

# FLINT ANIMAL CANCER CENTER

NEWSLETTER | Spring 2019



## PASSION & VISION FUEL NEW RESEARCH PROGRAMS

Drs. Keara Boss and Dan Regan are busy setting up new research programs at the Flint Animal Cancer Center.

**A**FTER MORE THAN 35 YEARS, THE ROBERT H. AND Mary G. [Flint Animal Cancer Center](#)'s comparative oncology research program continues to flourish, thanks to both brilliant staff and investment from private philanthropy and successful grant funding. Further strengthening our impact is the addition of two new research programs led by faculty members, [Dr. Dan Regan](#) and [Dr. Keara Boss](#).

Regan trained as a veterinarian at the University of Georgia and is a board-certified pathologist. He then completed a Ph.D. in tumor immunology at Colorado State University. He recently received a faculty position following postdoctoral research at the cancer center. Boss is a board-certified radiation oncologist and also holds a Ph.D. in radiation biology from North Carolina State University. Boss joined the Flint Animal Cancer Center in August 2016.

It typically takes a new faculty member two years to establish a research program, which includes hiring a team, ordering equipment, and writing grants to fund their programs. Both Regan

and Boss are already making an impact by asking big questions in their common quest to conquer cancer in all species.

### IN SEARCH OF ANSWERS TO COMBAT METASTATIC DISEASE

When Dr. Dan Regan talks about his work in cancer research, he boils it down to a simple analogy known as the seed and soil theory. He wants to understand how cancer cells (seeds) know where to find welcoming locations to take root (soil). In science speak, Regan studies the tumor microenvironment and metastatic disease.

His new research program at the Flint Animal Cancer Center is based on the work of Stephen Paget, an English surgeon during the late 19th century who was the first to theorize that the microenvironment played an important role in the spread of cancer.

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“When a plant goes to seed, its seeds are carried in all directions; but they can only live and grow if they fall on congenial soil. ... While many researchers have been studying ‘the seeds,’ the properties of ‘the soils’ may reveal valuable insights into the metastatic peculiarities of cancer cases.”

– Stephen Paget

“During my doctoral studies in tumor immunology, I came across a paper from 2005 describing how cancer cells condition distant sites before metastasizing,” said Regan. “The paper cited the work of Stephen Paget that had been forgotten for more than 100 years. For me, it was a mind-blowing idea and quickly became my passion.”

At the same time, it also became personal when Regan’s father was diagnosed with cancer.

As Regan learned more about the tumor microenvironment, he discovered it was not well understood and a field ripe for exploration. After nearly a decade of study, Regan believes one key to combatting metastatic disease is understanding how the primary tumor conditions the soil in distant locations. In both pets and people, metastatic disease continues to puzzle scientists and challenge clinicians. Once the cancer spreads, there are few treatment options. Regan is on a mission to change that fact.

His current projects include investigations relating to two highly metastatic cancer types. The first study focuses on breast cancer, which is the most common cause of female cancer mortality, with the majority of these deaths resulting from metastatic disease. While the initial response rate to tumor treatment can be up to 90 percent, recurrence is frequent, and the tumors that eventually spread are typically resistant to anti-cancer therapies. His study aims to understand changes within the host tissues/organs of metastatic sites that support this drug resistance, in hopes of identifying treatments that can prevent or reverse these changes and restore tumor cell drug sensitivity.

In a second study, Regan is on a quest to improve outcomes for patients diagnosed with osteosarcoma. Unfortunately, the prognosis for this

disease has not changed in more than 25 years, primarily due to an inability to predict and therapeutically target lung metastasis, the most common site for the cancer to spread. This project hopes to define the critical elements of non-malignant host cells that promote this lung metastasis. He believes the results of this study will provide the foundation for future investigations to evaluate new therapies and identify patients who may be prime candidates for these treatments to slow or prevent metastasis.

“More than anything, I want to give hope to patients, both pets and people, with metastatic disease,” said Regan. “I’m grateful for the opportunity and ready to make an impact.”

## FORGING A NEW PATH IN RADIATION BIOLOGY

Combining a busy clinical schedule with a robust research program is no small task, but Dr. Keara Boss makes it look easy. After settling into a demanding clinic rotation, Boss has hired lab staff, purchased equipment, and received funding for her work in radiation biology research. Never one to start small, she has a variety of projects in progress. Her dual role as a clinician and scientist is unique in veterinary medicine.

“I’m lucky that I can tie together two different angles of my career,” said Boss. “I love the clinical aspect of my job, treating veterinary patients and working with their families. Treatment planning sparks so many interesting conversations within our team, which leads to important questions that then we can investigate through clinical studies, thanks to our strong trials program. It’s also great to step into the lab. Basic science cancer research is critical to understanding what’s happening with our patients at a deeper level. Tumor and normal tissue responses to radiation therapy, and all cancer therapies, are complex, and the work coming out of the lab helps to piece it all together.”

With a variety of tumor types available to study, Boss is focusing her work on head and neck cancers, which are locally aggressive in pet patients and can behave similarly in people. She is most interested in studying the immune effects of radiation

therapy. The field of radioimmunology is flourishing; however, many important questions remain.

