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TOPPLING HEALTH DISPARITIES

New society supports cancer research

THE LION UNLEASHED

CAR T arrives in nick of time





**Alan F. List, M.D.**  
President & CEO  
Moffitt Cancer Center

**MOFFITT MOMENTUM®**  
VOLUME 4, ISSUE 1

Dear Friends,

The features in this issue of Momentum depict the broad scope of our growth, clinical and technical innovation, and outreach to the Tampa Bay community and beyond.

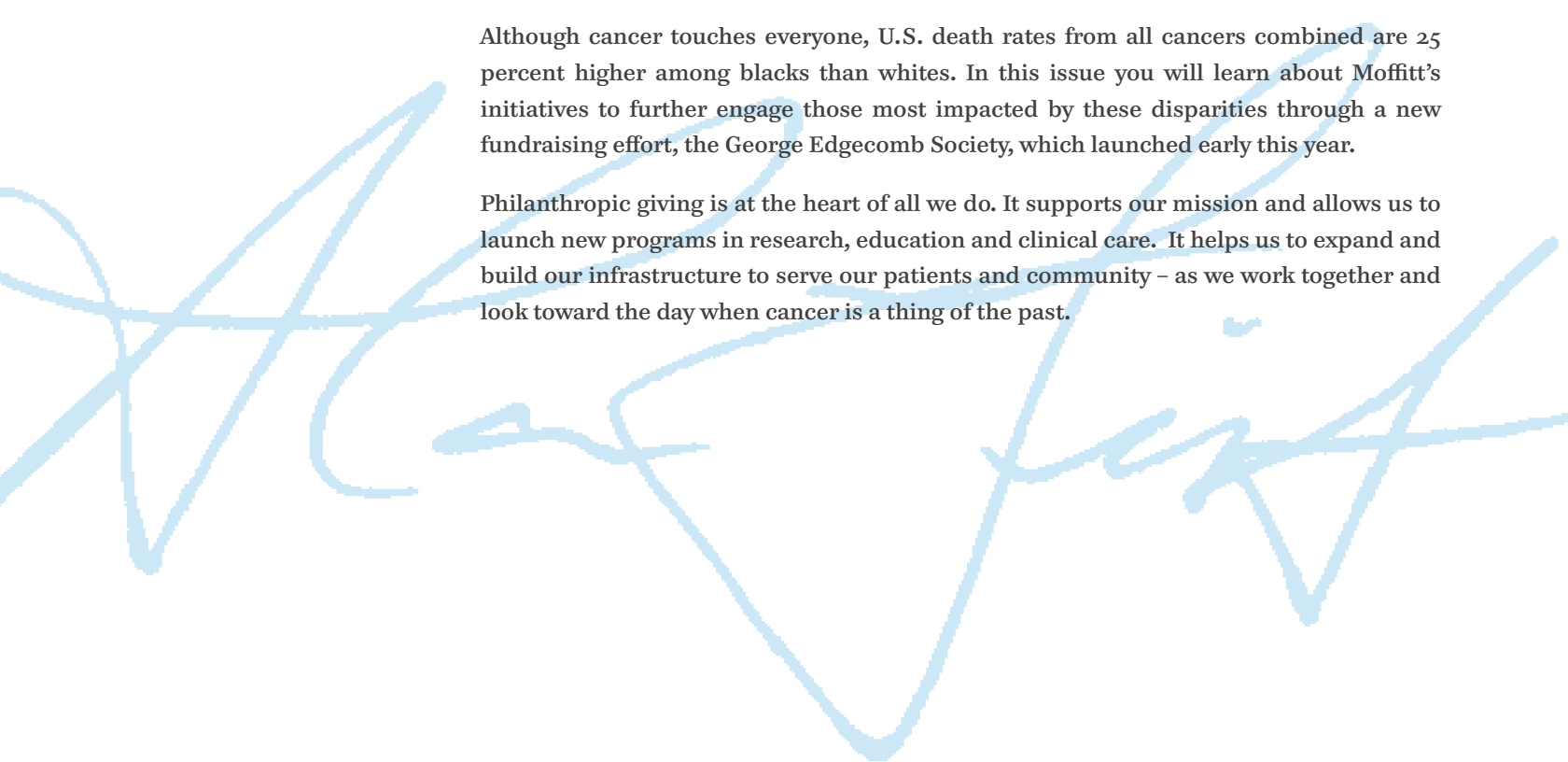
CAR T, an immune cell therapy that genetically reprograms a patient's immune system to better attack cancer cells, is bringing hope and exciting promise. Dr. Jeff Backer, an Orlando emergency room doctor who was successfully treated with CAR T for a rare form of lymphoma, shares his story on page 4.

In March, the cancer center made national news for this revolutionary lymphoma treatment. Dr. Frederick Locke is spearheading a non-Hodgkin lymphoma clinical trial that is expected to lead to the first FDA approval of CAR T-cell therapy later this year.

Teens and young adults diagnosed with cancer often face unique challenges at a time when they are becoming independent and planning their futures. Survivor Corrina Coutant tells of the isolation she once felt and how the Adolescent & Young Adult Program made a positive difference during her care and recovery.

Although cancer touches everyone, U.S. death rates from all cancers combined are 25 percent higher among blacks than whites. In this issue you will learn about Moffitt's initiatives to further engage those most impacted by these disparities through a new fundraising effort, the George Edgecomb Society, which launched early this year.

Philanthropic giving is at the heart of all we do. It supports our mission and allows us to launch new programs in research, education and clinical care. It helps us to expand and build our infrastructure to serve our patients and community – as we work together and look toward the day when cancer is a thing of the past.



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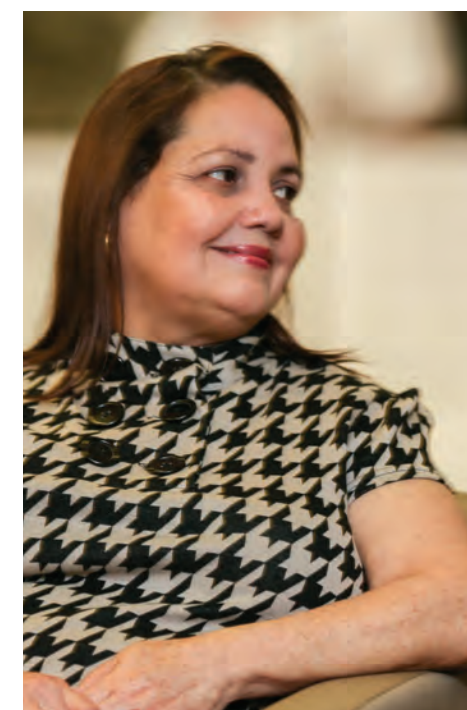
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# TECHNOLOGY RACES AGAINST DISEASE

## CAR T-Cell Therapy Making Gains At Moffitt Cancer Center

By Ann Miller Baker

*It started as a case of “physician, heal thyself.”*

Jeff Backer, an Orlando emergency room physician, claims to have never been sick a day in his life. But during a 2014 visit with his daughter in New York City, their usual walks left him totally exhausted. He'd never felt this way before. Weeks later at home, when he couldn't quite shake it, he decided to self-diagnose. Flu? No. Anemia? Possibly. Maybe a chest x-ray from his family physician would reveal a clue.

It showed shadows throughout his chest.

The straightforward diagnosis was later confirmed by CT scan and biopsy. Dr. Backer had a type of non-Hodgkin lymphoma called diffuse large B-cell lymphoma. Worse yet, he had a rare and aggressive subtype – double hit, which predicted that any response he might have to conventional therapy wouldn't last long.

Multiple rounds of chemo in Orlando and a subsequent stem cell transplant at Moffitt both gained him remissions that lasted a matter of months.

But that last relapse had a silver lining. It meant he might finally qualify for a clinical trial he'd read about – the one that first brought Moffitt to his attention.

As Dr. Backer puts it, “The secret to being a successful cancer survivor is just stay alive long enough until technology catches up to your disease.” He was ready to pin his hopes on something that hadn't been readily available when he was originally diagnosed – the latest development in cancer immunotherapy, called CAR T-cell therapy.



Dr. Jeff Backer (left) participated in a CAR T-cell therapy clinical trial led by Moffitt's Dr. Frederick Locke (right).

### UNLEASHING THE LION

CAR T stands for chimeric antigen receptor T-cell therapy – quite the mouthful.

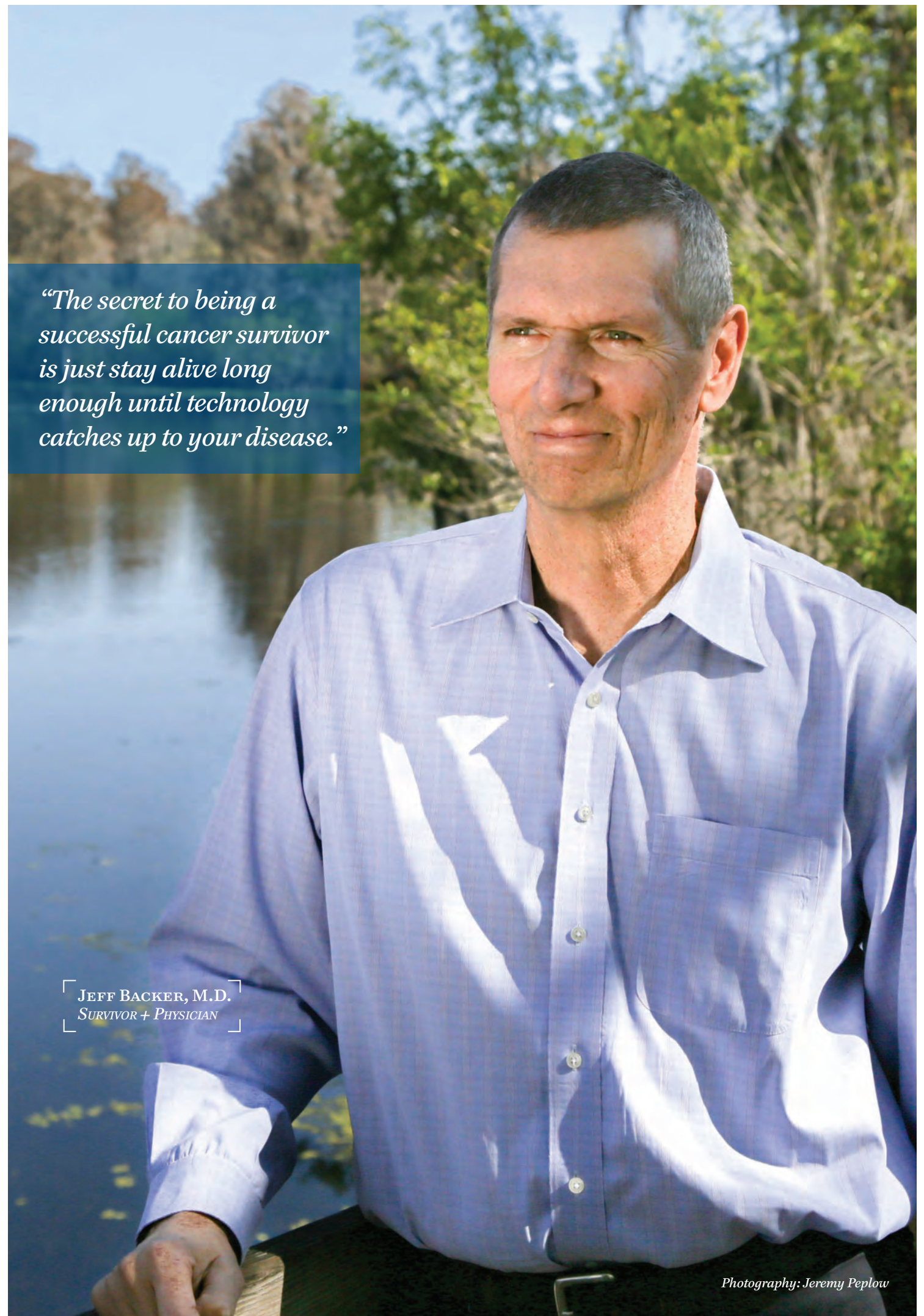
Those who study mythology know the Greek word chimera describes a fire-breathing monster with a lion's head and a serpent's tail. In science, chimeras are a mix of genetically different tissues – even molecules with parts derived from two or more organisms that are fused through laboratory manipulation.

