TMC PULSE

THE OFFICIAL NEWS OF THE TEXAS MEDICAL CENTER — VOL. 3 / NO. 3 — APRIL 2016

On Medicine and Mars

A look at NASA's Twins Study

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CENTER STAGE // p. 22

ROUGHLY 14 MILLION VIEWERS TUNED IN TO TELEMUNDO AND CNN TO WATCH AS FIVE PRESIDENTIAL CANDIDATES TOOK THE STAGE AT THE UNIVERSITY OF HOUSTON'S MOORES OPERA HOUSE FOR THE 10TH REPUBLICAN PRESIDENTIAL PRIMARY DEBATE. *THE STUDENT BODY AND LOCAL COMMUNITY ALSO GOT IN ON THE ACTION, TAKING PART IN VARIOUS CAMPUS EVENTS THROUGHOUT THE WEEK LEADING UP TO THE DEBATE.*

ON THE COVER: *NASA Astronaut Scott Kelly is pictured inside a Soyuz simulator at the Gagarin Cosmonaut Training Center in Russia. The photo was taken in March 2015, just prior to his one-year mission in space.* (Credit: NASA/Bill Ingalls)

PRESIDENT'S PERSPECTIVE

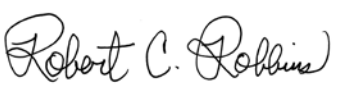
ROBERT C. ROBBINS, M.D.
President and
Chief Executive Officer,
Texas Medical Center

Last month, many of us watched history unfold as astronaut Scott Kelly landed safely on Earth after having spent nearly a year aboard the International Space Station. It was an exciting feat, not just for Commander Kelly and NASA, but for our country as well. Through his robust social media presence—from posting breathtaking photos of sunsets in space to the occasional selfie while cheering on the Texans or testing a new tech device—Commander Kelly reinvigorated our nation's interest in space exploration and aeronautical science. Even more, the research being done on Kelly himself will provide invaluable insight into the ways in which space affects the human body. The results will no doubt propel us toward a future mission to Mars, but they could also translate into medical breakthroughs here on Earth.

In fact, NASA has a rich history of lending its discoveries to the advancement of society, especially in the field of medicine. Cochlear implants, cardiac pumps, advanced water filtration systems, enriched baby formula and less-invasive breast cancer screening tools were all adapted from technologies originally developed for the space program.

In this issue of Pulse, you'll read about how Scott's one-year mission will be NASA's latest contribution to our field, and how some of the Texas Medical Center's own institutions are contributing to this groundbreaking research. Information collected from the Twins Study, in which Scott's unique biometric data will be compared to that of his twin brother, should provide insight into the effects of radiation exposure, bone and muscle loss, aging, cardiovascular function, personalized medicine approaches, and more.

The Texas Medical Center is proud to have a longstanding relationship with NASA and our neighbors at Johnson Space Center, and we value our ongoing partnership with Dr. Ellen Ochoa, the director of the Johnson Space Center, and her team there. Collectively, the city of Houston holds vast potential for our future, and I know we are all excited to see the results of these latest studies and how the road to Mars will help us improve our health as a society overall. Whether it's through new therapeutics for heart disease, a more comprehensive understanding of certain cancers, or even improvements in agricultural engineering—together we'll be making giant leaps for mankind.



