH BERLINER TALKS ABOUT SAFE ANIMAL HANDLING DURING INITIAL INTAKE EXAMS.

HEALING PATIENTS ACROSS THE STATE

The Cornell University Hospital for Animals and its satellite clinics treat thousands of animals from across New York state. From a Labrador in Niagara to an owl from the Adirondacks, Cornell veterinarians provide expert specialty care to animals of all kinds from every region in the state.

GREATER NIAGRA Bob, Yellow Lab

Diagnosed with an arrhythmia, the Cardiology service at CUHA performed cardiac ablation to successfully treat Bob's condition.

"Our experience with Cornell was wonderful. He has a whole new lease on life."

—Owner Pamela Schwartz



THOUSAND ISLANDS SEAWAY Brew, Bernese Mountain Dog

As a seven-week-old puppy, Brew was treated for jejunal intussusception, a serious gastrointestinal condition.

Since then Brew has recovered fully and recently finished his AKC Championship title.

"We owe it all to you!"

—Owner Deborah Butler-Miller

THOUSAND ISLAND SEAWAY



GREATER NIAGRA

FINGER LAKES

CHAUTAUQUA ALLEGHENY



CHAUTAUQUA—ALLEGHENY Screech Owl

Hit by a car, an adult screech owl came to the Janet L. Swanson Wildlife Health Center with trauma to its head and eyes. Inflammation caused one eye to develop a rare green coloration. Thanks to expert care from Cornell wildlife veterinarians and veterinary ophthalmologists, the eyes returned to normal and the owl was released.



FINGER LAKES Glorius Grace, Jersey Calf

The miniature Jersey heifer was born unexpectedly and suffered from hypomagnesemia. The Ambulatory and Production Medicine treated her for the metabolic disorder and the calf went on to thrive.



CENTRAL NEW YORK Willow, Australian Shepherd

Willow was treated for several complications due to vasculitis. Thanks to Cornell clinicians' efforts, Willow is beating the odds and is doing well at home.

"Everyone at the facility has been amazing, starting at our first visit, and each time since."

—Owners Mark and Anita Waller



THE ADIRONDACKS Snowy Owl

This snowy owl came to the Janet L. Swanson Wildlife Health Center with a fractured wing. Clinicians gave her a sturdy bandage and sent her to wildlife rehabilitator, who will help the owl strengthen her flight muscles so that she can be released.

THE ADIRONDACKS



CAPITAL—SARATOGA Dax, Domestic Short Hair Cat

Dax came to the Soft Tissue Surgery service with a congenital chest wall deformity called a pectus excavatum. Cornell surgeons successfully fixed the issue, and Dax is now doing well.

THE CATSKILLS Benton, Maltipoo

Benson came to Cornell with mitral valve regurgitation, a fatal condition that causes backflow of blood in the heart's chambers. Cornell clinicians partnered with a Japanese team of veterinarians to perform open-heart surgery that gave Benson a new lease on life.

"This experience has been life changing for us and we cannot seem to express our thanks and gratitude enough."

—Owner Kelly Desilva



HUDSON VALLEY Amos, Mixed-Breed Dog

Amos came to the Sports Medicine and Rehabilitation service at Cornell University Veterinary Specialists when he couldn't walk due to a ruptured Achilles tendon. Veterinarians fitted Amos with specialized braces to help Amos walk again.



LONG ISLAND Khaleesi, Warmblood Mare

Khaleesi came to Cornell Ruffian Equine Specialists pregnant, with a broken pelvis and a chronic infection in the back of her hock. The clinical team removed the infected bone, treated the infected tissue, and applied aggressive antibiotic therapy. Thanks to these efforts, Khaleesi healed and delivered a healthy foal named Kadabra a few months later.



CENTRAL NEW YORK

CAPITAL SARATOGA

THE CATSKILLS

HUDSON VALLEY

LONG ISLAND

NEW YORK CITY



NEW YORK CITY Raleigh, Hound Mix

Raleigh came to the Cornell University Veterinary Specialists' Dentistry and Oral Surgery service with a tumor in her mouth, which the clinicians successfully removed.