The chimera in CAR T starts with the patient's own natural defenders, the T cells. They are the immune system's enforcers, taking out infections or anything “foreign” to the body. Since cancers are the body's own cells growing out of control, T cells don't always target them for destruction. Cancers are notorious for cloaking themselves against the body's defenses.

In the CAR T process, T cells are gathered from the patient's blood and genetically manipulated in the laboratory, using a virus to add pieces that recognize the cancer. This chimera's lion head is trained to pounce on a protein called CD19 that's found on the surface of

certain cancer cells. And its serpent tail unleashes the T cell's deadly force.

Moffitt has led several CAR T clinical trials sponsored by Kite Pharma, with its California manufacturing facility manipulating the patients' T cells for multiple cancer centers across the nation. The studies' co-lead principal investigator, Fredrick



*“The secret to being a successful cancer survivor is just stay alive long enough until technology catches up to your disease.”*

JEFF BACKER, M.D.  
SURVIVOR + PHYSICIAN

Photography: Jeremy Peplow



*“I looked like elephant man.”*

*“Not only did I see how horrible cancer is but I could see how clinical trials can actually make a difference for people who are without other options.”*

*Dr. and Mrs. Backer enjoy an afternoon walk near the Hillsborough River.*

*Photography: Jeremy Peplow*

Locke, M.D., is a medical oncologist and translational scientist in Moffitt’s Department of Blood and Marrow Transplant and Cellular Immunotherapy (BMT-CI). He also happened to be Dr. Backer’s treating physician for stem cell transplantation. And he has his own personal connection to research.

Dr. Locke first witnessed the lifesaving potential of clinical trials as a teen growing up in Michigan. His father had been diagnosed with a different type of lymphoma. After many rounds of chemotherapy failed, he was enrolled in a phase 2 clinical trial for a drug called Bexxar.

Decades later, he remains in remission.

It was an experience that Dr. Locke cites as a motivating factor behind his career choices. “Not only did I see how horrible cancer is,” he reflects, “but I could see how clinical trials can actually make a difference for people who are without other options.”

As many as 10,000 U.S. patients die each year of unresponsive aggressive B-cell related lymphomas. Dr. Backer pinned his

hopes of avoiding that fate on a clinical trial. He qualified for Moffitt’s phase 2 ZUMA 1 study of KTE-C19 in aggressive B-cell non-Hodgkin lymphoma in the spring of 2016.

#### **THE ELEPHANT MAN ARRIVES**

By the time Dr. Backer returned to Moffitt for collection of his T cells, he recalls ruefully, “I looked like the Elephant Man.” Nodules of the cancer were everywhere – on his face, his neck, and a fist-sized nodule in the middle of his back that kept him from sleeping. It would be a tough two weeks waiting for the cells to be processed at the Kite Pharma facility while Dr. Backer faced his own preparation – more chemo, to make room in his immune system for the CAR T-cell infusion.

The infusion itself isn’t much different from getting a blood transfusion, except this one is done as a hospital inpatient - a challenge in and of itself for Dr. Backer. “I’d never been in the hospital as a patient for extended periods of time, and it was just difficult. The good part about it is that I have really almost no recollection of that three weeks.”

#### **ICE-T SETS MOFFITT APART**

The idea behind ICE-T was to bring together Moffitt experts from across the institution who are interested in immunotherapies, to define best practices for both research and clinical care. It was founded more than two years ago by Dr. Locke and a few key individuals like his mentor, Moffitt BMT-CI Department Chair Claudio Anasetti, M.D.; Department Chair of Thoracic Oncology Scott Antonia, M.D., Ph.D.; Julio Chavez, M.D.; Bijal Shah, M.D.; and several senior faculty members who have since left Moffitt. Others would contribute as the idea took hold - Associate Center Director for Translational Science James Mulé, Ph.D., by working with industry partners; Associate Center Director for Clinical Science Daniel Sullivan, M.D., by providing resources; and Cell Therapy Facility Medical Director Marco Davila, M.D., Ph.D., who brought experience working with CAR T from his previous post at Memorial Sloan Kettering Cancer Center.

The results have established Moffitt as a leader in safely and successfully conducting early stage cellular immunotherapy trials. ICE-T includes a dedicated research group, with clinical trial coordinators and data managers familiar with cellular immunotherapies to serve all of Moffitt’s investigators. On the clinical side, ICE-T cares for patients in the outpatient and inpatient setting. Moffitt hematologists, solid tumor medical oncologists and BMT physicians direct care with staff and resources initially provided by the BMT program. “My boss and chair, Dr. Anasetti, said that this is a good idea and we should make it happen,” notes Dr. Locke, so they lectured the nursing staff, the advanced practice professionals and the faculty on what toxicities could happen.

“If you just put a CAR T patient on the floor and hope for the best without careful attention, bad things could happen. We started with a few nurses and doctors taking care of the first few patients and then slowly broadened the experience so more and more people could see how this therapy could work.”

For Dr. Backer, the effects were almost immediate. As soon as the CAR T-cells were infused, he developed high fevers. Then came the neurologic complications. “Now I know what stroke patients face,” says Dr. Backer. “The nurses would show me a clock and I would know what time it was. In my own mind, I knew exactly what I wanted to say, but I couldn’t say it. Luckily, that only lasted a couple of days.”

But what truly amazed Dr. Backer was what happened to those “Elephant Man” nodules. Within a week, they simply melted away.

“I was stunned,” recalls Dr. Backer, though fevers continued to make him feel horrible. His care team worried they might signal developing pneumonia or an infection, so they ordered a CT scan one week after the infusion. “And the scans demonstrated complete remission - in a week. It was absolutely amazing,” he says. “Psychologically, it boosted me to another level. I wanted to get better. I wanted to leave the hospital because I knew there was a light at the end of the tunnel.”

Good, because he developed almost all of the potential side effects that Dr. Locke had previously described. Most patients experience severe flu-like symptoms with high fevers and chills that can go on for days. Some also experience low blood pressure or shortness of breath. These are symptoms of cytokine release syndrome or CRS, and in severe cases, patients may need intensive care and steroids to reverse the effects. Moffitt’s care team developed algorithms to guide appropriate intervention.

But Dr. Locke says perhaps the most disconcerting side effect is neurologic toxicity. “These patients can become confused or sometimes even aphasic - they can’t come up with the words to describe things. But in almost all cases, these effects are reversible and go away within a few weeks of the treatment.”

CAR T patients can get very ill from the immune effects of the therapy, and specialized care is paramount. Dr. Locke says that’s where Moffitt has really distinguished itself from other research centers nationwide – by creating an innovative Immune Cell Therapy program, called ICE-T.





*“I didn't know if I was going to be alive six or eight months ago. I certainly never expected to be cured of this”*

Photography: Jeremy Peplow

## A LIGHT OF HOPE

Results to date from the Moffitt-led ZUMA clinical trials offer that same hope for thousands of patients like Dr. Backer. Clinical trial patients from 22 centers nationwide with aggressive B-cell lymphomas showed significantly better response to the Kite Pharma-manufactured CAR T-cell therapy than what conventional therapies currently offer. At best, only eight percent of these patients could expect a complete remission with today's standard therapies. With the trial's CAR T therapy, about half the participants achieved complete remission, and over a third remain in complete remission six months after infusion of CAR T cells.

That's groundbreaking according to Dr. Locke, who presented an interim analysis on a cohort of patients enrolled in the phase 2 trial to his peers at the American Society of Hematology meeting last December. “We have patients who really have no other treatment options now going into remission with sustained responses – some patients treated on the phase 1 portion of the study have no evidence of lymphoma at the one-year mark.”

The data put Kite Pharma and this CAR T therapy in place for a potential approval by the U. S. Food and Drug Administration sometime this year. If approved, Moffitt stands experienced and ready to offer this new hope to patients from across the state and around the world. Its experts are already running clinical trials with other cellular immunotherapies created in Moffitt's Cell Therapies facility, including Dr. Locke's NCI-supported trial utilizing patients' dendritic cells as a vaccine against a key tumor target called survivin. Moffitt researchers are also developing their own studies for other possible CAR T therapies against some types of leukemia and solid tumors, with plans

underway to begin manufacturing these CARs at Moffitt's Cell Therapies facility.

For Dr. Locke, whose father is alive thanks to a clinical trial for a similar cancer, these studies in some way bring him full circle.

“To open the door to future cellular immunotherapies that can be brought to patients across the world has been an amazing opportunity,” he says. “Great teamwork has led to the success of this trial and others like it. Here at Moffitt we've come together and worked across departments in order to make it happen, so that we can bring these therapies to our patients.”