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WHR in the **TMC:**

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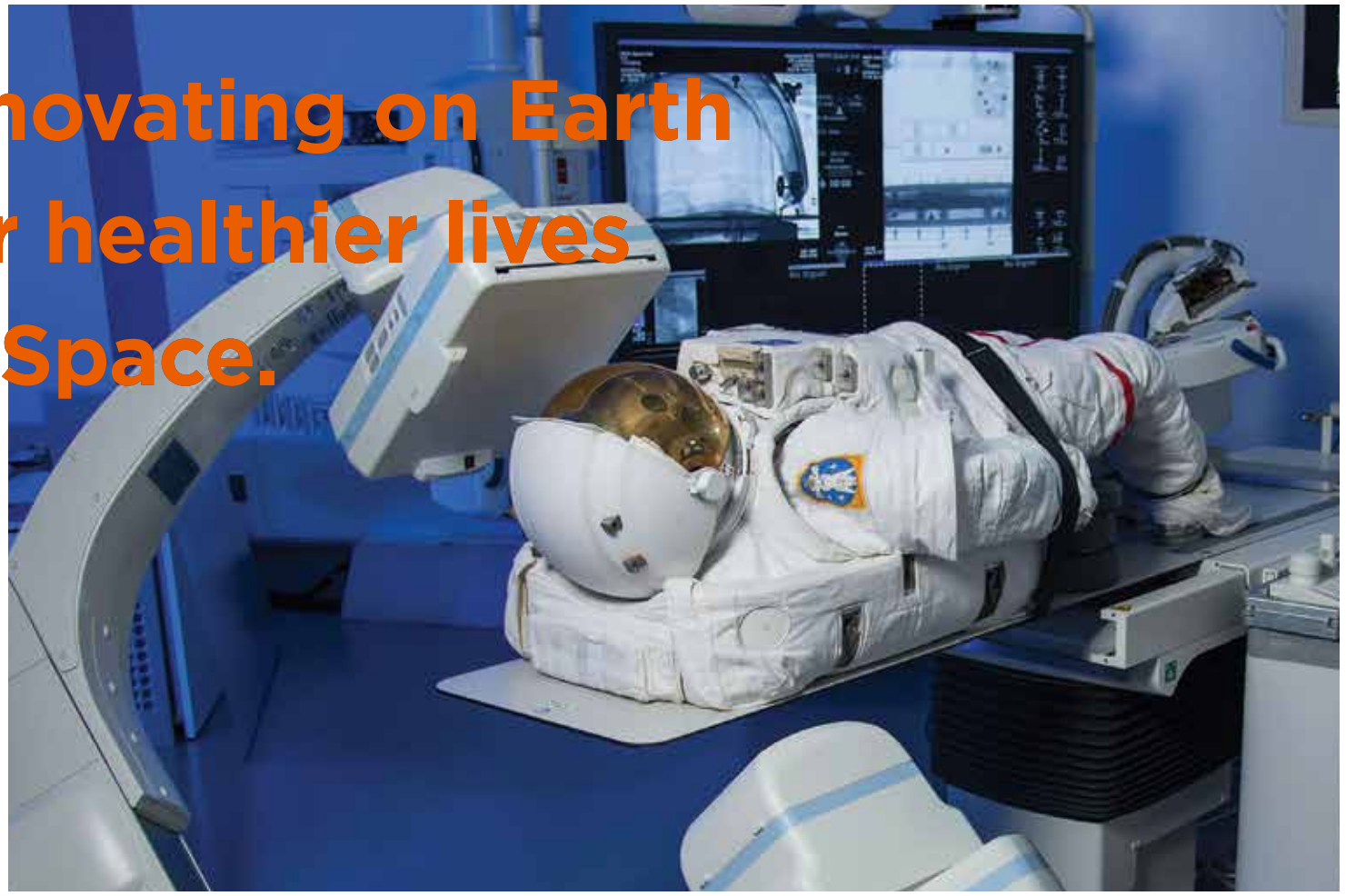

Designed by WHR and CO Architects, the Houston Methodist Institute for Technology, Innovation and Education (MITIE) was created to improve patient care through multidisciplinary collaboration among medical professionals, research scientists and the medical device industry. In this advanced-technology environment, NASA used state of the art CT-imaging to scan and correct, a water leakage problem in an Extravehicular Activity (EVA) spacesuit. For thirty years, no one has pioneered design innovation in the TMC more than WHR.

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Today, Eleanor is back to her old tricks, which also happened to include kicking up her heels and dancing at a friend's wedding.

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Left: Nikoletta Carayannopoulos, DO, Chief, Orthopaedic Trauma Surgery

Center Left: Kevin Murphy, MD, MCh, FRCS, Hand Surgery, Division of Plastic Surgery

Center Right: Vinod Panchbhavi, MD, FACS, Chief, Division of Foot and Ankle Surgery

Right: Gregory McGowen, PT, Cert MDT, AIB Certified in Vestibular Rehabilitation, Rehabilitation Services

The four clinicians featured here are representative of the whole team of specialists spanning our musculoskeletal services.

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Student Superheroes

Members of the UH Love Your Melon Campus Crew—an apparel brand run by college students across the country—provide support and adventures for pediatric cancer patients

By Alex Orlando

Members of the University of Houston Love Your Melon Campus Crew held a special "superhero adventure" for a pediatric cancer patient.

On a brisk winter morning at a private airfield in Tomball, Texas, the whirring of helicopter rotor blades sent a gust of wind toward a resolute band of University of Houston (UH) students. Clad in superhero costumes—with capes and hair billowing in the wind—and insulated by matching knit beanies featuring the words, "Love Your Melon," they waved on the helicopter's ascent. As the blades tilted forward for takeoff and the cockpit became visible, Jacob, a pediatric cancer patient battling leukemia, popped into view. Previously stoic and slightly withdrawn, a faint smirk crept across the corners of his lips before settling into a broad, happy grin. Cheering below as the helicopter receded into a single point on the horizon, the members of UH's Love Your Melon Campus Crew had accomplished their mission: to buoy Jacob's spirits and put a smile on his face.