In a new clinical trial, Boss hopes to address how treating lymph nodes with stereotactic radiation therapy affect the immune response within the tumor and throughout the body in canine patients with oral carcinoma. Canine oral carcinomas share several characteristics with advanced head and neck squamous cell carcinoma in people. Due to the highly translational value of this project, Boss is collaborating with Dr. Sana Karam, a physician-scientist specializing in human head and neck cancer radiation oncology at the University of Colorado Anschutz Medical Campus. This study is part of the Colorado Clinical and Translational Sciences Institute CO-Pilot Program.

Boss also will be investigating approaches for improving the effectiveness of radiation therapy by combining it with immunotherapy. In collaboration with Dr. Steven Dow, professor of immunology and the director of the Center for Immune and Regenerative Medicine at CSU, she will be studying the immune response of canine cancer patients following treatment with stereotactic body radiation therapy with or without immunotherapy, within tumors, lymph nodes, and throughout the body.

“In the lab and in the clinic radiation therapy, particularly SBRT, has been shown to stimulate a strong immune response against tumor cells,” said Boss. “We want to see if we can further enhance the response when we combine radiation with immunotherapy. My hope is this is the first of many opportunities to work with Dr. Dow on translational radioimmunology studies to improve outcomes for our veterinary cancer patients and, hopefully, people too.”

Thinking about her vision for the future, Boss has an eye on the past. “My mentors, Dr. Mark Dewhirst, Dr. Don Thrall, and Dr. Susan LaRue, were all trained at CSU by Dr. Ed Gillette, who pioneered the field of veterinary radiation oncology. They have each contributed so much to promoting comparative oncology in radiation biology research. I have been fortunate to learn from them and, now, I hope to make them proud through my contributions to the field.”

## FOCUS ON FELINES

CATS GET CANCER TOO. IN FACT, millions of our feline friends are diagnosed with cancer each year. At the Flint Animal Cancer Center, 90 percent of our patients are canines, but that doesn't mean all of our work is focused on dogs. Several initiatives at the FACC center on the unique needs of cats.

### FELINE GI LYMPHOMA

The [Feline Cancer Core](#), a team of scientists from Colorado State University, is studying critical questions surrounding inflammatory bowel disease and gastrointestinal lymphoma in cats. The two diseases have puzzled veterinarians for years. Both GI lymphoma and IBD present with chronic diarrhea and vomiting. While IBD is the most common reason for these symptoms, veterinarians do not have an effective method to confirm IBD or rule out GI lymphoma. A lack of research into the root cause(s) of these conditions (diet, environmental toxins, genetics, etc.) leaves open questions about the best way to treat patients.

Thanks to private philanthropy, the team is hoping to answer big questions, including: What is the best way to confidently distinguish between feline IBD and feline GI lymphoma? What genetic and environmental

factors contribute to the development of IBD and lymphoma? Does chronic feline IBD progress or transform into feline GI lymphoma over time? What therapies can be developed to treat IBD and GI lymphoma?

Answers to these questions may have implications for people too.

"Cats live in the same environment as their owners, breathe the same air, drink the same water," said Dr. Craig Webb, principal investigator. "Through our study, we may find triggers that place both cats and people at higher risk for developing disease."

The goal is to recruit 100 owner-enrolled cats diagnosed with either IBD or GI lymphoma over the next two years. To learn more, please contact, Dr. Craig Webb, [cbwebb@colostate.edu](mailto:cbwebb@colostate.edu).

### NEW DRUG THERAPIES FOR CATS

Cats have unique and sometimes unpredictable challenges with chemotherapy due to their metabolisms. Unfortunately, very little information about the ideal use of anti-cancer compounds is available to guide cancer therapy in cats. The purpose of the Angelo Feline Therapeutics Discovery fund is to support studies in feline pharmacology to improve clinical outcomes for cats with cancer.



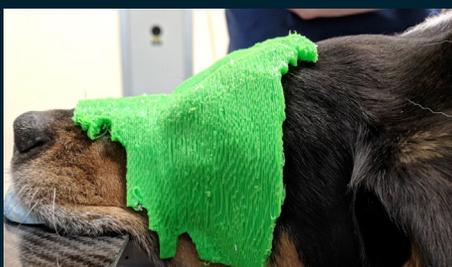
One significant outcome of this program was the development of a topical formulation that is rubbed on a cat's ear to improve appetite, which may be impacted by chemotherapy. The gel eliminates the need for "pilling," which can be traumatic both to the animal and the owner.

Currently, Dr. Dan Gustafson, director of basic research, Flint Animal Cancer Center, and a team of scientists are working to identify sources of variability within the domestic cat population with regards to drug metabolism. Recognizing these differences is the first step toward developing personalized medicine approaches in cats to make drug therapy safer and more effective. To support ongoing feline therapeutic research, please visit our [website](#).

## SETTING A NEW STANDARD IN RADIATION ONCOLOGY



Conventional bolus sheet



Custom 3D printed mold

The Radiation Oncology service at the Flint Animal Cancer Center is known for breaking new ground. They were the first veterinary oncology service in the U.S. to employ a linear accelerator to treat companion animals and the first in the world to offer stereotactic radiation therapy for pets.