And at least one patient knows just how lucky he is. Back home and back to work in his Orlando emergency room since last fall, Dr. Backer is relishing the opportunity to do what he loves. He and his wife are enjoying nature hikes. And he's anxious to get back to kayaking – maybe even on the Hillsborough River close to Moffitt after one of his quarterly follow-up visits.

“I didn't know if I was going to be alive six or eight months ago. I certainly never expected to be cured of this,” says Dr. Backer. “I expected to have a long, complicated course and ultimately succumb to cancer. This has been a blessing for me.”

A blessing in the form of technology that arrived at Moffitt in the nick of time for his cancer. “I never quite understood the value of a Comprehensive Cancer Center until I came to Moffitt. There's no reason to go to New York or Houston with this type of center in your backyard. With the research and treatment that's available at Moffitt, there's no doubt that this is the future of cancer care.”

*“To open the door to future cellular immunotherapies that can be brought to patients across the world has been an amazing opportunity.”*

# CHANGING A SOLITARY BATTLE

MOFFITT'S ADOLESCENT AND  
YOUNG ADULT PROGRAM  
CONNECTS YOUNG PATIENTS

By Ann Miller Baker

CORRINA COUTANT  
SURVIVOR



Photography: Ray Reyes



**IT WAS ENOUGH TO DRIVE A SELF-DESCRIBED POSITIVE PERSON INTO HER SHELL.**

In 2011, when Corrina Coutant was diagnosed with Hodgkin lymphoma at the age of 33, she was understandably shaken but intent on making a wise treatment choice. Moffitt Cancer Center was high on her list, and not just because her then-boyfriend (now husband) worked in Moffitt's Molecular Oncology and Drug Discovery Program. After meeting with hematologist/medical oncologist Celeste Bello, M.D., she knew Moffitt was the right place for her – “much more pleasant, and more current with research on the best Hodgkin treatments,” she recalls.

But the reality was still daunting. Every Friday, she faced eight hours of chemo, scheduled around her full-time job as a teacher. “In infusion clinic, just seeing what others were going through would make me cry,” she remembers. “So I tried to stay to myself. I had my iPad and my music.”

*“I was just passing through, not planning to be there long enough to make friends.”*

As medical director of Moffitt's Sarcoma Program and a board certified pediatric oncologist, Damon Reed, M.D., has seen many young patients face their treatment in exactly the same way. They retreat into their smart devices, Dr. Reed says, “and leave the hospital thinking not another patient under the age of 40 was seen at Moffitt that day.”

In fact, 20 patients age 15-39 years old are hospitalized at Moffitt on any given day. Another 100 are seen in Moffitt's outpatient locations. They are dealing with their cancer diagnosis while still developing as a young adult – seeking independence, fostering relationships with peers, planning for careers. Some are raising young children. Others wonder if they'll ever be parents after all the treatments they need to survive cancer. And for many, their only prior health care experience has been going to the dentist and getting vaccinations – a far cry from the life experience of most Moffitt patients, 92 percent of whom are over 40.

Addressing the age-specific needs of teens and young adults with cancer led Dr. Reed to spearhead Moffitt's Adolescent and Young Adult (AYA) Program, serving patients age 15-39 years old with any type of cancer diagnosis. “Moffitt leadership understood that young adults are different

than the typical cancer patient here,” says Dr. Reed, “and that we should try a different approach to meet those needs.”

**RESEARCH BRINGS OUT AYA CHAMPIONS**

AYA oncology is a relatively new field in the United States, with seminal works published in the early 2000's by Archie Bleyer, M.D., of the Knight Cancer Institute in Oregon. They brought attention to the fact that survival rates for cancer patients aged 15-39 had been stagnant for more than two decades, while cancer survival had improved markedly in both children and older adults during that same time interval. Figuring out why this was happening – and how to change it – led to several key initiatives in the mid-2000's, including the development of clinical practice guidelines for AYA programs by the National Comprehensive Cancer Network of which Moffitt is a member.

In 2011, Dr. Reed set out to establish Moffitt's AYA efforts within his Sarcoma Program. “We intended purposely, once we built this initiative within the Sarcoma Program, to take any opportunity we could to be lateral and branch across the institution,” he explains. One key would be the ability to identify AYA champions within each Moffitt diagnosis-related program. Dr. Reed knew he could draw out his colleagues if AYA could fund their research related to why young adults with a given cancer don't do as well as older adults with the same diagnosis.

Donations have enabled studies that are already yielding results. Dr. Reed points to an article published in the Sept. 15, 2016 issue of the journal *Cancer* that characterizes unique genetic alterations in AYA patients with colorectal cancer. It took massive amounts of existing data, “and just looked at it from a different



*The AYA Lounge gives a sense of belonging.*



*“Moffitt leadership understood that young adults are different than the typical cancer patient here and that we should try a different approach to meet those needs.”*

DAMON REED, M.D.

*Photography: Ray Reyes*

perspective - age,” says Dr. Reed. “With under \$20,000 of philanthropic funding, we came up with a really rather amazing finding that got the attention of the major cancer centers in the country and the National Institutes of Health.”

Another study pending publication from Moffitt's cutaneous cancer program looks at the possible relationship between clinical trial enrollment rates and melanoma survival in the AYA population. Studies show the vast majority - 98 percent - of young adults diagnosed with cancer don't go on clinical trials. Says Dr. Reed, “With those numbers, you won't have many treatment advances.”

“So we looked at our melanoma AYA patients' clinical trial

enrollment rates and overall treatment response, from 2007 to 2014. The overwhelming majority of stage 4 melanoma AYA patients who did not go on a clinical trial did not survive. But for those who enrolled in clinical trials, the chance of survival went up to 30 or 40 percent. And our rate of AYA melanoma patients going on trials was nearly 20 percent - ten times higher than what's shown in the literature for this population.” Dr. Reed says the credit for the high trial enrollment rates and improved survival figures goes to Moffitt's Cutaneous Oncology Program staff. “It was the fact that the Cutaneous Program understands AYA. You have a dedicated group of physicians and staff who believe in young adults, and take the extra time to teach them about clinical trials and obtain their consent.”



*“When I was in middle of my cancer treatment, I didn’t want to talk about details. The AYA staff will introduce you to others you’re most likely to connect with - people with similar attitudes, similar cancers.”*

#### AN UMBRELLA OPENS IN A RAINSTORM

But research opportunities aren’t the only draw, notes Dr. Reed. “When the AYA program opened, it was like an umbrella in a rainstorm. We created this space, and team members from throughout Moffitt were drawn to it because they want to contribute to the cause. I’m passionate about the research, but the clinical aspect of dealing with this patient population is heart-wrenching and also very important to address.”

To that end, Moffitt’s AYA Program includes an AYA Patient Navigator, Cathy Elstner, R.N. Elstner is a seasoned nurse with the experience to help eliminate barriers across the entire continuum of cancer care and ensure that these young patients get needed information and services, including fertility preservation resources. Additionally, the program is recruiting a dedicated coordinator.

But the most visible resource thus far, Dr. Reed says, has been the Swim Across America AYA Lounge on the hospital’s fourth floor. Opened in April 2015, it’s named in honor of its funding source, a national organization that holds swim events to raise money for cancer research and prevention. Within the past six years, Swim Across America events have raised \$1 million for Moffitt Cancer Center. Those funds have benefitted Moffitt’s Melanoma, Sarcoma and AYA programs, including the AYA Lounge.

Dr. Reed says the AYA Lounge is more than just the physical location of the program. “It’s the spot for weekly “meet-ups” – informal sessions that we don’t call support groups. It’s also somewhere for hospitalized AYA patients to play video games, watch movies or just hang out with friends. Most importantly, it gives them a sense of belonging.”

And the AYA efforts continue long after they walk out Moffitt’s doors.

#### INVITATION ACCEPTED AND FRIENDS DISCOVERED

Now 38-years old, Coutant views her cancer experience through the rear view mirror of her life. She completed treatment at Moffitt in 2012 and remains cancer-free. She and her husband have been doubly blessed with two precious, healthy children. But Moffitt still keeps in touch, regularly sending invitations to events for the AYA program that got its start just months before her Hodgkin diagnosis.

Last year, one such event caught her attention. It was at Ulele, a restaurant she’d wanted to try. “So I figured, why not?” Coutant discovered it wasn’t “just people talking medical ‘doom and gloom.’ We had time to mingle. And I found out, these people are really cool. I wish I’d done this sooner.”

Thanks to Swim Across America program funding, Moffitt’s AYA group is able to offer several events every year at locations throughout the bay area. There have been outings to Tampa Bay Rays games, an annual wellness fair, spa days, holiday parties, even a trip to 3 Daughters in St. Petersburg – a family friendly craft brewery where Coutant’s kids enjoyed games with other survivors’ children as a local band played.

“The people who brainstorm places to go are super positive,” says Coutant. And that’s another important point to this self-described positive person. “When I was in middle of my cancer treatment, I didn’t want to talk about details. The AYA staff will introduce you to others you’re most likely to connect with - people with similar attitudes, similar cancers. If you don’t want to talk about your cancer, you’ll find others like you. The same goes for people who want to share all the details and discuss options.”

Perhaps best of all, young people still going through treatment see peers like Coutant who have survived – and thrived.

Dr. Reed says his favorite part of any AYA outing is the ending. “It’s pretty rare not to wind up with at least two people who never met before that just won’t leave,” he says with a smile. “And then, it’s like they’re best friends forever. That’s a pretty good feeling at the end of the day.”

For more information about Moffitt’s AYA Program, visit [www.Moffitt.org/AYA](http://www.Moffitt.org/AYA). 



*Corrina Coutant and her husband Ronil Patel enjoy time with their daughters.*

*Photography: Ray Reyes*





*“I’m the cancer queen!”*

BRITTA BENINGFIELD  
SURVIVOR

Photography: Jeremy Peplow

# A TUMOR’S UNDOING

## *From Within*

### TIL THERAPY RESEARCH AT MOFFITT CANCER CENTER

By Ann Miller Baker

#### WHAT IF THE ULTIMATE CANCER-FIGHTING WEAPON COULD BE FOUND WITHIN A PATIENT’S TUMOR?

Instead of chemotherapy drugs and their collateral damage to healthy cells, this weapon would seek out the tumor where it lives, evade its protective mechanisms and deliver a cancer-killing payload.

Moffitt researchers are leaders in advancing this concept, called TIL therapy, through clinical trials of these personalized cancer killers produced in its own Cell Therapies facility.

Patients like Britta Beningfield are living proof of TIL’s potential power.