Hoping to provide a much-needed reprieve for pediatric patients battling through treatment, these superhero adventures—which are possible through donations as well as profits from merchandise sales—take children to the clouds, the high seas and the open road in the form of helicopter, plane, boat and limo rides. It's all part of the mission of Love Your Melon, an apparel brand run by college students across the country who are working to give a hat to every child battling cancer in America. To date, Campus Crew members have donated over 51,000 beanies, including more than 33,000 in 2015 alone.

"That's what really attracted me to Campus Crew—their core mission of donating hats to children battling cancer," said Samantha Russell, a UH student and founder of UH's Campus Crew. "It creates such a big impact on their day, even though it's just a hat. They really appreciate you going into their hospital room or visiting them at home. Letting them know that someone's thinking about them and cares about them is invaluable."

But as Russell explained, Love Your Melon is about much more than just the hats. In communities across the country, an ever-expanding network of student crew members—known as "ambassadors"—raise awareness for childhood cancer through sales, volunteer work, and other initiatives such as the superhero adventures. More than 11,000 college students at over 736 schools nationwide have signed on as ambassadors.

> "We hope that events like these provide a positive experience for pediatric cancer patients to talk about. [...] All of that happiness is powerful, and we want to help them create something that will stay with them."
>
> — SAMANTHA RUSSELL
> *Founder of the University of Houston Love Your Melon Campus Crew*

"It's very easy for someone to send out hats to hospitals without having that personalized touch," said Alex Meysman, event director for Love Your Melon. "We focus on personally donating those hats to children—all while having our ambassadors dressed up in superhero costumes. We'll send hats to our ambassadors who will bring them to hospitals, but we'll also set up household visits if the child is feeling well enough to leave, and even throw them a party.

"It's all about spending time with them and getting to know who these children—these 'real superheroes,' as our ambassadors call them—are," he added. "They get to learn so much, and the overarching mission and purpose of Love Your Melon is really to enable these students to engage with their communities."

Right before the start of the 2015 academic year, Russell found herself doing what any college student might at 8:30 at night—scrolling through Facebook. A small ad featuring a logo for Love Your Melon immediately caught her eye.

"At first, I thought, 'What does that even mean?'" said Russell. "I thought it was going to be about breast cancer awareness—like, 'love your melons'—but it wasn't. I went to the web site and thought, 'Wow, this is incredible!' I read everything on there, and that same night, I submitted the application. By 10:30 p.m., I got a response that essentially said, 'Yes, go ahead! If you can find 10 people, you can create a crew.'"

After amassing an army of friends and supporters, Russell and her classmates officially launched the UH Campus Crew in August 2015. In the months that followed, they have visited Ronald McDonald House (RMH) Houston—dressed as superheroes, of course—to hand out hats, take photos and create crafts with the children staying there; traveled to The University of Texas MD Anderson Cancer Center on multiple occasions to donate beanies and engage with patients; and participated in a continuous stream of weekly online challenges to earn prizes like Jacob's superhero adventure helicopter ride.

"That's what we're trying to show," Meysman said. "We'll still provide the hats themselves, and if you want to provide them for apparel reasons, that's great. But the other side of that hat is if you see someone wearing one, you're going to think about all of the other things that Love Your Melon is doing. Maybe it was donated to the person that you're seeing; maybe it was distributed as part of a superhero adventure. That's the story that each hat will tell, and it's a narrative that people are slowly picking up on and starting to understand."

More than 40,000 children undergo treatment for cancer each year. According to the Cancer Treatment Centers of America, therapeutic forms of treatment such as the ones Love Your Melon are working to create may have numerous health benefits for patients, ranging from pain relief to strengthening the immune system.

"Any time we have a group like Love Your Melon come in, it's an opportunity for patients to have their minds taken off the hospital environment," said

> “It’s all about spending time with them and getting to know who these children—these ‘real superheroes,’ as our ambassadors call them—are.”
>
> — **ALEX MEYSMAN**
> *Event Director for Love Your Melon*

Lauren E. Shinn, program manager for The Children’s Cancer Hospital at MD Anderson Cancer Center. “One of our goals as a hospital is to provide a normal childhood experience, as much as possible. That’s why it’s great to have groups like Love Your Melon come in, so they can provide those opportunities for kids to be kids and to have experiences where they can take a moment to forget about what’s going on and just have fun.”

“A little lifting of spirits is always good,” added Colleen Dillahunty, family activities coordinator at RMH Houston. “Part of what we do here is give options for families to have a time to not have to think about what’s going on with their kids in terms of medical issues. It’s really giving them a break from that medical jargon that comes to dominate their lives. Having Love Your Melon here was really nice.”