BUILDING THE SCAFFOLD:

COLLEGE ALUMNAE VOLUNTEER TO HELP NEXT GENERATION OF CORNELL WOMEN

BY OLIVIA HALL

Cornell has long been a leader in the higher education of women. Fulfilling Ezra Cornell's promise to "found an institution where any person can find instruction in any study," in 1870 the university became one of the first among its peers to admit female students. In the same spirit, the College of Veterinary Medicine awarded a DVM degree to Florence Kimball in 1910, making her the first woman in the United States to earn such a title.

Nevertheless, the 1990 creation of the President's Council of Cornell Women (PCCW) by then-President Frank H.T. Rhodes—at the suggestion of University trustees Lilyan Affinito '53 and Patricia Carry Stewart '50—acknowledged the need and opportunity to do much more to strengthen women's roles across the university. Since then, hundreds of Cornell alumnae have followed the call to further issues of importance to women at Cornell; engage accomplished alumnae by strengthening their ties to the university and each

other; provide financial support to Cornell women and programs through grants and scholarships; develop leadership skills of Cornell women; and serve as role models on numerous committees.

"The energy is contagious"

Currently, six highly accomplished alumnae of the College of Veterinary Medicine are among their ranks as members-at-large, in addition to three sustaining members. Approximately 60 alumnae per year are invited by Cornell's president to join PCCW for a six-year term. Present members like Renee Bayha Gossett '80, DVM '86, an associate veterinarian at the Pound Ridge Veterinary Center near South Salem, N.Y., have helped newer members get acclimated and exposed to the breadth of opportunities to engage with alumnae, students, and faculty. Among these newer members are Bayha Gossett's classmates Lisa Freeman '81, DVM '86 and Liz Dole '82, DVM '86; Mari Morimoto '96,

DVM '01; Ellen Carlin DVM '07; and Carol Gamez DVM '91.

"I haven't been a member that long but already I feel welcomed and excited to do more," said Gamez, who owns the Georgetown Veterinary Hospital in Connecticut with partner Stanley Truffini DVM '78 and has a strong interest in exotic and avian medicine. "The energy is contagious. My first several meetings I was in awe at the organization and the leadership and openness of the group members. Everyone was so involved and respectful of each other."

This community of dynamic women works throughout the year, coming together at meetings and an annual symposium. As many alumnae whose initial terms have expired remain involved as sustaining members, PCCW creates far-reaching and powerful networks within and outside the university.

Creating new leaders

For Freeman, the acting president of Northern Illinois University and a member of PCCW's Faculty Engagement Committee, these connections have the potential to give a significant boost to women. "I believe that it is important for women to have mentors to support their success," she said. "I understand that women may face implicit bias as they advance in their careers and that one important way to minimize the impacts is through sponsorship and through the advancement of women to leadership roles."

Bayha Gossett has chosen to tackle this mission as a member of the Mentoring Committee, one of several on which she serves. She also sits on the Cornell University Council Administrative Board. On behalf of PCCW, she has helped to create a speaker series in conjunction with Cornell's Graduate



MEMBERS OF THE PRESIDENT'S COUNCIL OF CORNELL WOMEN WELCOME MENTEES.



CARLIN



GAMEZ



BAYHA GOSSETT



FREEMAN

College alumnae currently serving as PCCW members-at-large

Renee Bayha Gossett '80, DVM '86

South Salem, N.Y.

Associate Veterinarian, Pound Ridge Veterinary Center

Ellen Carlin DVM '07

Washington, D.C.

Senior Health and Policy Specialist, EcoHealth Alliance

Liz Dole '82, DVM '86

Orange, Va.

Drug Safety Veterinarian, Merck Animal Health

Lisa Freeman '81, DVM '86

DeKalb, Ill.

Acting President, Northern Illinois University

Carol Gamez DVM '91

South Salem, N.Y.

Co-Owner, Georgetown Veterinary Hospital

Mari Morimoto '96, DVM '01

New York, N.Y.

Owner, Vet On-the-Go, PLLC

Freelance translator & interpreter

and Professional Women's Network (GPWomenN). Supported in part by a \$10,000 PCCW Leadership Grant, the series brings five speakers to campus throughout the year to lecture on leadership topics to an audience primarily in the STEM fields.