“I’m the cancer queen!” she laughs. Six years after her initial melanoma diagnosis and treatment at Moffitt, her cancer made an unexpected return in 2012. She was weak, with abdominal pain that was originally attributed to a gallbladder attack. By the time she returned to Moffitt, she required emergency surgery to stop internal bleeding from the metastasized melanoma tumor that had eroded through her stomach and into her pancreas.

Beningfield had also been through radiation therapy at Moffitt

to tame an unrelated cancer in her tonsils in those intervening years. When first told of the melanoma’s recurrence, she had plenty of will to fight – but drew the line when it came to more chemotherapy.

“I needed to plan out the rest of my life, and asked – how long do I have? They said - think months, not years,” she remembers.

That’s when she decided to learn more about a clinical trial mentioned by her Moffitt surgeon, Amod Sarnaik, M.D.

“My only choices were to die or try this new treatment called TIL,” she says. “And thank goodness I did it, because I’m still here.”

#### MOFFITT HAS HISTORY WITH TIL

Dr. Sarnaik, a surgical oncologist in Moffitt’s Department of Cutaneous Oncology, has been the principal investigator on five Moffitt TIL therapy clinical trials. Co-investigator Shari Pilon-Thomas, Ph.D., is an associate member in Moffitt’s Immunology Program. Both spent time at the National Cancer Institute (NCI) to learn firsthand about TIL therapy. It was in NCI’s Surgery Branch in the 1980’s where the concept’s use was first explored

for patients with advanced melanoma by Steven Rosenberg, M.D., Ph.D., along with James Mulé, Ph.D., now Moffitt’s associate center director for Translational Science.

“Many patients with cancer have immune cells that infiltrate their tumor,” explains Dr. Pilon-Thomas. The problem is that cancer finds ways to disarm our immune system - in this case, small white blood cells called lymphocytes that include our T-cell defenders. It’s possible to recharge them for the fight by giving potent drugs, but not without serious side effects.

“Instead,” notes Dr. Sarnaik, “we can actually reprogram the tumor infiltrating lymphocytes (TIL) outside of the body with drugs, wash all the drugs away and infuse only those TIL cells back into the patient.”



Immunologist Shari Pilon-Thomas, Ph.D., and cutaneous surgical oncologist Amod Sarnaik, M.D., are co-investigators for TIL therapy clinical trials at Moffitt.





Photography: Jeremy Peplow

Obtaining the cells begins with surgery to remove some of the patient's tumor. In the lab, tumor tissue is divided into small bits. Each sample is bathed in a mixture complete with high-dose IL-2 (interleukin-2), a naturally-occurring protein that encourages immune cells to grow. As a result, the tumor in each sample dies off, leaving only T cells. A few surviving T cells from each sample are tested to see which react most strongly to the tumor. The best cancer killers are multiplied to be infused back into the patient in massive numbers – "80-billion superheroes," Beningfield calls them. "I visualized them attacking my cancer."

There are only five cancer centers nationwide that can generate a patient's own TIL cells. Moffitt is one of them, with a multimillion-dollar Cell Therapies Core on the Moffitt McKinley Outpatient Center campus, made possible in part through generous support from the Dr. Miriam & Sheldon G. Adelson Medical Research Foundation, Donald A. Adam and the Donald A. Adam Family Foundation and Swim Across America.

#### MAKING SPACE FOR SUPERHERO CELLS

While Moffitt was growing Beningfield's "superheroes" in the Cell Therapies lab, she was going through her own preparatory regimen for infusion in early 2013. More chemo – first outpatient, then inpatient. "Not to shrink the tumor," explains Dr. Sarnaik. "It's in fact to reduce the patient's own immune system temporarily, so that the TIL cells have space to expand when we infuse them." After infusion, patients are also given the same IL-2 that had been used to encourage immune cell growth in the lab – though at a much lower dose because of its potential side effects in the body.

Beningfield is no stranger to chemo, and knew this treatment would be aggressive. Beyond that, it was hard for Dr. Sarnaik to explain exactly what she might anticipate after the TILs were infused. "One of the challenges of this treatment is that it's highly personalized. So, cells from one patient will biologically behave differently from another."

*"80-billion superheroes.  
I visualized them attacking my cancer."*

"Some patients will just sail through the treatment without too much in the way of problems. Most patients develop fever. And while their white count is so low, we have to give them powerful antibiotics as a precaution against infection."

Others, according to Dr. Sarnaik, will develop low blood pressure which can require intensive care. It's one of the reasons these patients are cared for by specially trained nurses and also followed through Moffitt's ICE-T service (see page 7), for immune cell therapy protocols. Beningfield mostly just wanted to sleep throughout the therapy and recovery, but remembers her care team talking about a transfer to ICU. "I just thought about my boyfriend to raise that blood pressure so I didn't have to go," she says with a chuckle.

The good news, says Dr. Sarnaik, is that most of these side effects are temporary and reversible. But for Beningfield, the best news showed up in abdominal scans. Within three months, these scans showed the cancerous mass on her pancreas was shrinking. One year after TIL therapy, Dr. Sarnaik says, there

was no evidence of disease in Beningfield's body. That's still the case, though she gets scans every six months to be sure.

For now, that means more time for the painting she loves and the garden full of flowers that she tends outside her St. Petersburg home. She credits her Buddhist philosophy of "being happy no matter what" along with the support of her surgeon brother and sister-in-law ("my advocates - much more adept at medical issues") for getting her this far in her cancer journey. She's grateful for Dr. Sarnaik, her nurses and everyone at Moffitt – "my one-stop cancer shop," she says. "If everyone could have access to a facility of Moffitt's caliber, there would be a lot more cancer survivors still walking around in this world."

"There is just no way she would still be here if it hadn't been for TIL therapy," says Dr. Sarnaik. "I just wish it worked that way for everybody. That's my wish."

#### EXPANDING TILS USE

Making that wish come true will take more research, more patients like Beningfield willing to enroll in clinical trials, and the funding to conduct them.

While Beningfield's clinical trial of TIL combined with a checkpoint inhibitor drug was funded through an NCI grant called SPORE (Specialized Programs of Research Excellence), other Moffitt TIL trials rely on grants from non-profits including the American Cancer Society and Swim Across America, as well as partnerships with biotech companies like Lion Biotechnologies which is committed to pursuing FDA approval of TIL therapy for wider use (see sidebar).

Dr. Sarnaik calls it the "it takes a village" approach to funding. "You need all these different elements in order to gain access to the resources that are required for something that's incredibly complicated and costly but highly effective." He says Moffitt's experience with TIL for incurable metastatic melanoma shows some degree of tumor shrinkage in half the patients on trials. One in five of all trial patients will maintain that response a year or more.

"We have patients originally deemed incurable who are now seven years post-TIL therapy – some of whom have been rendered free of disease," he says with pride. "We think those patients are, in fact, cured. So now, our efforts are focused on making the process available to more people, making it more effective, and applying it to other cancers – not just melanoma." Moffitt researchers have initiated, published or are in the process of publishing studies of TIL therapy for sarcoma, bladder, cervical, pancreatic and lung cancers.

"I think we've learned enough now from our experience with melanoma that we should be able to translate it into other cancer subtypes," he says with hope. "I like to think that, right now, we've hit a double and we're really looking for a home run."

Many more patients like Britta Beningfield are counting on it.

## ALLYING with BUSINESS For Better Therapies

### *Moffitt And Lion Biotechnologies*

While many of Moffitt's TIL therapy clinical trials are investigator-initiated and government grant/philanthropy-funded, alliances with business leaders in biotech and pharma are an essential element in getting such new therapies to patients.

"There's a track record in this country where academics develop an idea," explains Amod Sarnaik, M.D., surgical oncologist and principal investigator for several Moffitt TIL clinical trials. "But in order to commercialize these emerging therapies, to get FDA approval that makes them available to patients nationwide, you need to have a pharmaceutical or biotech company involved." Moffitt's Office of Innovation and Industry Alliances facilitates these mutually beneficial arrangements.

Among Moffitt's growing list of corporate alliances, Lion Biotechnologies has been instrumental in advancing TIL therapy. The California-based biotech company set up an office in the University of South Florida Research Park to facilitate this relationship. In December 2016, Moffitt's Innovation Office finalized a new three-year Sponsored Research Agreement between Shari Pilon-Thomas, Ph.D., an associate member in Moffitt's Immunology Program, and Lion, as well as a Clinical Grant Agreement that supports ongoing Moffitt trials of TIL therapy in combination with the checkpoint inhibitor nivolumab for patients with metastatic melanoma. Dr. Sarnaik serves as the principal investigator on Lion-sponsored clinical trials.

"We are very pleased to continue our research collaboration with Moffitt," said Maria Fardis, Ph.D., MBA, Lion Biotechnologies' president and chief executive officer, in announcing the agreements to the press. "This is the third study combining TIL plus a checkpoint inhibitor that Lion will have supported."

"This partnership with Lion Biotechnologies will further Moffitt's efforts to lead the way in providing cutting-edge immunotherapies to cancer patients in Florida and beyond," added Moffitt Associate Center Director for Translational Science James Mulé, Ph.D.

"The study's basic goal is to validate the safety, feasibility and effectiveness of a centralized growth strategy for TIL that will allow patients to be treated all over the United States, in areas that don't have access to a state-of-the-art cell therapy facility like we're blessed to have here at Moffitt," said Dr. Sarnaik.



# Edgecomb Legacy Lives On At Moffitt

## Landmark Tampa Family Name Supports Cancer Disparities Research

By Ann Miller Baker and Cathy Clark

What began as a friendship now lives on as a legacy, linking two iconic local names in a battle against cancer's unequal burden in the African American community.



Photography: Ray Reyes

Kickoff events to introduce the newly formed George Edgecomb Society drew about 300 people who wanted to learn how they could support Moffitt's cancer research efforts to address racial disparities. L-R: Dr. Alan List, Valerie Goddard, Doretha Edgecomb, Vivica A. Fox, H. Lee Moffitt, Dr. Lee Green

Before there was a Moffitt Cancer Center, founder and former state Speaker of the House H. Lee Moffitt lost three close friends to cancer – all of whom had to search out of state for expert cancer care. Among them was fellow attorney George Edgecomb, Hillsborough County's first African American judge whose name now graces the county's courthouse. Added to the deaths of two close associates, Edgecomb's passing in 1976 fueled Lee Moffitt's drive to create a premiere cancer center in the state of Florida to serve all its citizens.