That break is well deserved for patients like Jacob, who was diagnosed with a lymphoblastic leukemia—a rare and aggressive form of cancer—over a year ago. While Jacob’s cancer is now in remission, the task of recruiting others in the fight against childhood cancer remains as essential as ever. It might just start with something as small as a knit hat and a smile.

“We hope that events like these provide a positive experience for pediatric cancer patients to talk about,” Russell said. “When they’re asked, ‘How was your day?’ rather than having to respond with, ‘I got chemotherapy treatment,’ instead, they can say, ‘Oh! Well, we had superheroes visit us, and we got to make bracelets and hats, and we got to laugh.’ It’s something as simple as providing a positive experience for them as they’re going through their treatments and doctor visits. All of that happiness is powerful, and we want to help them create something that will stay with them.” ■

MARC L. BOOM, M.D., *PRESIDENT AND CHIEF EXECUTIVE OFFICER OF HOUSTON METHODIST HOSPITAL, SAT DOWN WITH WILLIAM F. McKEON, EXECUTIVE VICE PRESIDENT AND CHIEF STRATEGY AND OPERATING OFFICER OF THE TEXAS MEDICAL CENTER, TO DISCUSS THE ROLE HEALTHY COMPETITION PLAYS IN ADVANCING PATIENT CARE AND HOW MAINTAINING A CLINICAL PRACTICE PROVIDES HIM A UNIQUE PERSPECTIVE IN THE WORLD OF HOSPITAL ADMINISTRATION.*

Q | *Tell us about your early childhood.*

A | I was born in Englewood, New Jersey. My folks immigrated to the United States just before I was born, so I was the child of immigrants in northern New Jersey, and my father worked in Manhattan. Actually, at that point I think my father worked in Florham Park, New Jersey, for Exxon, if I remember correctly, and later in Manhattan.

So they were both born in Belgium in the midst of WWII. Both very young, so they don't have big memories of the war, but my father has some vague memories of getting ushered into the house because a Canadian plane was in a dogfight with a German plane right over the neighborhood. It got shot down in his neighborhood. He remembers, as a four-year-old, seeing this stuff. And my mom's older brother, he's 86, so he was born in probably 1931 or '32, remembers it vividly.

Q | *Growing up, were you always interested in the sciences? I know you eventually ended up as a biology major at UT.*

A | Yes, I always liked the sciences. I was never much into English or other subjects, they were never my favorite. So I was very interested in science, and it's funny, people ask me when did I decide to go into medicine, and it's more just like an 'aha' moment, and I can't really tell you why. But it's more that I was just really fascinated by medicine. So by my junior year of high school, I was telling my parents that I wanted to be a doctor. Now, with an engineering father, and thinking it would be really cool, I decided I wanted to do biomedical engineering. I ended up at UT, which I was thrilled to go to.

Q | *So how did you meet your wife, Julie?*

A | We met as juniors in a pathophysiology class. She was from Dallas, I was from Houston. Sitting with two or three people in between us who we both knew, but we didn't know each other. We're talking a 200-person lecture hall with the long tables. And one of them said, 'Oh, have you met?' And we chatted on the way out, and it turned out her sorority and my fraternity were having a mixer/match that week, where on Tuesday night you have a cocktail party and the whole purpose is to find a date for the match, and then the match would have some theme on Saturday. Well, she had an exam the next day, and she came with one goal: to see if I would ask her out. And I went with one goal: to ask her out. She told her friends she would only stay for 30 minutes because she had to study. My wife was a good influence on me, studying-wise. So we met there and married four years later and now we are at 25 years with three wonderful children. Julie is a very

successful academic pediatrician at Baylor and Texas Children's Hospital.

Q | *What led you to Baylor?*
A | We looked around the country and knew we were probably going to stay in Texas. There was no couple's match, but we knew we were getting married by then. In medical school, we were never Marc or Julie, we were Marc and Julie, so we looked around within Texas, and Baylor was our first choice.

Q | *What shaped your discipline once you got to medical school?*
A | I had no idea what exactly I wanted to do, or if I had an idea it was totally wrong. When I was in high school and said I wanted to be a doctor, it was actually more that I wanted to be a surgeon. And in college, I actually spent summers doing the usual kind of pre-med stuff. I spent two summers at MD Anderson, and then I did the heart surgery program at Texas Heart Institute. There is a picture of the 10 of us in the program with Dr. Denton Cooley, and me with my eyes closed. Not the best picture, but that was pretty neat. But looking back now, it was the start of me realizing I didn't want to be a surgeon. Because while it was pretty interesting, there were moments of sheer boredom punctuated by lots of excitement.