Under the direction of [Dr. Del Leary](#), medical physicist, they are at it again. Over the last year, Leary has worked with radiation oncologists to develop 3-D-printed molds, known as boluses, that contour to patient bodies to improve radiation dose delivery to tumors. According to Leary, this novel approach currently is used in 10-20 percent of human radiation oncology services worldwide.

Until recently, FACC used conventional bolus sheets made of a gel-like substance. However, the sheets are limited in their ability to contour over irregular surfaces leaving air gaps that reduce the functionality of the bolus.

To create a custom bolus, Leary uses the patient's CT image and sends the data to the 3-D printer. The CT image provides a blueprint to create a unique mold that hugs curves and crevices.

"Using custom 3-D printed molds, we've found there's a better agreement between what we have in the planning system and the dose delivered to the patient," said Leary. "The molds minimize the air gaps so we can increase the dose to the tumor."

Putting the new technology to the test, radiation oncology resident Dr. Tiffany Martin found significant improvement to tumor coverage when using the custom mold compared to traditional bolus for head and neck cases. She has submitted her findings for publication.

"While this is a novel approach today," said Leary, "I think this quickly will become mainstream in both human and veterinary practice."

## FLINT ANIMAL CANCER CENTER NEWS BRIEFS

### LAFFERTY HONORED BY AIMVT

Longtime Flint Animal Cancer Center veterinary technician, [Mary Lafferty](#), will be recognized posthumously as an Honorary Oncology Veterinary Technician Specialist in the Academy of Internal Medicine for Veterinary Technicians. Lafferty began her career as a “bone nurse” in 1990 working alongside surgical oncologist Dr. Stephen Withrow. At the time, most of their work focused on osteosarcoma (bone cancer) treatment and research. Over the years, she served as a veterinary technician, mentor, study coordinator, and much more. She also co-authored 17 publications, a unique accomplishment for a veterinary technician.

Lafferty died in a tragic horseback accident in April 2018. AIMVT will honor Lafferty’s memory with a tribute during their pinning ceremony at the American College of Veterinary Internal Medicine Forum in Phoenix this June.

### WITHROW NAMED DISTINGUISHED ALUMNUS

Flint Animal Cancer Center founding director, [Dr. Stephen Withrow](#), has been named a 2019 Distinguished Alumnus by the University of Minnesota, College of Veterinary Medicine. Withrow, who completed his D.V.M. at the University of Minnesota in 1972, will receive the award during the College of Veterinary Medicine’s Points of Pride Research Day in October. The award recognizes Withrow’s “outstanding accomplishments in the field of veterinary research with particular attention to work in veterinary oncology with translational applications.”

### GUSTAFSON CHAIRS FIRST OF ITS KIND SESSION AT ASPET MEETING

[Dr. Dan Gustafson](#), professor of pharmacology and biomedical engineering and director of basic research at the Flint Animal Cancer Center, chaired a recent session at the American Society of Phar-

macology and Experimental Therapeutics Annual Meeting. The session, called “Companion Animals in the Cancer Therapeutics Development Pipeline,” was the first of its kind at this prestigious scientific conference.

Gustafson designed the program to highlight research in comparative oncology with a particular emphasis on cancer drug use in companion animals. The annual meeting, in conjunction with the Experimental Biology conference, attracted 12,000 scientists from around the world and provided an extraordinary opportunity to raise the profile of comparative oncology research and the work of the Flint Animal Cancer Center.

In addition to Gustafson, session presenters included Dr. Dawn Duval, associate professor of molecular oncology at Colorado State University, and FACC staff member and former FACC trainees, Dr. David Vail and Dr. Luke Wittenburg.

### ROOM DEDICATIONS HONOR MEMORY OF RILEY ANDERSON

Friends of the Flint Animal Cancer Center, Dawn and Brett Anderson, recently dedicated two new rooms to the memory of their cherished black lab, Riley. The “4R – Riley’s Radiation Rounds Room” honors the care he received from the cancer center during treatment for a soft tissue sarcoma and a brain tumor. The naming gift will support a comparative oncology clinical trial led by radiation oncologists Dr. Keara Boss and Dr. Sue LaRue. The Andersons also paid tribute to Riley’s memory with the naming of the “RAMS – Riley’s Advocates Meaningful Support” Room. The additional gift supports the counseling work of Colorado State University’s Argus Institute. Through these gifts, the Andersons hope Riley’s memory will live on and also impact the lives of future patients.



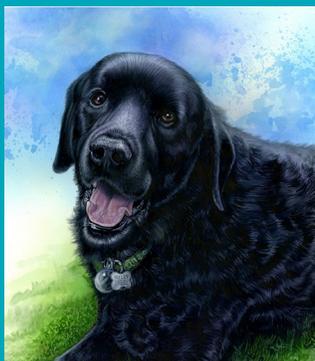
Mary Lafferty will be awarded an honorary VTS in June 2019.



Dr. Stephen Withrow named Distinguished Alumnus.



Dr. Dan Gustafson chaired session at ASPET Annual Meeting.