Gamez, who calls Bayha Gossett her "PCCW buddy," is focusing her efforts on individual mentoring, drawing on her own experience as a first-generation college student. "Currently I have one mentee that I am excited to build a relationship with," she explained. "As a young Mexican American woman, I wished I had someone to mentor me as I navigated my way through college and the unknown. I was very naive and could have used some good sound advice, so now I hope to motivate other young women to find their passion and go on to succeed in their fields of study."

Inclusion and diversity are issues close to Morimoto's heart as well. In fact, she sees her invitation to join PCCW as a reflection and continuation of her work in these areas. In addition to PCCW, Morimoto is helping to plan this year's first ever All-Diversity Reunion at Cornell.

Liz Dole also brings a strong volunteer résumé to PCCW, having served multiple terms on the college's Advisory Council and on the board of the Central New York Veterinary Medical Association. She continues the college's tradition of alumnae lending their expertise to the university community through PCCW, inspiring future generations to get involved.

Perhaps it is a testament to the early accomplishments of such organizations as PCCW that Ellen Carlin, Senior Health and Policy Specialist at the non-profit EcoHealth Alliance and member of the PCCW Communications Committee, never felt disadvantaged by her gender. "I have been fortunate to have not felt for a second that there were any doors open to men that were not open to me," she said. "But I recognize that is not true for everyone." Through her PCCW work, for example, she learned that the all-women's Cornell University Chorus is still seeking to achieve financial and experiential parity with the men's Glee Club. "I'm happy to be a small part of helping them get there," she said.

"CORNELL CHANGED MY LIFE. IT WAS MY BUILDING BLOCK, AND I OWE IT TO CORNELL TO GIVE BACK."

—CAROL GAMEZ DVM '91

Giving back

Carlin shares this desire to support the next generation of women with her fellow PCCW alumnae, all of whom are driven by a deep sense of gratitude. "Cornell changed my life," Gamez said. "It was my building block, and I owe it to Cornell to give back." Carlin echoed her sentiment: "Because so many people at Cornell helped create the scaffold that enabled my own career, I feel a total sense of obligation to do the same for today's students," she said.

In PCCW, Carlin has found an ideal avenue, one she recommends to all potential members. "It's a great opportunity with no downsides," she said. "You can give as much or as little time as your schedule allows for, and it's a nice way to still feel connected to campus from far away."



HORSEPOWER:

Cornell and the Harry M. Zweig Memorial Fund for Equine Research keep the New York horse industry healthy

BY LAUREN CAHOON ROBERTS

A newborn foal receives a vaccine that improves its odds against harmful diseases; a Standardbred once diagnosed with roaring can now breathe freely as it paces down the homestretch; a thoroughbred identified as having a high breakdown risk is allowed to heal rather than race. These are just a sample of the many clinical advances pursued by researchers at the Cornell University College of Veterinary Medicine, thanks to the Harry M. Zweig Memorial Fund for Equine Research. Since its establishment in 1977, the fund's mission has been to support both basic and applied research that benefits the New York state's equine industry, with the college serving as the engine of discovery.

A prolific founder

The fund's namesake, Harry Zweig, received his DVM from Ohio State Veterinary College in 1938. He went back to his hometown of Nassau, N.Y. to start a large animal private practice and later a successful Standardbred farm. Zweig became a huge proponent of harness racing and worked greatly to improve both the breeding and racing of Standardbreds in the state. Zweig was also instrumental in the passage of New York state's Laverne Law in 1965, which mandated that a portion of the harness racing industry's purse money goes towards improving the breeding of horses and equine research in New York state. The legislation transformed the industry by increasing the number of owners and breeders and improved the quality of the state's racing stock.

His death in 1977 spurred the New York State Legislature to establish the Harry M. Zweig Memorial Fund for Equine Research, which supports translational equine research projects at the college, where he served as a member of the advisory board. The fund, created as an amendment to the

pari-mutuel wagering and breeding law, recognized Zweig's efforts in bolstering New York State's equine industry. Since its establishment, the fund receives two percent of all money accruing to the Agriculture and New York State Horse Breeding Development Fund and the New York State Thoroughbred Breeding and Development Fund from the state's tracks and off-track betting.