So I did that and then went to medical school, and I really got grabbed by internal medicine. I loved the intellectual challenge. I loved the diagnostic puzzles. In fact, my two favorite parts of medicine are the diagnostic puzzle part of it and the relationship part of it. I ended up doing primary care and I love knowing people through their lives and helping them with a myriad of things. One day it is one thing and the next it is something totally different that you are helping them with and guiding them through.

It's kind of special having come back here and working my way into this position. There are still a bunch of people in significant leadership positions here who taught me in medical school, either in lecture halls or one on one. Our chair of OBGYN, who just retired about a year ago, Alan Kaplan, the first time I stepped into an operating room as a medical student, and the first time I stepped into an operating room at Houston Methodist, was with him. It was actually my first clinical rotation out of basic science, watching him. And many years later, he was our chair and I got to work with him that way. So there are lots of great ties like that.

Q | *When you were at Massachusetts General Hospital, at what point did you decide to go to Wharton?*
A | With the benefit of hindsight, it was actually clearly while I was still in medical school that I became interested in the business side. And I say it's sort of in my DNA. My grandfather left the farm, became a cabinet maker, built a business. My father, an engineer, ends up on the management side after a few years. My brother is an attorney, and ends up on the management side after a few years. I'm a physician and end up on the management side. So we have all got our trade, and then we do that. And to different degrees, we keep that trade. I still practice, so I have kept that, too.

I knew I wanted to be involved in leadership in medical school. But I didn't know quite what that meant, and actually, I owe a lot to Ralph Feigin, a major mentor for me. So Ralph was always really good at attracting great students from Baylor to stay in his pediatric program and convincing great students to go into pediatrics. My wife was going into pediatrics, so he had his eye on her to be there, and he was trying to convince me to go into Med-Peds [combined internal medicine and pediatrics] because he knew I didn't want to do pediatrics. He knew I had this interest in leadership, and I thought that meant I wanted to be an academic chair someday. That's what I thought it meant at the time. But of course, those were the role models you have in that setting. So he offered for me to spend six weeks in my fourth year of medical school, right around the time we were turning in our match list, doing his administrative rotation that was normally reserved for the top third-year pediatric residents. For about a month, I followed him around. I remember going to board meetings, city council meetings, helping him write book chapters. It was a really cool experience. He had it all, from a leadership, academic and pediatric base. One of the two smartest physicians I have ever known.

I went to Mass General and thought I wanted to be a cardiologist because everyone at Mass General was in cardiology. And I liked cardiology, I enjoyed it. My wife wanted to do neonatology, and we, at one point, had a heart to heart, and about three weeks before the match list for fellowships was due, she said, 'I want to start a family, and I don't know how to do that as a neonatologist. It's just brutal.' And I said, 'I don't think I want to be a cardiologist. I want to do something a little different than that.' I was getting this administrative bug, and I had figured out that there were other tracks, and I had done some research and knew someone at Mass General and figured out that there were a number of people who went the business track to get into leadership.

So we backed out of the match two weeks before we had to turn in our lists, and that summer started doing research into options. Wharton was ranked number one in business schools at that point, but more importantly, it had the oldest health care management track in the country. I was 28 years old at the time, and they specifically took about 45 health care people, of which usually four or five were physicians or were in an M.D./MBA program. So I applied to Wharton and decided, 'If it's meant to be, it will be.' So I became a general medicine fellow, while working on my MBA. I did both simultaneously. My wife worked as a pediatrician at CHOP (Children's Hospital of Philadelphia). So that was busy.

We had our first child two months in. My first round of final exams were Monday, and my wife went into labor at 11 p.m. on Saturday night. So as she is in labor on Sunday, and then, as our first daughter is born, I am sitting there during the quiet time studying for my exams and multitasking.

Q | *Often when physicians go on to be administrators or leaders, they leave clinical practice altogether. It is really unique that you stayed with it. Has that proven to be helpful to you as you lead this organization?*
A | Very much so, and I love that. In business school, I knew I wanted to stay working on the provider side, whether hospitals or physician practices. I didn't want to go into managed care, which was hot at that time. I could have gone consulting. I could have gone finance. There were people doing lots of things. But I knew I was interested in the provider side, so I started working 50/50 clinical practice and administration in Houston for a joint venture between Baylor and Methodist. And really since 2004, when the administrative side was ramping up so much, I took what was a very robust 20 percent practice—a typical primary care doc, if you look at their panel, let's say 3,000 is pretty busy, we counted up my active patients and it was over 800 at that point—and had to ramp that way down. It was hard to do.