This portrait of Riley Anderson, created by Monte Moore, will hang in the rooms bearing his name.

## WHERE ARE THEY NOW?

Over the last four decades, many residents and fellows have graced our halls with their intelligence, dedication, and caring, often leaving deep and lasting impressions with our clients, who ask “where is \_\_\_\_\_ now?” Here’s an update on three of our amazing “graduates.”

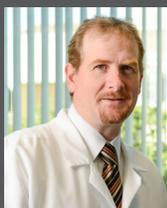
Dr. Jolle Kirpensteijn  
Surgical Oncology Fellow  
1992-1993



After my time at the Flint Animal Cancer Center, I was appointed assistant professor of the Veterinary Medicine department at Utrecht University in the Netherlands. Before leaving CSU, Dr. Steve Withrow inspired me to follow his footsteps in Europe and set up a surgical oncology service at Utrecht University and spread the love for surgical oncology all over the world. I went through the academic ranks and became a professor in surgery at the University of Copenhagen in 2005, and then a full professor in surgery at Utrecht University in 2008. After 20 years of a fantastic academic career, I switched alliances in 2013 to the corporate world and am now the chief professional veterinary officer at Hill’s Pet Nutrition in the United States.

I loved the awesome team I worked with during my time at CSU. The experiences I had while working at the James L. Voss Veterinary Teaching Hospital instilled in me a balance of enjoying the beauty around you while working passionately for things you love and admire. I have never forgotten this lesson; it has shaped both my personal and professional career, and Colorado State University will always have a special place in my heart.

Dr. Robert Rebhun  
Medical Oncology Resident  
2006-2008



I took a little different track and completed a Ph.D. in cancer biology after veterinary school. My goal was to be a clinician-scientist, and the Flint Animal Cancer Center had a long-standing history of training and mentoring clinician-scientists. I didn’t have the same amount of clinical experience as most of my resident peers, and I will always be grateful to the FACC for taking a chance on me and giving me a clinical residency following my Ph.D.

After my residency, I joined the faculty of the University of California – Davis, School of Veterinary Medicine, and I’ve been there ever since. I currently serve as professor and Maxine Adler Endowed Chair in Oncology. I enjoy the balance between research, clinics, and teaching.

My favorite FACC memory involves Dr. Steve Withrow pulling me out of morning rounds to ask me to see a new case. The client and patient were flying into the Fort Collins airport around 10 a.m. He wanted me to admit the patient, complete bloodwork and a CT scan, and have the patient in the operating room by 1 p.m. because that was the only window of time he could “cut it.” No pressure!

Dr. Luke Wittenburg  
Graduate Student & Postdoc  
2005-2016



During my first clinical oncology rotation as a vet student at CSU, I decided to make veterinary oncology my career. After completing my D.V.M. and an internship, I interviewed for an oncology residency at the Flint Animal Cancer Center. At the interview, Dr. Steve Withrow mentioned a new cancer biology Ph.D. program. Up to that point, I thought a clinical position was my next step, but the opportunity to be involved in research excited me.

In 2005, I became the first veterinarian enrolled in the cancer biology Ph.D. program at CSU. After completing my Ph.D. in 2010, I became a postdoctoral researcher and resident in veterinary clinical pharmacology. Following residency, I spent time as a research associate and then became a special appointment assistant professor. I think, in all, I had five offices in my time at the FACC!

After 11 years at CSU, I joined the faculty at the University of California – Davis. I am currently an assistant professor and work in the Center for Companion Animal Health. My current position allows me to use all aspects of the broad training that I received at the FACC. What’s more, I get to work with some great people, some of whom I first met while working at the FACC.

# Innovations in Surgical Oncology

FACC faculty employing technology to advance patient care



The [Flint Animal Cancer Center](#) has a long history of pioneering innovations in veterinary cancer treatment. In particular, founding director, [Dr. Steve Withrow](#), was instrumental in the development of the surgical limb spare and several oral/facial reconstruction procedures. Today, these techniques are common practice around the world.

Withrow set the stage for FACC faculty to think outside the box in the pursuit of advancing patient care. Today, the FACC surgical oncology team is harnessing technology to tackle a variety of challenges that impact patient well-being and outcomes.

## 3-D PRINTING TECHNOLOGY TO PERSONALIZE IMPLANTS

One of the most common cancers in dogs is osteosarcoma (bone cancer). Typical treatment includes amputation, but for some patients, amputation is not an option due to neurologic or orthopedic issues. The limb-spare technique developed by Withrow provided a solution for those patients (and human patients too). While a saving grace for many, it also comes with complications. Common challenges include infection,

biomechanical failure, and local recurrence. Of these, implant failures – plate breaks, screws pulling out – occur in up to 60 percent of cases in pets.

FACC-trained surgical oncologist and associate professor, [Dr. Bernard Séguin](#) is hoping to use 3-D printing technology to overcome one or more of these challenges.

“This project came along as I was trying to think of a novel way to reduce the complication rates with traditional limb-spare surgery,” said Séguin.