Now, George Edgecomb's memory will fuel the cancer center's drive to address one of cancer's most glaring inequities; the disproportionate toll it takes on the African American community (see sidebar). As federal research dollars continue to decline, Moffitt aims to further engage those most impacted by these disparities in a new fundraising effort, the George Edgecomb Society at Moffitt Cancer Center. Society membership comes with options at all giving levels. Some Society members will even have a voice in selecting which Moffitt research studies related to cancer disparities will receive Edgecomb funding each year.

These funds will have a meaningful impact, according to B. Lee Green, Ph.D., vice president for Moffitt Diversity, Public Relations and Strategic Communications. "Our goal is to get funding into the hands of our disparities researchers, so that we can put into action strategies that can reduce and eventually eliminate disparities altogether."

George's widow and retired Hillsborough County School Board leader Doretha Edgecomb views the new Society as a fitting tribute to her late husband. "George was always committed to making a positive impact wherever it was needed," she says. "And if the impact of using his name brings attention to these disparities, saves lives and encourages research, then it's the right thing to do."

"It brings instant credibility to the cause," says Dr. Green. "The community knows that the Edgecomb family would only lend his name to something of significance."

Launching the Society drew a sizeable crowd. More than 300 people attended events in January and February to learn more about the Society and how they could support Moffitt's cancer research efforts. Joining Mrs. Edgecomb, founder H. Lee Moffitt and Dr. Green were entertainment luminaries: actress Vivica A. Fox, Kathy Sledge of Sister Sledge and Grammy Award-winning R&B hip-hop artist Paul Anthony of Full Force, who performed and shared details of his own cancer experience. Fox and Anthony went on to join Moffitt's National Board of Advisors.

Local VIPs attending included Tampa Bay Buccaneers Hall of Famer Derrick Brooks; Chloe Coney, retired deputy director to U.S. Rep. Kathy Castor; former state Senator Arthenia Joyner, and former state appellate court Judge E. J. Salcines. They had an opportunity to mingle with cancer survivors and Moffitt

researchers like radiation oncologist Kosj Yamoah, M.D., Ph.D. Dr. Yamoah's work examines the biologic and behavioral drivers behind the inordinate incidence and death toll of prostate cancer among black men of African descent.

"We're raising the next generation of health care professionals with knowledge and experience in health disparities gained at Moffitt," says Valerie Goddard, Moffitt Hospital Board member and chair of the Edgecomb Society. "It's important that we have health care leaders who can relate to the African American community and its culture."

But the bottom line, says Goddard, "is to make sure that everyone has the best possible opportunities to beat cancer. And Moffitt Cancer Center is the best place for that to occur."

To learn more about how you can join the George Edgecomb Society, visit [Moffitt.org/GES](http://Moffitt.org/GES).

## RIGHTING A CANCER WRONG. MOFFITT RESEARCHERS TAKE ON HEALTH DISPARITIES

Cancer touches everyone, but the damage it inflicts across cultures and races is far from equitable. What causes these disparities – and what's being done to eliminate them? Moffitt researchers have undertaken major studies of both the biology and the behaviors behind cancer health disparities. Their investigations run the gamut: studying disparities in breast and cervical cancer, looking into the role of HPV in various diagnoses, developing culturally- and literacy-relevant cancer communications, and examining the impact of disproportionate minority participation in clinical trials. Funding from the George Edgecomb Society will enable even more research.

"It is really disconcerting to know that the answers we already have are not being delivered to all populations," says Clement Gwede, Ph.D., MPH, R.N., an associate member in Moffitt Population Sciences. His research focuses on identifying the barriers that prevent underserved populations from adopting known cancer-fighting strategies and finding ways to tailor and deliver these interventions to those communities. Culturally based interventions, developed with thoughtful engagement of community members are more effective and more likely to be accepted by underserved communities.

Colorectal cancer is a case in point. Its incidence and mortality are highest among blacks. Despite the proven



*“Of all the forms of inequality, injustice in healthcare is the most shocking and inhumane.”*

Martin Luther King, Jr.

life-saving potential of colorectal cancer screening tools like inexpensive, easy-to-perform home stool sample test kits, this group consistently posts screening rates well below the national average.

What can be done to reverse this trend? Dr. Gwede and his colleagues worked with community partners to take their questions to the source - black men between 50-75 years old who have not been screened. “We asked - how do you want to learn about colon cancer? And they said they want engaging materials. We want it to be apparent and transparent that they are made for me, particularly the fact that I am from Jamaica or Haiti.”

Through a series of studies, Dr. Gwede and colleagues developed a “photonovella” heavy on pictures and a video that share the reasons for screening through a story. It’s tagged with national flags and details from common countries of origin or descent. When paired with a home stool sample test kit and given as part of a clinic visit, screening rates climbed to over 80 percent - but repeat screening dropped off in subsequent years. Current studies hope to identify the best mechanisms to remind and coach these patients to improve rescreening rates.

Such incremental studies are crucial - and often in need of a funding source like the Edgecomb Society. “Even though it’s an investment in one simple project, one at a time we can move the needle forward,” says Kosj Yamoah, M.D., Ph.D., Moffitt radiation

oncologist and assistant member of Cancer Epidemiology.

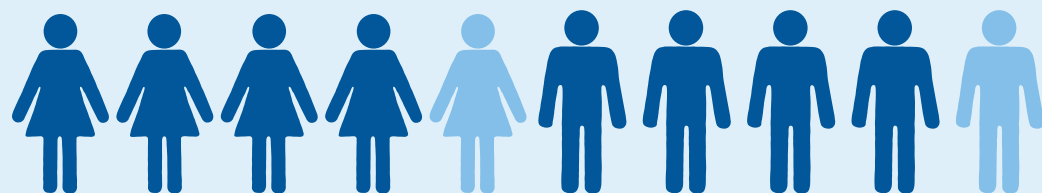
A native of Ghana, Dr. Yamoah’s research focus is on the biologic factors that predispose African American men to higher prostate cancer incidence and mortality. Understanding the biology can inform future targeted treatments. He has already led studies that identified a subset of genes known as biomarkers which define a subtype of aggressive prostate cancer more common in black men of African origin.

Dr. Yamoah likens this to the finding of the BRCA genes in the Ashkenazi Jewish population, and its link to a biologic subtype of breast cancer. “We’ve now identified new therapeutic agents that are more effective in patients with the BRCA gene mutations,” says Dr. Yamoah, who hopes that further study of the genetic biomarkers he’s identified in prostate cancer patients of African origin will lead to development of better treatments.

And he is most gratified, amidst mounting threats to federal research funding, to see the Edgecomb Society efforts take hold in the African American community. “Until this effort, there has been very little to move us forward in taking ownership of disparities research funding. And while the funding is much needed, supporting researchers who have demonstrated a track record and commitment to work on cancer disparities or who personally share disparity risks will provide the right environment to move this field forward.”

## HEALTH DISPARITIES

Despite progress in cancer treatment, screening, diagnosis and prevention, the black/African American community continues to face cancer health disparities.



Based on skin color alone, National Institutes of Health statistics show:

African American men have lower 5-year cancer survival rates for lung, colon, and pancreatic cancers compared to non-Hispanic white men

U. S. death rates from all cancers combined are 25 percent higher among blacks than whites

African Americans have the highest mortality rate of any racial or ethnic group for all cancers combined and for most major cancers.

Black men have the highest incidence rates for all cancers combined - higher than any other racial or ethnic group

African American women are less likely than white women to develop cancer - but more likely to die from it

ELBA NIEVES  
PREVENTION AND SCREENING ADVOCATE

# It's OK To Ask For Help

## M-POWER Provides Patient Access And Navigation

By Cathy Clark

Photography: Jeremy Peplow

*Elba Nieves knows the importance of reaching out for help - and not putting herself last. But it was not always that way.*

“I was one of the ones who never checked herself,” the native of Puerto Rico says softly in Spanish. Communicating with help of a Moffitt Languages Services interpreter, Nieves says she never realized the importance of breast self-exams and mammograms previously.

M-POWER community outreach team members have found it is not uncommon for Hispanic women to put themselves last, because they focus on their work and their families - often waiting until they are sick before going to the doctor.

The Moffitt Program for Outreach Wellness Education and Resources (M-POWER) provides the community with health

education in the areas of prevention, early detection, and screening. The program is part of Moffitt Diversity, Moffitt Cancer Center’s broad-based initiative to increase the access to care. This is achieved by enhancing Moffitt’s image among underserved communities as an organization delivering cultural and linguistically competent care through prevention education and mutually beneficial partnerships. The aim is to serve as a resource, as well as to identify opportunities to increase Moffitt’s preparedness when serving diverse communities.

Through M-POWER, health educators and community outreach workers give workshops on topics related to prevention of various cancers, healthy lifestyle and more. With the cultural,



*“I was the one who never checked herself.”*

linguistic and health literacy needs of the community in mind, the educators present the programs in English, Spanish and Haitian Creole.

M-POWER aims to fill gaps identified through a community health needs assessment that Moffitt conducted in 2016. The most pressing needs relate to screening and prevention – especially for prostate, breast, colorectal and lung cancers – along with smoking cessation efforts and a focus on access to care.

For people like Nieves, M-POWER’s services translate access to screening and prevention services and, if needed, access to care – one person at a time.

Through M-POWER, Nieves got a voucher for her mammogram. She went to the Moffitt McKinley Outpatient Center, where an interpreter from Moffitt’s Language Services helped her. Nieves says Language Services boosted her confidence when going in for the mammogram procedure.

“For me it is important to be healthy, because that enables me to spend time with and help my family, and also to help others,” said Nieves, who recently celebrated her 40-year wedding anniversary. She and her husband have four children and nine grandchildren.