But in 2004, I went to family, friends and some patients that I had a longstanding connection with and said, 'Hey, would you like to stay with me and my small boutique practice here while I spend most of my time administratively?' And that's what I did. So for about 12 years now, I have had about 70 patients in my practice. Most of them are the same as they were 12 years ago. I have picked up some. I have three-generation families in many cases now. So it's really neat. I love that part of what I do.

I joke with my head of IT that I'm his worst nightmare, because I'm a CEO that actually uses his IT system. And he comes back and says, 'No, it's the best thing ever.' Because I get what has to be done. I am doing the same exact training as every single one of our physicians. We are in the midst of an Epic transition. I won't use it nearly as much as they do, obviously, but I will use it. Especially on the outpatient side. I don't really do inpatient anymore, but I will follow along with some patients of mine when they are in. And I am actually going to do all of the training for the inpatient side, too, because I want to be part of the experience.

> "It's kind of special having come back here and working my way into this position. There are still a bunch of people in significant leadership positions here who taught me in medical school, either in lecture halls or one on one."

> “Right now we have 20,000 wonderful employees. We have 4,000 outstanding physicians, and I am absolutely confident they come to work every day saying, ‘How do we make it better for patients?’”

That is a real tangible example of why it does help. I order tests, I consult with the radiologists, the tests come back to me, all of those things. So I get a chance to hear from patients in a different voice. And then the other part, very selfishly, even in the midst of some crazy stressful day, when you are dealing with this or that, when you go over there, only one thing matters, and it’s the patient that I am sitting with in the room.

Q | *Having now been at the helm of Houston Methodist for many years, what are some of the most challenging moments and some that you are most proud of?*

A | I think one of the absolute most challenging was Tropical Storm Allison. At the time, I was CEO of what was called Methodist Diagnostic Hospital, which is our West Pavilion building right across the street, and had already recommended to my bosses here at the time that we merge it into main Houston Methodist, because it made no sense to have a hospital catty-corner across the street. We were blessedly almost unaffected by the storm, as was most of that side of Fannin. So our Scurlock and Smith Towers had relatively minor issues, and Diagnostic had minor issues.

But the devastation that happened in the medical center was just jaw-dropping. And I’m not just talking Houston Methodist, I’m talking the med center as a whole. To see something that was so alive and vibrant one day, and to see the force of nature and what that can do. That was quite an experience. In many ways, it was one of the darkest hours in this institution’s history, and in many ways, it was one of the brightest, because people just pulled together and did what they had to do. People put the institution before themselves, and they put their patients before themselves, and it really helped launch some of what we have done culturally within the institution. It was one of the catalysts for our I CARE values and deepening our emphasis on our faith basis of care. So it was a tough, tough time. But like many disasters or difficult times, they either fracture something or pull it tighter. And in our case, it really pulled us together. So that was a heck of a moment.

Q | *When you look at the growth here, and how Houston Methodist has really extended out into the community, was that a natural byproduct of success and growth around excellence in care and quality? Or is that the new model?*

A | I think the answer is somewhat all of the above. We have, obviously, a very rich history. We will be 100 years old in 2019, so we are really preparing for how we are going to celebrate. And we talk about our vision for the second century, which is unparalleled safety, quality, service and innovation. Those six simple words really say it all from an academic institution that’s focused on patients and driving patient care. But in 1951, we were one 300-bed hospital, and wouldn’t have been that big but for Mrs. Ella Fondren, who put her foot down in the board room supporting the then-administrator who wanted to expand. And they were right. We started expanding with Houston Methodist San Jacinto Hospital. Then we decided to build a health center in Sugar Land. The idea was, here we are in the midst of HMOs, the gatekeeper model, and the hospitals are going to be passé, you don’t need hospital beds…and so they built this 20-bed health center down in Sugar Land, and it wasn’t the right model. And of course, a couple of years later, that model nationally imploded. And we re-trenched and really started focusing, and built a hospital in Willowbrook.

We learned over the next decade, and as health care evolved, and as Obamacare evolved, it became very clear that standalone, isolated, academic medical centers—whether medical school-related or not—sitting there sort of waiting for a patient volume to come to them, was a pretty risky thing to do. So in 2010, we built the West Houston facility, and it was a very different approach. But before that really, we massively expanded our hospitals in Sugar Land and Willowbrook, and have continued to expand. Sugar Land will be a 350-bed hospital in about a month. That’s a huge community hospital, and it’s not done. It will keep growing. And in 2010, we built a 193-bed hospital in West Houston, and darn if that thing didn’t just hit the ground like you wouldn’t believe.