Conventional implants are straight, which limits how well they fit and consequently increases the stress on the implant and bones when a patient places weight on the treated limb. Séguin hypothesized that implant failure would be reduced if the implant was designed to fit the shape of the bones of each dog. In his pilot study, Séguin worked with engineers at the Department of Mechanical Engineering at *École de Technologie Supérieure* in Montreal to 3-D print personalized implants using the patient’s CT scan images.

The pilot project included five patients. Séguin completed the first surgery in September 2017 and the final surgery in late December of that year. Before drawing any conclusions on his

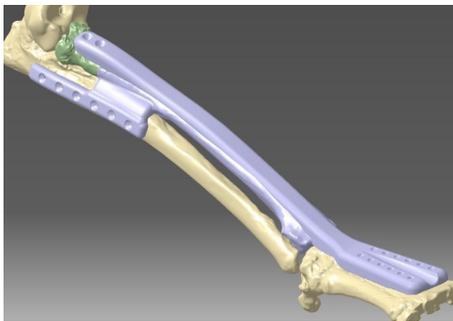
premise, Séguin will follow each patient's progress for more than eighteen months.

While no two patients responded in the same way to their 3-D implant, infection has been a challenge for most. Séguin has some ideas on how to address that using 3-D printing.

"I'm thinking about how we might be able to use the implant itself to address infection," said Séguin. "Moving forward, I'd like to explore coating the implant with silver, which has antibacterial properties, or antibiotics."

While results are still pending, Séguin believes he's learned enough to continue to explore the potential of this personalized approach to limb-spare surgery.

"I'm excited about this technology, and as we work on refining the process, I'm hopeful we'll address two of the major complications with traditional limb-spare surgery for both our patients and human patients as well."



Personalized 3-D-printed implant

## STEM CELLS: MAKING MUSCLES WORK AGAIN

Like her colleagues, [Dr. Nicole Ehrhart](#), professor and surgical oncologist at the Flint Animal Cancer Center, is studying innovative ways to improve patient lives after surgery. Ehrhart has dedicated the last two decades to investigating the use of stem cells to enhance patient healing following limb-spare surgery and other procedures that remove cancerous sections of bone or muscle.

Along the way, advances in the field of nanotechnology have opened a variety of possibilities for stem cell applications. With these advances, Ehrhart has demonstrated success in using stem cells to promote bone growth in limb-spare patients.

More recently, Ehrhart has turned her focus to muscle-derived stem cells. The goal of her work is to address muscle damage following trauma such as the removal of a large tumor. Currently, there is no medical solution to aid in replacing lost muscle – it heals as scar tissue, which reduces function.

In a pilot study funded by the Limb Preservation Foundation, Ehrhart used donated muscle, removed the cells to create a muscle scaffolding, added muscle stem cells, and placed the muscle in rats. In her study, she found the rats with the "new muscle" recovered 97 percent of their muscle function, while those rats with only scar tissue lost 40 percent of muscle function.

Excited by the initial results, Ehrhart wanted to learn more about muscle stem cells and how they work. To advance her study, she recently completed a six-month sabbatical working with Johnny Huard, Ph.D., director, and chief scientific officer at the Steadman Philippon Research Institute in Vail, Colo. Huard happens to be the researcher who discovered muscle stem cells.

"One of the great things about being immersed in other institutions," said Ehrhart, "is that you have the opportunity to absorb and be a sponge. Out of that comes a lot of creativity. When you put great minds together, sparks fly."

Energized by her experience, Ehrhart is pursuing answers to new questions relating to muscle stem cells and their applications for cancer patients. She's also in the middle of a second study to validate the result of the pilot study that led to her sabbatical.

"I feel like this is just the beginning," said Ehrhart. "I can't wait to harness these discoveries to benefit our pet patients and people too."

## STATE-OF-THE-ART OPERATING ROOM OFFERS NONINVASIVE SURGICAL ALTERNATIVE

Nearly one year ago, the James L. Voss Veterinary Teaching Hospital at Colorado State University opened a new state-of-the-art [hybrid operating room](#), the first of its kind in veterinary medicine. Since then, Flint Animal Cancer Center surgeons have collaborated with veterinary cardiologist and hybrid

OR specialist, [Dr. Brian Scansen](#), to employ the operating suite's advanced technological capabilities to benefit a variety of oncology patients.

The surgical suite offers the opportunity to conduct noninvasive surgery guided by advanced real-time imaging.

"As we get to know all of the capabilities, we're thoughtfully selecting cases that we think benefit the most," said [Dr. Deanna Worley](#), associate professor and surgical oncologist.

To date, the most common application for the hybrid OR has been in the treatment of liver and heart tumors – tumor types that have the most vascular involvement. According to Worley, the operating room allows surgeons to visualize blood flow to a tumor in a variety of ways through high-definition fluoroscopy, ultrasound, and CT. Using the vascular system to guide the way, surgeons can see what they need to see without opening the body cavity, which is less invasive and reduces complications.

"Sometimes, cutting off blood flow to the tumor will shrink it enough to reduce surgical complications when removing the tumor or helps support other treatment options, such as selective radiation or chemotherapy delivery to the tumor," said Worley. "Seeing where the tumor gets its blood and slowing down the flow or delivering a targeted treatment is a big advantage."