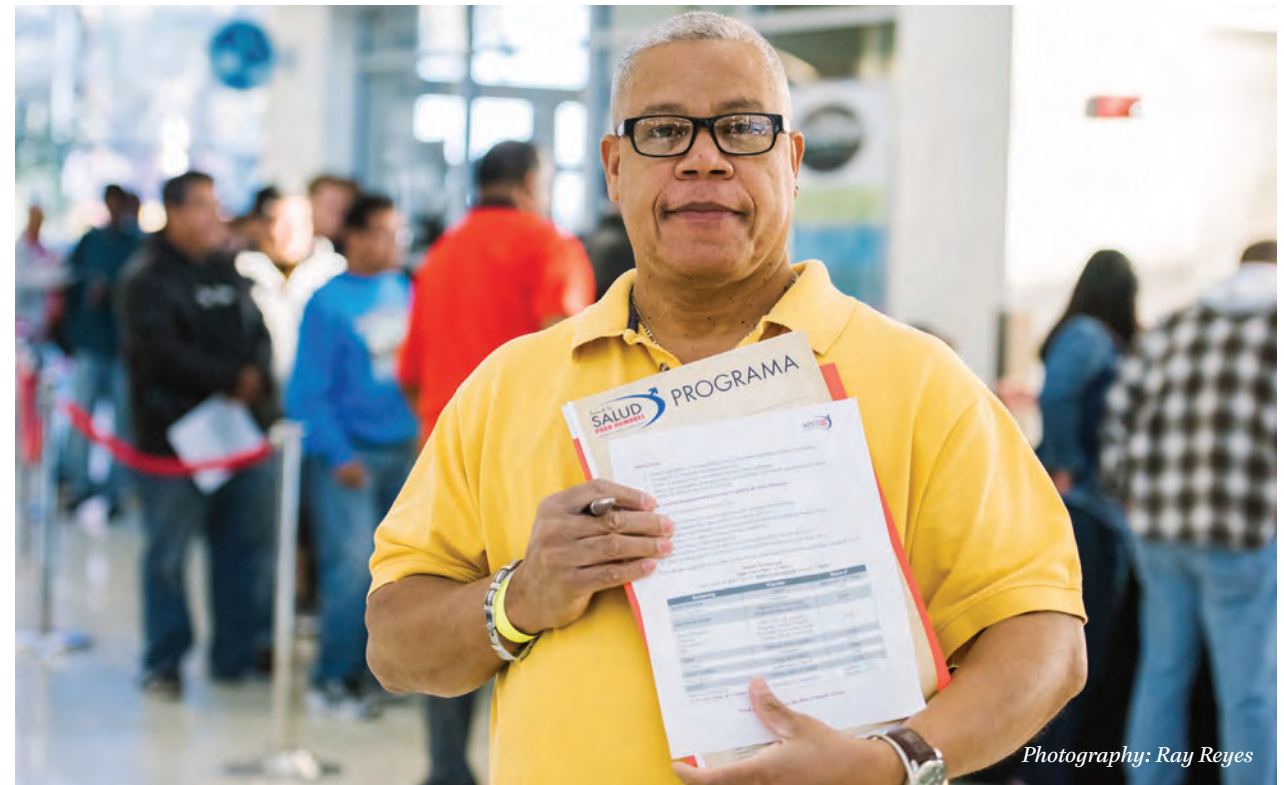
Fortunately, Nieves had a good outcome. Her mammogram results were negative. For people who test positive, their cancers are easier to cure because they were detected early.

“It is important that people find information, that they get educated. They should not be afraid and they should ask for help,” said Nieves. “It is very important that they do the breast self-exam so that if they find something they can go to the doctor right away. They should not wait until it is too late.”



*“They should not be afraid and they should ask for help.”*

Photography: Jeremy Peplow



Photography: Ray Reyes

## 17 Years and Counting

### Men’s Health Forum Fosters Screening And Prevention

**A growing number of men living in the Tampa Bay area don’t have access to regular health care screenings and services. The reasons include lack of insurance, awareness and access to doctors.**

To combat this, Moffitt Cancer Center and nearly 80 other community organizations partner in a yearly Men’s Health Forum. The forum is a shared effort by area hospitals, health care organizations, churches, community organizations and businesses. The forum offers free health screenings, such as blood pressure, cholesterol, HIV/AIDS/STI, skin cancer and more assessments, to men who are 18 years and older and uninsured, underinsured or do not have a regular health care provider. The forum also provides health education workshops and fitness demonstrations.

Baseball legend Ken Griffey Sr. attended the event. At age 55, doctors discovered he had prostate cancer. He underwent robotic surgery to remove it. Since then, Griffey has become an advocate for cancer screening, and in particular prostate cancer screening. He lost four uncles to prostate cancer and is convinced that his mother’s encouragement to be screened saved his life.

Hillsborough County commissioners and cancer survivors Les Miller and Mike Suarez also attended to lend their support to the cause of cancer prevention and men’s health.

The 2017 Men’s Health Forum provided participants with a range of exams that are critical to health and longevity.

- Of 395 men examined, 60% were uninsured or underinsured
- Of 304 men tested, 46% had pre-hypertension and another 28% had high blood pressure
- 82 men were educated on the importance of prostate testing and received vouchers for free prostate testing at Moffitt Cancer Center
- Of 214 men receiving skin cancer exams, 24% had suspicious skin findings and needed further follow-up by a physician
- Of 295 men tested, 15% were identified as at-risk for diabetes

“The Men’s Health Forum is a wonderful opportunity for men in and around Tampa Bay to learn about cancer screening and get appropriate screening for a number of health-related issues,” says Julio Pow-Sang, M.D., chairman of Genitourinary Oncology at Moffitt. “It is a way for health care professionals to work directly with men who may otherwise not have access to quality health care.”

Sponsors of the 2017 Men’s Health Forum include Moffitt Cancer Center, Bayer/Men Who Speak Up, The Wawa Foundation, Tampa General Hospital, Genesis 680AM, Florida Blue, WMNF 88.5 FM, The Urban Cafe, HART, Spectrum and the New York Yankees.



# Spreading Moffitt's BRAND of COURAGE

By Ann Miller Baker



*“Everything has a story.”*

BILL BRAND  
BOARD MEMBER + ADVOCATE

Photography: Jeremy Peplow

## HSN President Bill Brand Strengthens Community Ties

### FOR BILL BRAND, THE STORY IS EVERYTHING.

Ten years ago, he relocated to St. Petersburg's HSN. It was a creative stretch for someone who already had an impressive resume in entertainment programming, but then-CEO Mindy Grossman was confident that he was just what the network needed to reimagine the shopping experience.

“Everything has a story,” says Brand. “So when I realized the potential for marrying entertainment and storytelling to products, and for connecting directly with consumers, I thought, wow – that’s an interesting place to be!”

Now president of HSN, Brand has broadened the multiplatform retailer's connections to its customers around the country and to its local community through programs like HSN Cares, which is committed to empowering women and helping families in need. It's a corporate commitment to mirror HSN customers' values by participating in philanthropic and volunteer work. HSN team members put in nearly 25,000 volunteer hours each year for causes of their choice - or as Brand puts it, “roll up the sleeves and get involved.”

For Brand, that includes volunteering his time on the Moffitt Cancer Center Foundation Board. The commitment was forged through networking, when Moffitt Foundation Board Chair Ed Droste invited Brand to lunch with Moffitt President and CEO Alan List, M.D., to learn more about Moffitt's story.

Brand was hooked by another creative stretch. “When I look around these board meetings, I think - ‘one of these things is not like the other.’ I come from a very different background. I am able to marry storytelling and marketing to the work at Moffitt - that's why I'm there.”

His arrival on the Foundation Board and membership on the cancer center's Marketing and Public Relations Committee coincided with the undertaking of a new branding effort - what would become Moffitt's award-winning “Courage” campaign, with inspiring stories told firsthand by Moffitt's patients, caregivers and researchers.

Brand is beyond enthusiastic about it. “My goal is that, when anyone hears the word ‘courage,’ they immediately think of Moffitt. Courage is what Moffitt is all about.”

He's learned that firsthand, from the friends and colleagues who now reach out to him about their cancer experiences. “I had no idea that by joining the board, I would also then hear from people I care about and what they need.” In fact, he says



Photography: Jeremy Peplow

*“My goal is that, when anyone hears the word ‘courage,’ they immediately think of Moffitt.”*

the greatest and most unexpected reward of board membership has been the ability to inform and connect people to Moffitt for expert care.

No wonder, then, that Brand welcomed the opportunity to serve as the 2017 Honorary Chair of Miles for Moffitt (M4M) - an annual family-friendly run/walk fundraiser that holds a special place in Dr. List's heart. Since 2006, the signature event has raised over \$4 million for Moffitt research.

Brand built his own M4M team of HSN colleagues and fellow Moffitt board members as runners or “virtual runners” for the May 13 event on the University of South Florida campus. “It's fun to bring people together other than around a conference table every quarter,” he says. “I think it will make a stronger board. I think it will make the event stronger. And it will show the entire Moffitt community, the entire Tampa Bay area that this is important.”

“I live on the St. Pete side,” he adds. “Tampa can feel pretty far away. I go there for the airport and the mall. And now I go there for Moffitt. Were it not for my volunteer role on the board, I would never have understood what's happening here. I mean, we have the number one cancer center in the southeast - the number six cancer center in the country right here in Tampa Bay and it's just thirty years old. Some of the most important research in the world is happening right here in Tampa Bay.

“That's just mind-blowing, something that we should all be really proud of. Why wouldn't you want to be a part of that and give more people access to it?”

To learn more about how you can help to support life-saving research, visit [www.Moffitt.org/Give-Back](http://www.Moffitt.org/Give-Back). 





## We Start Them Young

Education Opportunities Abound  
at Moffitt Cancer Center

Julie Djeu, Ph.D., has seen more than her share of struggling freshman undergraduates in the honors discovery course she helps to teach at the University of South Florida. “They have no idea how to pursue their goals,” she says with a smile. “But once you head them in a direction, show them the way to go, they are unstoppable.”

The diminutive Dr. Djeu is quite an inspiration. A renowned immunology researcher who trained at the National Cancer Institute, she helped describe the role of NK (natural killer) cells in the battle against cancer before being hired as Moffitt’s first research scientist in 1992. She chaired Moffitt’s Immunology Department, which she built into a world-class research program focused on cancer immunotherapy. In 2013, she was named Moffitt’s first associate center director for Education and Training, overseeing all research education and training activities.

In that role, she’s focusing on a calling almost as deep as her scientific roots. “My research is always important to me,” she says. “But inspiring others is just as important.”

In fact, she says, tomorrow’s cancer breakthroughs rely upon it. “New diagnostics, new treatment protocols – all of that comes from research. To do research, you have to be trained. And to be trained, it’s better to start very young to go into this field.”

Moffitt’s involvement in this training comes as surprise to many, says Dr. Djeu. “They see Moffitt as a hospital. But we do so much education - you just don’t know about it.”

Moffitt provides more than 1,800 training experiences for biomedical researchers and health care professionals annually. For students and trainees, its varied offerings start as early as high school and continue throughout undergraduate, graduate, medical school and even Ph.D. training. The following pages highlight a handful of such programs that continue to be “hidden gems” among the Bay Area’s educational opportunities.