Along the way we built another office building, now five years into it, we have pulled the trigger on a $177 million, 100-bed expansion. In a five-year-old hospital, that’s unheard of. So now we are building a 193-bed hospital in The Woodlands, and then along the way, for a variety of reasons, we picked up St. John down in Clear Lake and St. Catherine on the west side of town. Here we are today with 20,000 employees, and in the late last decade, we had under 10,000. So it has really been a remarkable growth trajectory. We are very blessed that there was a lot of good decision-making over time, and I think it has positioned us very well.

Q | *What is your perspective of the environment in the Texas Medical Center today?*

A | I think it’s a collection, unparalleled anywhere, of wonderful institutions. I think there is a lot of potential in the collaboration that happens here. From a clinical perspective, my personal belief is when we compete, patients win. And that’s what it’s all about—better care for patients. And let me be clear. When we are talking about that for Houston Methodist, yes, we are paying attention to what is happening with our competitors locally, but that is not our primary focus. We are focused on Johns Hopkins, and the Cleveland Clinic and the Mayo Clinic. Houston needs and deserves a leading academic medical center that is at the top of the top of the top of the U.S. News & World Report honor roll list. Houston Methodist is the only institution in a position to do that. We are consistently ranked as the number one hospital in Texas.

From a patient standpoint, our competition focus is elsewhere. But when we all compete, patients win. So I think that competition is good.

From an academic standpoint, collaboration is the name of the game. Every institution, I think, has to build its own robust academic enterprise, and everybody has their own areas of focus. And we turn those people loose and say, ‘Collaborate with whomever you want.’ They collaborate with every institution in the med center—including UH and Rice, as well as the more traditional medical institutions. We have something happening with everybody. We also collaborate with institutions around the country and around the world, notably Weill Cornell Medicine and Texas A&M.

What I see the Texas Medical Center focused on is how to build that collaborative environment and foster those collaborations. The part that I get most excited about is the building of the ecosystem, which is how I would describe it. So when, collectively, we can bring JLABS to the table, or we can bring other pharmaceutical or device companies, the venture capital to do this, that, to me, is how the TMC is helping build that. And we will all benefit collectively from that. Then there are some parts of it that are more architectural, geographic. We are not, at the present time, in your TMC3 activities, and really the reason is our model is translational research. Our model is embedding researchers right in with our clinical infrastructure. And we put in hundreds of millions of dollars to fund a research institute five years ago, we built with capacity, so it’s still not yet full. What I hope is that longer-term we will need more space. Short-term, we don’t. We are very excited about participating in collaborations that make a difference for patients.

Q | *Any closing thoughts?*

A | At the end of the day, it’s not about me. The institution is so far bigger than any one of us, even a Dr. Michael DeBakey, God bless him. He put us on a great course, and what was built is so much bigger than him now and will go on for decades and centuries, really. And that’s what we talk about, our vision for the second century. But right now we have 20,000 wonderful employees. We have 4,000 outstanding physicians, and I am absolutely confident they come to work every day saying, ‘How do we make it better for patients?’ ■

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At Houston Methodist, our team of world-class specialists uses a comprehensive approach to deliver an individualized treatment plan to those suffering from neck or back pain. Whether it's minimally invasive surgery or a nonsurgical therapy, our doctors use leading-edge imaging and rehab technologies to guide our patients to a happier, pain-free life.

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LEADING MEDICINE

TMC at SXSW

The Texas Medical Center thrives at SXSW Interactive as the festival enters its second year featuring health care and medical technology

By Shanley Chien

Noninvasix CEO Graham Randall, Ph.D., earned a second-place victory at the Impact Pediatric Health Pitch Competition.

> "It's a vast oversimplification, but in that space of time, between then and now, geeks have become rock stars."
>
> — HUGH FORREST
> *Director of SXSW Interactive*

As the South by Southwest (SXSW) Conferences and Festivals—a world-renowned convergence of creative content and new ideas in the music, film and tech industries—increasingly becomes the go-to place for health innovation, it comes as no surprise that the Texas Medical Center had a large presence at this year's festival. Nine TMCx Accelerator companies participated in competitions and Texas Children's Hospital collaborated with three other top children's hospitals to host a pediatric pitch competition.

In its 23rd year, SXSW Interactive, the festival's incubator of emerging technology and digital enterprise, hosted 19 different tracks that encompassed everything from sports, government, food, education, and health and medical technology.

"I remember complaining, 'We've got rock stars coming for SXSW Music, we've got movie stars coming for SXSW Film, and all we've got for this Multimedia and Interactive thing is a bunch of geeks,'" said SXSW Interactive Director Hugh Forrest, recalling a conversation he had with his boss in the 1990s. "It's a vast oversimplification, but in that space of time, between then and now, geeks have become rock stars."