As FACC surgeons become more familiar with the hybrid OR's capabilities, applications are evolving.

"This gives us a new set of tools and the opportunity to explore better ways to treat patients," said Worley. "It's pretty amazing to have yet another state-of-the-art option for the care of our patients. I look forward to exploring its potential."



New hybrid operating room



Gimpy is enrolled in the Flint Animal Cancer Center's VDC-597 for Treatment of Canine Splenic Hemangiosarcoma clinical trial.

## Hemangiosarcoma clinical trial extends Gimpy's lucky streak

**S**OME CALL IT LUCK; OTHERS CALL IT FATE. WHATEVER it is, Gimpy's life has featured a series of fortunate events, starting at birth.

In 2010, a woman brought her dog into a local veterinarian to help deliver a litter. After delivery, it was immediately apparent that something was wrong with the hind legs of one of the puppies. When the owner learned of the puppy's condition, she believed euthanasia would be the best option. Fatefully, Kelly, a veterinary technician at the clinic, stepped in and said she would take the pup if the owner would keep him with his mother until he was 8 weeks old. She agreed.

When the puppy eventually joined Kelly's home, he wasn't able to use his hind limbs. To honor his not-quite-right legs, Kelly named him Gimpy.

"I wasn't sure if he would ever be able to walk," said Kelly.

But as luck would have it, Gimpy was soon chasing his new fur siblings around the house.

"It was pretty incredible to see Gimpy running around," said Kelly. "I really didn't think it would be possible with-

out surgery or some type of intervention."

Gimpy settled into life with Kelly and his four-legged siblings, which included a dog and two cats.

"He's a super-sweet dog," said Kelly. "Not the smartest, bless his heart, but his main goals in life are to cuddle and please."

April 2018 marked another significant time in Gimpy's life. After he swallowed a rock that would not pass, Kelly brought Gimpy in for X-rays to examine the blockage. That's when his veterinarian discovered a small splenic mass. The good news; it was caught early and wasn't yet causing any internal bleeding. Gimpy had surgery the next day. The bad news came when they learned that Gimpy had a type of cancer called splenic hemangiosarcoma. With her veterinary experience, Kelly knew the prognosis was poor, so she set out to find treatment options.

As luck would have it, Kelly found a clinical trial for patients with splenic hemangiosarcoma nearby at Colorado State University's Flint Animal Cancer Center.

After their first visit to the Flint Animal Cancer Cen-

ter, Kelly learned Gimpy would be eligible to participate in the study.

“I have to admit, I was a little nervous. I was trying to manage my expectations and not be too hopeful; I know this is an aggressive cancer,” said Kelly. “I was second-guessing my decision to pursue further treatment when my son, Daniel, convinced me it was the best thing to do. He said, ‘wouldn’t it be so great if Gimpy could be part of something that helped other animals?’”

Encouraged by Daniel’s words, Kelly enrolled Gimpy in the [VDC-597 for Treatment of Canine Splenic Hemangiosarcoma](#) trial. VDC-597 is an oral medication that has antitumor and antimetastatic activities in human and mouse cancer models. The goal of the study is to evaluate the effectiveness of VDC-597 in canine patients.

“Canine splenic hemangiosarcoma is an aggressive disease with extremely short survival times when treated with surgery alone,” said Dr. Kristen Weishaar, clinical trials director, Flint Animal Cancer Center. “Our hope is this protocol will give patients like Gimpy more quality time with their families.”

Following the study protocol, Gimpy receives regular doses of VDC-597 at home and visits the cancer center for frequent checkups.

“Gimpy loves going to CSU, probably because the clinical trials staff are always excited to see him,” said Kelly.

A year after diagnosis, Gimpy lives life just like before with daily walks, regular hikes, and frequent peanut butter treats.

“Given the typical prognosis with this disease, I wasn’t expecting to celebrate Gimpy’s 9th birthday, but here he is,” said Kelly.

It’s safe to say; Gimpy is one lucky dog.

## ONE CANCER. ONE CURE.

Cancer is the leading cause of death in dogs. In the U.S. alone, millions of dogs will be diagnosed this year. And in 2019, despite declining rates, 1.7 million people in the U.S. also will be diagnosed with cancer. Scientists recognized long ago that our cancers are the same. It doesn’t matter if you have two legs or four; cancer looks the same under the microscope, grows and spreads the same, and responds to treatment in the same way. Today, we’re using that information to our advantage to help both pets and people with cancer.

### **The answer to cancer may be walking right beside us.**

Companion animals, specifically dogs, are the best models to study cancer because they get cancer naturally, just like people. They also share 85 percent of our genetic makeup, and they share our environment – live in the same places, breathe the same air, and drink the same water.

### **Naturally occurring cancers in dogs and humans share many features, including:**

- Appearance under a microscope.
- Tumor growth and spread.
- Response to conventional treatment (chemotherapy, surgery, or radiation) and novel therapies.