# DOCTORATE TRAINING In Cancer Research

## Cancer Biology Ph.D. Program Draws World-Class Students

*You could say research  
is Shonagh Russell’s calling.*

Growing up in Aberdeen, Scotland, Russell had several friends and family members diagnosed with cancer. It fueled her desire to make a difference as a cancer researcher. The first in her family to attend university, Russell was still a University of St. Andrews undergraduate when she began researching educational opportunities and reading papers on new cancer developments.

- ~ Mathematical oncology papers by Drs. Robert Gillies and Robert Gatenby of Moffitt Cancer Center.
- ~ News about HPV vaccine clinical trials, with principal investigator Anna Giuliano, Ph.D., of Moffitt Cancer Center.
- ~ A listing for a Cancer Biology Ph.D. program at Moffitt Cancer Center.

“I couldn’t wait to apply,” Russell recalls. Currently in the third year of her five-year Ph.D. studies, Russell now calls Dr. Gillies her mentor. She appreciates the rigors of completing her Ph.D. in an NCI-designated Comprehensive Cancer Center where students are immersed in cutting-edge research from the start.

“You see these renowned scientists using the latest technology,” she explains. “And you think – I’m not a student, I’m a scientist first and foremost.”

Moffitt’s Cancer Biology Ph.D. program, in conjunction with the University of South Florida, admits 5-10 students per year. More than 100 applicants vie for those slots, according to Program Director and Vice-Chair of Moffitt’s Immunology Department Kenneth Wright, Ph.D. “All the applicants are very gifted academically – that’s not the issue. What I look for when recruiting students is that passion – wanting to do this so much that they’re willing to put in the hours necessary.”

### **MAKE NO MISTAKE. IT’S A LOT OF WORK.**

The first year is spent in half-day lectures on all aspects of biology – everything from biochemistry to immunology – but

*Shonagh Russell (right) is enrolled in Moffitt’s Cancer Biology Ph.D. Program; Moffitt immunologist Kenneth Wright, Ph.D. (left) directs the program.*

*Photography: Ray Reyes*



*“You see these renowned scientists using the latest technology and you think – I’m not a student, I’m a scientist first and foremost.”*

specifically how that relates to cancer. They spend the rest of their days in ten-week rotations through different Moffitt labs, to forge a match with a researcher who will mentor them for the remainder of the program. It’s hands-on lab work on how to be scientist.

“They’re the lifeblood of the lab,” says Dr. Wright, “the ones who are here day-in, day-out, doing experiments, training to be independent scientists and producing data that hopefully will lead to the next breakthrough. They’re the ones you hope will be coming up with new ideas as well, to push the research forward.”

Graduation is contingent on publishing a primary research paper on some aspect of cancer biology – as its first author. Since accepting its first class in 2001, the Ph.D. program here has graduated more than 50 scientists. And their papers have appeared in many high profile journals.

Russell has already been part of a study published in Cancer Research. It centered on solid tumors’ characteristically acidic microenvironment and its potential impact on new immunotherapy treatments. “Hopefully, we can find ways to improve and deliver immunotherapy against cancer in this hostile acidic environment,” says Russell.

Back home in Scotland, Russell’s family members typically scratch their heads when she offers such explanations. But they’re proud of her, and of her devotion to the mission statement that greets her on the wall outside of Moffitt’s Stabile Research Building.

*To contribute to the prevention and cure of cancer.*

“It’s a great daily reminder of your chance to make a difference,” she says. 🎧



Photography: Ray Reyes

# PHYSICIAN- SCIENTISTS IN THE MAKING

## CLINICAL EDUCATION AT MOFFITT

**By the time Matt Perez elected to do a clinical rotation at Moffitt as a fourth-year USF medical student, he was already familiar with several Moffitt physicians from working in their research labs. Now an M.D. halfway through his residency at Emory University in Atlanta, he’s taking a two-year break – to come back to Moffitt as a clinical research fellow for Dr. Jonathan Zager in the Cutaneous Oncology Department.**

“Being a Florida native,” says Dr. Perez, “I knew the presence Moffitt has in the state and the amount of research that it’s constantly performing. As a USF med student, it was such an opportunity to be able to come over here and participate. You want to be somewhere where the faculty is very accessible for mentorship and guidance.”

**Dr. Zager, a surgical oncologist who also chairs Moffitt’s Graduate Medical Education program, was named Moffitt’s Clinical Educator of the Year in 2015. He says the breadth of clinical education at Moffitt is surprising to many – “I’m**

**sure there are plenty of people who are not aware of all the different avenues provided here,” starting with one-day observation experiences that are open to high school students considering a medical career.**

Moffitt trains more medical students and physicians in the field of oncology than all other Florida institutions combined. More than 400 medical students rotate through Moffitt each year, with first- and second-year med students getting firsthand exposure to Moffitt’s clinical services. “It’s called DCE for Doctoring Clinical Experience,” explains Dr. Zager. Moffitt physicians who volunteer for DCE, as does Dr. Zager, welcome these young physicians-in-training to follow them in clinic or even the operating room one day a week. Many will return as third- and fourth-year med students doing clinical rotations, as did Dr. Perez.

After medical school, the opportunities for clinical education at Moffitt become very competitive. Residents (newly graduated physicians who practice under the direct supervision of an

*Matt Perez, M.D. (right), is a clinical research fellow through Moffitt’s Graduate Medical Education Program, chaired by Jonathan Zager, M.D. (left).*

attending physician) and fellows (post-residency physicians seeking more training in a medical subspecialty like breast surgical oncology) fill 115 full-time equivalent positions on a monthly basis at Moffitt. While Dr. Zager says most residents are USF grads, Moffitt welcomes one or two visiting residents each month. “So, if you are doing your residency in another state but are interested in eventually pursuing a surgical oncology fellowship at Moffitt,” Dr. Zager explains, “you might elect to come here during your fourth year of residency to do a one-month elective.”

Moffitt offers 26 different fellowships, “and they are great programs,” says Dr. Zager. While other institutions offer similar fellowships, “Moffitt is a huge cancer center, ranked number six in the nation. We have world-class faculty, and are extremely busy both clinically and academically. Our faculty and trainees are on the forefront of publishing on the latest techniques, the biggest case series and retrospective reviews. It’s good for the trainees – and advantageous to Moffitt to offer these fellowships. Otherwise, we’ll lose top-quality candidates to other centers.”

Dr. Perez already has his eye on a possible return to Moffitt. Now working on clinical outcomes research with Dr. Zager, he’ll go back to Atlanta to complete his residency before heading off to a fellowship. He wants to become a professor of surgical oncology – hopefully at Moffitt.

“No doubt, my experiences working with Moffitt faculty, as well as my experiences working with Moffitt researchers have solidified my thoughts on my career,” says Dr. Perez. “My plan is to become a surgical oncologist, and I have an interest in skin cancer and soft tissue malignancies. In the last decade, there have been a lot of therapeutic breakthroughs, so it’s a very exciting time to be participating in the care of these patients. And I want to continue to participate in research and teaching.”

Another physician-scientist in the making, with help from Moffitt Cancer Center. 🎧

MOFFITT TRAINS MORE  
MEDICAL STUDENTS AND  
PHYSICIANS IN THE FIELD  
OF ONCOLOGY THAN  
ALL OTHER FLORIDA  
INSTITUTIONS COMBINED.





# HIPsters Focus On Math And Medicine

## HIGH SCHOOL INTERNS GAIN EARLY EXPOSURE TO MOFFITT RESEARCH

In 2013, researchers in Moffitt's Integrated Mathematical Oncology (IMO) laboratories hosted a class visit from the Academy of the Lakes High School. They intended to show students how mathematical models can help researchers define and predict how cancer starts and grows – and even how best to treat it.

Little did the IMO staff realize that the visit's result would be a new internship program for high school students – and a chance to introduce enthusiastic young learners to an emerging career path in mathematics.

One of the visitors that day – a 14-year old named Pranav “Raj” Warman – wanted a chance to put his mad math skills to work during the summer months. He would have to wait until he was 16 – and until Heiko Enderling, Ph.D., director of education and outreach in Moffitt's IMO Department, could formalize a program now known as HIP-IMO, for High School Internship Program in Integrated Mathematical Oncology.

Dr. Enderling recalls he barely had the program set up back in 2015 before 17 online applications came in – some from as far away as California and Minnesota. “I don't know what these kids were doing – maybe Googling ‘unpaid summer program in mathematics and cancer’ - but if there are so many kids that want to learn, we want to teach them.”

They're called “HIPsters” – as many as ten rising high school juniors and seniors who spend eight weeks throughout the summer at Moffitt's Stabile Research Building. “We don't ask for transcripts. We don't really care what the kids have done in school,” says Dr. Enderling. “We aren't going by grades but by interest - not just a great student, but a student that we can help learn the most.”

For the first week, they attend lectures. “Cancer biology 101, mathematics 101, some computer programming tutorials,” Dr. Enderling details, “but most of these kids have pretty solid background knowledge. We truly only get the crème de la crème.”

The rest of the summer is spent working with an IMO mentor on a defined project that matches their interests and abilities. The project has to include stated deliverables within six to eight weeks, and there's a presentation to peers, faculty and parents at the end of the summer.

The first HIPster – Pranav Warman – not only completed his project but also set up a novel ongoing study with his mentor, IMO Associate Member David Basanta, Ph.D. Warman developed a simple mathematical model based on Game Theory to model biological systems, and to quickly identify alternative treatments that might have potential for cancer patients.

“Our goal is to get it published this year,” says Warman, who is now pursuing a math degree as a Duke University freshman with a full scholarship. He still stays in touch with fellow HIPsters through Facebook. “I gained friends and mentors for life,” he says. But the greatest impact of HIP-IMO is his continued interest in mathematics and biology. “This is such an exciting field – in the next 20 years, it will shape how we view things. The idea that it can inform treatments for cancer patients is inspiring to me.”

What's inspiring to Dr. Enderling is the opportunity to expand the now shallow pool of trained scientists who are bilingual in the languages of math and medicine. “It's an opportunity to spark a little light and see them run with it,” he says. To do that, he says, you need to reach students while they are still planning for college and beyond.

Dr. Enderling adds - while the program can be a gateway into a science career, it's also a place where these students may finally fit in. “Most of them don't have peers in their class or in their school. A lot of them already have done all college level

*“It's an opportunity to spark a little light and see them run with it.”*



HEIKO ENDERLING, PH.D.

math courses. And they push each other. If someone has a new idea and takes it to the next level, everybody tries to catch up.”