The statute established a committee to administer the Zweig fund; its members include the chairman of the New York State Gaming Commission or his designee, the dean of the College of Veterinary Medicine at Cornell or his designee, a member or the executive director of the Agriculture and New York state Horse Breeding Development Fund, a member or the executive director of the New York State Thoroughbred Breeding and Development Fund, and at least five New York state breeders, owners, trainers, or veterinarians in equine practice.

Decades of dedication to equine health

For almost 40 years now, the Zweig Fund has bolstered innovative research at the college, which in turn helps provide the equine industry with advances in health and performance.

Cornell has developed equine research projects in the following areas supported, in part, by the Zweig Fund: reproduction, orthopedics, genetics, cardio-respiratory functions, nutrition, and infectious diseases. These research programs have attracted additional funding from national agencies and foundations, produced new information and clinical applications, and provided training for a generation of students who are now pursuing successful independent careers.

In addition, the Zweig Fund has been instrumental in supporting the careers of equine researchers through three-year positions that fund the faculty member or scientist in their career. These researchers include:



Julia Felipe Ph.D. '02, associate professor, section chief of Large Animal Medicine:

Felippe's research focuses on identifying a way to augment the immune system of foals to reduce their susceptibility to disease. Felipe's Zweig-funded research examined the fact that the degree of a foal's susceptibility to infection in the neonatal period is partially dependent on the adequacy of transfer of maternally-derived antibodies through the colostrum. "The horse placenta does not allow transfer of antibodies during gestation; hence the foal is born essentially devoid of antibodies," Felipe explains. "The maternally-derived antibodies absorbed in the first few hours of life confer short-lived, limited protection against environmental pathogens for the initial one to two months of life. After this, the maternal antibodies reduce to very low levels, and the foal must depend on its own immune system to resist infections."



Bettina Wagner, professor and chair of the Department of Population Medicine and Diagnostic Sciences:

Wagner studies the regulation of the equine immune system, allergic reactions in horses, and the relationship between the innate and adaptive immune responses. Thanks to Zweig and USDA funding, Wagner developed several reagents to study the immune response to Equine herpesvirus type 1 and the mechanisms leading to immunity and protection from disease in foals.



Jonathan Cheetham Ph.D. '08, associate professor, large animal surgery:

Cheetham examines the clinical issue of laryngeal neuropathy (commonly known as 'roaring'), which is a common cause of diminished athletic performance and abnormal breathing noise in horses. Cheetham studies treatments using regenerative medicine such as tissue engineering, reinnervation, and functional electrical stimulation techniques. He also studies the immune response involved in both the damage and recovery of nerve tissue in the upper airway.



Gerlinde Van de Walle, assistant professor at the Baker Institute for Animal Health:

Van de Walle focuses on infectious disease and wound healing. For the first category, she examines the possible roles of viruses in two common conditions in horses: ulcers and hepatitis. Van de Walle's work has uncovered evidence that an infectious cause may be to blame for some ulcer cases, a possibility that offers new treatment options or even a cure, says Van de Walle. "If we can link ulcers to an infectious cause we can treat these affected horses and heal them," she says. In the case of hepatitis, Van de Walle investigates the ways in which nonprimate hepacivirus (NPHV) causes liver inflammation. Finally, Van de Walle is testing stem cells to determine whether they can aid in the wound healing process in horses—which can be quite slow.

With the breadth and depth of scientific work the Harry M. Zweig Memorial Fund for Equine Research has supported over the decades, Zweig's legacy of championing horses and the equine industry in continuing support from the fund will do so for decades to come.

Zweig-funded research:

All proposals for Zweig funding are reviewed by the College Research Council which is comprised of CVM faculty. This group then makes recommendations to the Zweig Committee, which makes the final decisions about awarding funds. Zweig-funded research is meant to be practical and produce results that can translate directly to help the equine industry in New York state. Past and present research projects have included:

- Transvenous electrical cardioversion to treat horses with atrial fibrillation
- Using nerve grafts and other regenerative treatments of laryngeal paralysis
- Determining genetics behind recurrent laryngeal neuropathy in racehorses
- Surgical and regenerative therapies for treatment and prevention of equine arthritis
- Understanding innate and adaptive equine immunity for development of neonatal vaccines
- Preventing and predicting acute breakdown in racehorses
- Immunology, vaccination, and treatment of equine herpes virus type 1
- Stem cell therapy in wound healing
- Jugular thrombosis treatment
- Controlled postponement of ovulation in mares for breeding management
- Prevention of Theiler's disease
- Post-operative incisional infections in horses receiving abdominal surgery
- Understanding how the equine mother, fetus, and placenta communicate and compromise during pregnancy