The Flint Animal Cancer Center’s One Cure Clinical Trials program enrolls companion animals, typically dogs, to evaluate the effectiveness of new drugs, find novel uses for old drugs, or investigate new approaches to surgery and radiation therapy to treat cancer. We learn valuable information from every patient, and we use this information to improve their care as well as the care of future patients, both pets and people. Maybe the most significant benefit of our clinical trials program is that we see results in half the time; one to three years for our pet patients instead of five to ten years for people and at a fraction of the cost.

In 2018, our clinical trials program opened or completed 31 studies. The team manages approximately 20 trials at any given time and sees about 70 patient visits per month. Studies included novel therapies for a variety of cancer types including brain tumors, osteosarcoma, lymphoma, hemangiosarcoma, soft tissue sarcoma, and oral tumors. For more information or to support One Cure in our quest to conquer cancer in all species, please visit [www.onecure.com](http://www.onecure.com).





From left to right: PetCo Foundation and Blue Buffalo Cancer Treatment Support fund grant recipients Teddy Bear, Lily, and Baba Ganoush

## Petco Foundation invests in oncology patient assistance

**T**HE PETCO FOUNDATION, IN partnership with Blue Buffalo, recently awarded a \$150,000 grant investment to the Flint Animal Cancer Center to support patient care over the next two years.

Funds were provided by the Petco Foundation's annual Pet Cancer Awareness campaign, which aims to create a better world for animals and the people who love and need them by investing wisely in organizations with the most lifesaving impact in the fight against pet cancer. The Flint Animal Cancer Center at Colorado State University was fortunate to receive a previous grant investment of \$350,000.

"We are grateful to the Petco Foundation and Blue Buffalo for their continued commitment to providing financial assistance to our qualified clients so that they can pursue advanced treatments for their pets," said Dr. Rod Page, director, Flint Animal Cancer Center.

When awarded the original grant investment three years ago, the FACC clinical team decided to focus on patients with specific diagnoses that could be controlled for extended periods, but only with advanced diagnostics and treatments that cost \$5,000-\$10,000 or more per case, making them unattainable for many families.

"With the initial investment from the Petco Foundation, our goal was twofold," said Page. "First, we wanted to provide patients with the best care available without regard to cost. Second, by strategically focusing on cases that would benefit the most from innovative treatment, our purpose was to add to our body of knowledge."

In the first three years, the fund assisted 73 patients, including Teddy Bear, a Westie who received high-dose radiation to treat a nasal tumor; Lily, an Italian greyhound, diagnosed with a type of brain tumor called a meningioma, which was treated using both surgery and radiation; and Baba Ganoush, a friendly feline with a soft tissue sarcoma.

All of the cases provided an opportunity for the Flint Animal Cancer Center team to learn more about the therapeutic benefits of the treatments that would potentially benefit future patients.

After a review of the patients' cases supported by the previous award, the clinical team decided to hone the focus of the next two years to assist with the cost of treatment for patients diagnosed with brain tumors, nasal tumors, and those who would benefit from interventional radiology and surgery techniques.

"With the new funding, our goal is to continue to provide advanced

treatments to patients to improve their quality of life," said Page. "We're also hoping to see enough cases in each of the areas we have identified to draw conclusions about the efficacy of these therapies."

"With their investment, the Petco Foundation and Blue Buffalo will continue to provide meaningful support for every patient and family while also advancing our knowledge to advance treatment options for future patients."

### ABOUT THE PET CANCER AWARENESS CAMPAIGN

For 10 years, the Petco Foundation and Blue Buffalo have teamed up to raise funds to help with the costs of pet cancer treatment, provide life-saving surgeries, continue groundbreaking research for a cure, and fund clinical trials for new treatments. The campaign runs during the month of May in Petco Stores nationwide and online. For more information, visit [www.petcofoundation.org/PCA](http://www.petcofoundation.org/PCA).

## HONOR ROLL, SPRING 2019

Generous giving from the private sector has become increasingly important over the years. The following individuals (in alphabetical order) are especially noteworthy in that they have given once, or in a sustained way, more than \$25,000 to support our work. Our heartfelt appreciation goes out to them.