Good luck for most of the parents, says Dr. Enderling, who often grow teary-eyed while listening to their teen present scientific findings at the end of the summer.

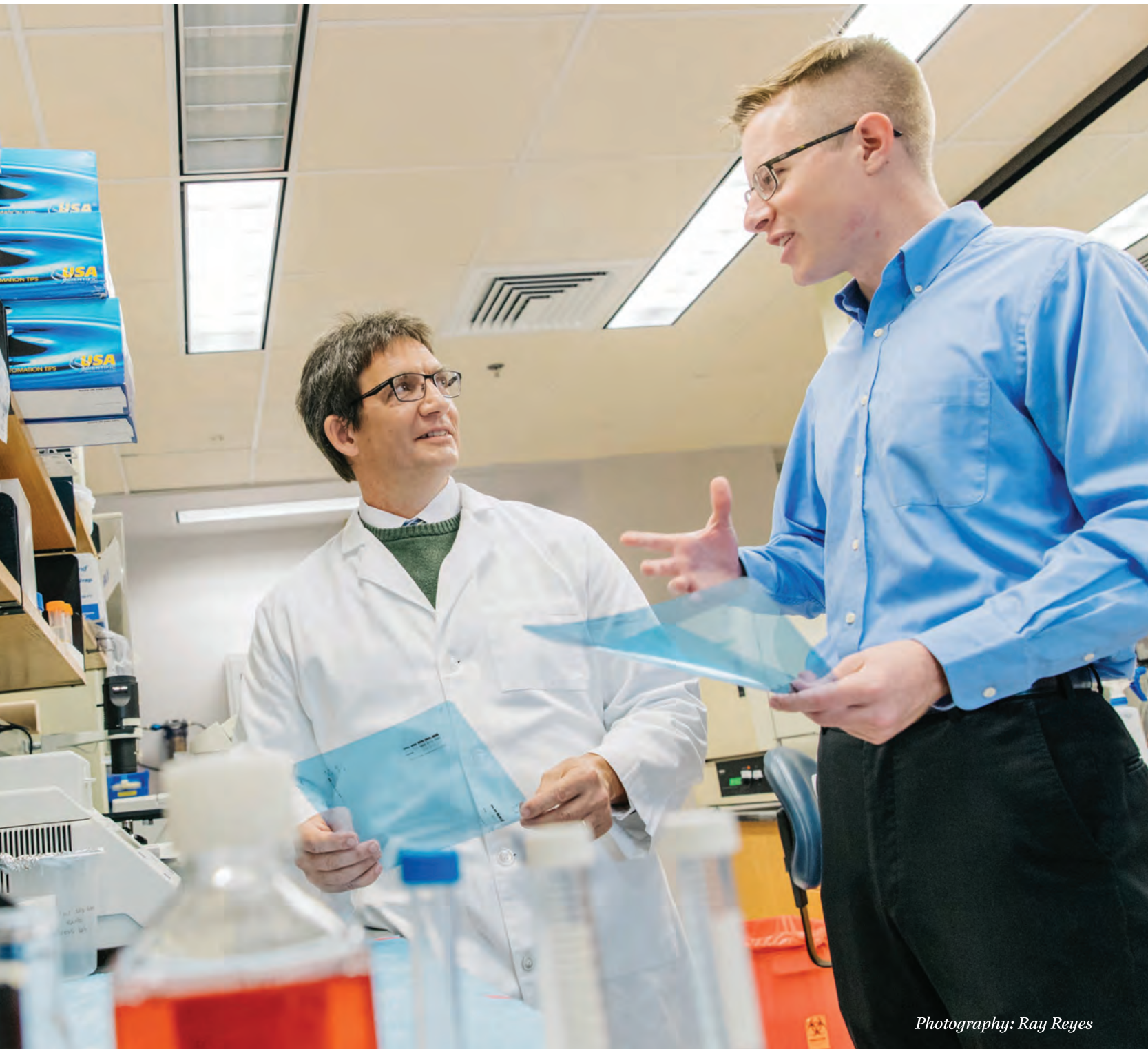
“I know there are many teens who have great talent for this type of research,” adds Warman. “But they haven't realized the potential. They need to hear about opportunities to gain exposure to it - and it is right here at Moffitt.”

The HIP-IMO program has already selected its interns for summer 2017, but you can learn more at: <http://labpages.moffitt.org/imo/hip-imo>.



# SPARKing Scientific Interest

MOFFITT'S UNDERGRADUATE SUMMER INTERN PROGRAM



Photography: Ray Reyes

SPARK program director Doug Cress, Ph.D. (left), mentors students like Evan Johnson (right) as they create science projects with measurable goals.

## IN THE BEGINNING, THERE WAS SPARK.

Moffitt's first undergraduate research opportunity - the Summer Program for Advancement of Research Knowledge (SPARK) - was initiated in 1992. It was the same year Julie Djeu, Ph.D., left her lab at the University of South Florida to become Moffitt Cancer Center's first basic scientist and to establish Moffitt as a leader in research training.

"The day I accepted the job, my first condition was that a summer undergraduate research program I'd started with six students per summer at USF would be expanded at Moffitt," says Dr. Djeu. It immediately grew to as many as 30 undergraduate interns each summer, mentored by scientists throughout Moffitt.

Over the past 25 years, she says proudly, over 600 SPARK interns have gone on to study at great schools (Harvard, Columbia, Yale, Emory, Vanderbilt and others) and accomplish impressive things. "They'll get in touch and say - 'hey Dr. Djeu, do you remember me? I was in your SPARK program. You really set me up... Because of SPARK, now I'm a physician here at this institute - and I want to thank you for what you did for me.'"

What she did was open a door. SPARK interns like Evan Johnson chose to walk through and investigate career opportunities.

Now a USF pre-med senior, Johnson says he became very interested in medical research after his grandfather was diagnosed with lymphoma. "I have this personal connection," he says, "so research is something I'm very passionate about." Johnson was a junior when he reached out to Moffitt to see if there were any opportunities to learn firsthand as a volunteer. It wasn't long before he applied to become a SPARK intern working on a funded research project.

Current SPARK program director Doug Cress, Ph.D., explains the ten-week summer program is a "full-time immersion in research." Competition is tough for SPARK's limited slots, with hundreds of applicants. Interns study under some of the nation's leading scientists in Moffitt labs. Dr. Cress's Molecular Oncology lab is just one example, though interns may be mentored in such diverse programs as Drug Discovery, Experimental Therapeutics, or even prevention-related studies in Health Outcomes and Behavior. Each intern works with their mentor to create their own research project with achievable goals and present their findings in a scientific paper and oral presentation at Moffitt's annual Research Day.

For Johnson, the real thrill was learning technical research skills. "I'd learned about the DNA of a cancer cell in my undergraduate courses. Now, I had someone teach me how to actually look at that DNA firsthand."

He used those skills to continue his research project on proteins involved in cancer metabolism - it's now his senior USF Honors College thesis. Johnson is looking forward to starting medical school in August, knowing he'll already have valuable research experience under his belt. "Most medical schools have mandatory research components," he explains. "I can walk into a lab and know what I'm doing."

Once he has his M.D., Johnson says he won't give up his interest in research.

Mentoring future physician-scientists, says Dr. Cress, is the greatest reward of the SPARK program.

For Dr. Djeu, creating new ambassadors is Moffitt's reward. "I tell all my students when they leave - remember, this is not just a summer thing. You are our ambassadors. When people ask, tell them Moffitt inspired me." 📍

*"I'd learned about the DNA of a cancer cell in my undergraduate courses. Now, I had someone teach me how to actually look at that DNA firsthand."*



Photography: Ray Reyes

SPARK interns Nick Gimbrone (center) and Evan Johnson confer with Dr. Cress.



## ABOUT MOFFITT CANCER CENTER

Moffitt Cancer Center in Tampa, Florida, has made a lasting commitment to the prevention and cure of cancer, working tirelessly in the areas of patient care, research and education.

### MISSION

To contribute to the prevention and cure of cancer

### VISION

To transform cancer care through service, science and partnership

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## NOTABLE

**MOFFITT WILL PROVIDE BLOOD AND MARROW TRANSPLANT AND MALIGNANT HEMATOLOGY SERVICES AT MEMORIAL HEALTHCARE SYSTEM (MHS), BEGINNING JULY 1.** With the goal of establishing a comprehensive Blood and Marrow Transplant Cellular Therapy program, Moffitt created a new department in the Moffitt Medical Group (MMG). Hugo Fernandez, M.D., has accepted the position of department chair, Malignant Hematology & Cellular Therapy at MHS, and he will lead an initial team of 11 providers, all new MMG members.

MHS is based in Hollywood, Florida, with facilities in Hollywood, Pembroke Pines and Miramar. MHS and its patients will have increased access to research, personalized medicine and innovation through a distribution of the Moffitt model of care. This relationship speaks to Moffitt's legislative mandate to serve the citizens of Florida, as we broaden our reach and provide access to our experts and deliver superior value.

**M2GEN® ANNOUNCED THAT MERCK AND ABBVIE HAVE JOINED THE ONCOLOGY RESEARCH INFORMATION EXCHANGE NETWORK® AVATAR RESEARCH PROGRAM.** ORIEN Avatar is a collaboration among leading U.S. cancer hospitals, pharmaceutical companies and M2Gen, which manages the program. The program fosters collaboration among key stakeholders in cancer research, including patients themselves, with the shared goal of discovering and developing novel therapies and ultimately matching patients to the best treatment options.

**THE NATIONAL HEART, LUNG AND BLOOD INSTITUTE (NHLBI) SELECTED MOFFITT AS A CELL THERAPIES PROCESSING FACILITY.** One of five institutions comprising the NHLBI's Production Assistance for Cellular Therapies group, Moffitt is part of an exclusive group including the only NHLBI-approved facilities to produce cell-based therapies for scientific research. The facility also will manufacture human cells that will be used to help develop early-stage clinical trials to evaluate the safety and effectiveness of new therapies.

Visit **MOFFITT.org** to find out about our upcoming events

**WHEN YOU DONATE TO CANCER RESEARCH** your gift will go directly to helping researchers and scientists develop the medicines and protocols that will advance cancer treatments and help cure patients. Simply put, your generosity will help save lives. Every gift, no matter the size, makes a difference. Now is the time to get involved and help make a difference. Visit **MOFFITT.org/Giving** to find out more.

H. Lee Moffitt Cancer Center & Research Institute, an NCI Comprehensive Cancer Center - Tampa, FL

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