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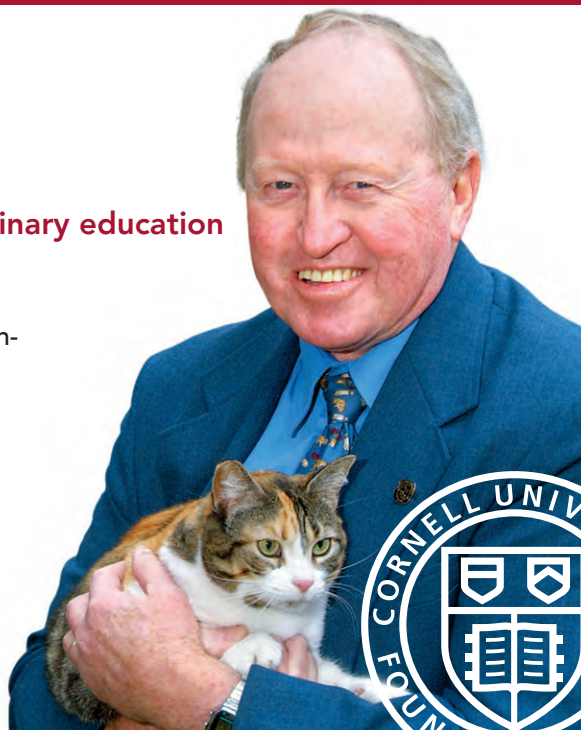
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In Memoriam

Since the Summer 2017 issue of 'Scopes, the college has been notified of the passing of the following:

John H. Baldwin DVM '57, July 29, 2017

Richard R. Basom DVM '44, November 12, 2017

Nicholas Berry DVM '54, July 26, 2017

Malcolm B. Carsley DVM '47, July 12, 2017

William W. Crandall DVM '60, October 17, 2017

Lewis A. Goldfinger DVM '53, November 28, 2017

Rodney S. Graves DVM '56, April 25, 2017

N. Bruce Haynes DVM '52, October 7, 2017

Donald C. Hunt DVM '61, January 27, 2018

Jay D. Hyman '55, DVM '57, August 1, 2017

Lance F. Karcher '79, DVM '85, January 28, 2018

C. Edward Kemp '69, DVM '71, October 28, 2017

Moe Kopp DVM '40, November 2017

Robert W. Nichols Jr. DVM '74, June 30, 2006

Malcolm C. Peckham DVM '50, June 22, 2017

Paul J. Phillips DVM '54, March 10, 2018

Carleton W. Potter DVM '40, March 16, 2018

Stewart R. Rockwell DVM '50, November 29, 2016

William G. Ryan DVM '46, December 10, 2016

Jeanette Sams DVM '46, February 10, 2018

Steven P. Sanford '76, DVM '79, June 8, 2017

Lee H. Schechter DVM '75, December 17, 2017

Norman Simon DVM '50, March 10, 2017

Ceylon M. Sutherland DVM '54, March 4, 2018

Robert J. Toole '82, DVM '89, February 28, 2018

D. Jesse Wagstaff DVM '62, September 1, 2017

Robert M. Wainwright DVM '52, November 5, 2017

John E. Willson DVM '54, December 13, 2017

Donald O. Wirth DVM '58, July 3, 2017

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Katherine Edmondson, Assistant Dean for Students and Instruction

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Susan Ackermann DVM '86, President, Alumni Association Executive Board

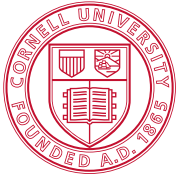
David A. Behnke, Chair, Baker Institute/Cornell Feline Health Center Advisory Council

Kimberly R. Kahn DVM '09, Chair, Young Alumni Annual Fund

Mitchell E. Kornet '76, DVM '79, College Advisory Council Chair, Annual Fund Chair







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