Allen & Company Inc.	Lillian M. Key*	Charles R. Jr.* and Lucia H. Shipley*
Herbert A. Allen	Kneller Family Foundation	Kraig and Suzanna Smiegowski
Dawn and Brett Anderson	Robert* and Eva Knight	Michael and Iris Smith
Anschutz Foundation	Kate Koogler Canine	David and Peggy Sokol
Libby Anschutz	Cancer Fund Inc.	Frederick W. Stelle
Philip Anschutz	Susan LeFebvre	Dr. Ralph and Peggy Starkey
John* and Raeia* Bell	Limb Preservation Foundation	Jennie and Bob Strayer
Bow Wow Buddies Foundation	William C. Lukes, AIA*	Brett F. Stuart
Timothy T. Brown	Maddie's Fund	E. Hadley Stuart Jr.* and Family
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CanineKids Outfitters	Steven J. McCarthy	Stuart Foundation
C.H. Robinson Worldwide Foundation	Robert and Evelyn McKee Foundation	The Estate of Barbara Cox Anthony
Charles Engelhard Foundation	Ana Mendez and Rajeev Jayavant	The Estate of Maria Bristol
Charles Shipley, Jr. Foundation Inc.	David Merin Foundation	The Estate of Lionel Edmunds
Colorado State University	Jay and Sandra Mesinger	The Estate of Jaynn Emery
Research Foundation	Milheim Foundation Cancer Research	The Estate of Patricia Hall
Community Foundation of Northern	Kenneth and Myra Monfort	The Estate of June Harper
Colorado	Charitable Foundation	The Estate of Fern A. Howard
Steve and Kitty Cooper	Thelma C. Morici	The Estate of Elisabeth Kellie
Sophie and Derek Craighead	Mark and Bette Morris Family	The Estate of Lillian M. Key
Crystal Waters Foundation Inc.	Foundation	The Estate of Laura Katherine Krebill
David Cummings and Shelley Kerr	National Institutes of Health	The Estate of Carolyn Larson
Dani's Foundation	Jeffrey Neu	The Estate of William Lukes
Dr. William and Sara DeHoff	Robert Neu	The Estate of Lois Maurer
Paul Dunbar and Mindy	Gary and Alice* Nordloh	The Estate of Carol E. McCandless
Richards-Dunbar	Norman Hirschfield Foundation	The Estate of Julia Holt Merkle
Elbridge and Debra Stuart Family	Meg and Andy O'Neil	The Estate of Nancy A. Oyster
Foundation	Ann E. Osborn	The Estate of Constance C. Ricci
Walter* and Jaynn* Emery	Terry and Linda Owen	The Estate of Patricia Shay
Gene* and Marylynn* Fischer	Dr. Rodney L. Page	The Estate of Jacquelyn Ann Smith
Robert H.* and Mary G. Flint*	Susan C. Page	The Hadley and Marion Stuart
Matthew Frank	Petco Foundation	Foundation
Mari Hulman George	Landon Phillips and Susan Maltby	William V. Taylor*
Golden Retriever Endowment Fund	David and Maxine Pierce	Allison Topham
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Haddington Ventures LLC	Joe and Kay Pyland	Dr. Cleve Trimble
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Jeffery Harbers*	Reiman Charitable Foundation	Lori Venners
Renee Harbers-Liddell	Roy and Roberta Reiman	Theodore Venners
June Harper*	Scott and Virginia Reiman	Bruce Weber and Nan Bush
Kathleen Henry	Erik and Terrin Riemer	Melissa Westerman
Alan* and Berte Hirschfield	Dr. Ronald R. and Sara Ringen	Rick Westerman
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John H. Bell Charitable Remainder	Company	Robert and Susan Wilson
Trust	Robert E. Knight Trust	Dr. Stephen and Susan Withrow
Lawrence Jones III*	Richard and Nancy Rogers	Willard L. and Ruth P. Eccles
Dr. Norman and Ann Jorgensen	Harold and Cathy M. Roozen	Foundation
Gretchen* and Taylor Joyner	Donita Rotherham	William Wrigley Jr. Trust
Elizabeth Keen	James Rotherham	Rosamond R. Zetterholm*
Sam* and Margaret Kelly	Albert and Nancy Sarnoff	*Deceased

We are grateful to the following individuals for honoring the Flint Animal Cancer Center in their estate planning.

Vikki and Arthur Anderson	Michele Lier	Nancy and Carl Schramm
Dr. Allen D. and Kathy Brandon	Robert and Elizabeth Merrill	Joe and Nancy Sisinyak
Susan Butler	Connie Miller	Kraig and Suzanna Smiegowski
Susan Coit	Janet Morgan	Robyne Taylor
Steve and Kitty Cooper	Jerry and Karen Moore	Clint Teegardin and Martha Baxter
Edward and Karen Franceschina	Deanna and Daniel Mueller	Patrick and Kim Thomsen
Virginia Garland	Alan and Robyn Pauley	Allison Topham
Angelica Harcharik	Landon Phillips and Susan Maltby	Julie Tyger
Elizabeth Keen	David and Maxine Pierce	Jacqui and Russell Widener
Teresa and Robin Koogler	Sharon Powers	
Adrian and Karen Lakin	B. Gregory Russell	

**THANK YOU FOR  
MAKING OUR  
WORK POSSIBLE!**

**2018 Impact**



**6,139**  
PATIENT VISITS

**428**  
SURGERIES

**1,356**  
ONLINE  
CONSULTS

**31**  
Clinical Trials

**2,595**  
Radiation Therapy  
Treatments



James L. Voss Veterinary Teaching Hospital  
300 W. Drake Road, Fort Collins, Colorado 80523

## STATE YOUR PURPOSE

• THE CAMPAIGN FOR COLORADO STATE UNIVERSITY •

### ONE CANCER. ONE CURE.

**Cancer is cancer.** At the Flint Animal Cancer Center, we believe the answer to curing cancer lies in comparative oncology. Our One Cure initiative works to advance cancer research through comparative oncology clinical trials. Every day, our researchers look for new treatment options that benefit our pet patients – and people too. Your support is critical to our continued work. Please visit [www.onecure.com](http://www.onecure.com) to learn more.



**FLINT ANIMAL  
CANCER CENTER**  
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