Although the prevailing zeitgeist of SXSW Interactive in previous years has been focused on social media, gaming, and retail and e-commerce companies, a new wave of emerging health care startups are thriving in collaboration with each other, trying to solve a slew of health-related challenges at SXSW's second annual health care track. In addition to panel discussions with health care professionals and venture capitalists, SXSW Interactive featured several pitch competitions—including the Massachusetts Institute of Technology's Shark Tank-inspired HackMed Barracuda Bowls—that brought health technology and medical device ideas to the forefront of discussion.

"Every American knows health care has tremendous waste and is ripe for solutions that will create better outcomes, based on real data," said Katherine Chambers, chief executive officer of current TMCx company The Right Place and MIT HackMed Barracuda Bowl winner. "In today's world it's a shame we have more solutions and tools as consumers in retail, travel, social engagement and educational models through technology solutions, but that health care is still playing catch up. Our health is the most personal and important thing we have, so shouldn't technology play a strong role there to help us all live lives more fully?"

AOL co-founder and former CEO Steve Case emceed the second annual Impact Pediatric Health Pitch and welcomed founders of 10 startups to present their innovative solutions for unique challenges in pediatric health care to a panel of judges representing the nation's top children's hospitals, including Boston Children's Hospital, Cincinnati Children's, Texas Children's Hospital and The Children's Hospital of Philadelphia.

One of the judges, Jennifer Arnold, M.D., medical director of the Pediatric Simulation Center at Texas Children's Hospital, said she regularly sees the direct impact and value of cultivating a culture that encourages entrepreneurs to develop innovative products and solutions geared toward improving pediatric health care.

"Focusing on pediatric health and health care startups is critical to moving health care for our most fragile patients, infants and kids, forward," Arnold said. "In a system where the focus tends to be on adult health care and innovation, the ability to support those companies willing and interested in focusing on advances in pediatrics is crucial. Without supporting their work, pediatrics will continue to lag behind in innovation."

The Right Place CEO Katherine Chambers, left, and TMCx Business Strategist Sandeep Burugupalli

The products aimed at improving care for the country's newest and youngest patients ranged from a voice-translation tool to help those with speech impediments and a screening software for child development, to an avatar-based nurse to help manage chronic conditions and a stabilization device for neonatal umbilical catheters. But it was New York-based Cohero Health's asthma medication management platform that won over the judges and walked away with the $50,000 first-place prize, while TMCx alum Noninvasix, which was originally slated as an alternate finalist, came in second with its unique monitoring system for reducing cases of oxygen deprivation in infants.

"We are thrilled with the outcome of the competition," said Noninvasix CEO Graham Randall, Ph.D. "Bragging rights are great, but I think the biggest impact for the company from the competition will come from the connections we've made. We now have connections to the top children's hospitals in the country, and, after the competition, several of the judges asked how they could help Noninvasix."

Eager to make sure his work was meaningful and impactful, Randall left Silicon Valley 15 years ago to earn his Ph.D. in biosciences from Baylor College of Medicine in an effort to develop new life sciences solutions for unmet needs in pediatric health and collaborate with like-minded and equally passionate individuals.

"I expect that most entrepreneurs in life sciences are driven by a desire to do good, by either improving patient outcomes or creating new efficiencies in the system," Randall said. "Health care is the biggest economic problem in the country right now. We need entrepreneurs working on creative new solutions that will allow us to get spending under control, without compromising outcomes."

Ultimately, collaboration across the spectrum of tracks and industries is at the heart of SXSW. Erik Halvorsen, Ph.D., director of the TMC Innovation Institute, said although exposure to other health care companies is vital to startup growth, creating meaningful interactions outside of health care to draw inspiration from and apply to their own ideas is critical.

"One of the secrets to effective innovation, and you see this across different industries, is when you find somebody doing something cool in an unrelated field, like in film or music or design, and you have that 'Oh, wow' moment, and think, 'I could totally apply that to my digital health product or medical device,'" Halvorsen said.

"When you find those gems, new connections that arise as the unintended consequences of chance meetings and discussions, that's when the magic happens," he added. "People are trying to solve for some significant problems in health care, and they can easily get into the weeds with all the complexity, but if they step outside their comfort zones and explore what's going on in unrelated fields like energy, entertainment, architecture and the arts, they might just find something useful and unanticipated that turns out to be a real game changer."

Whether it's coming up with innovative solutions to help people better navigate health policy, improve patient safety, mitigate the research translation problem or develop new medical devices that improve patient outcomes, the display of talent at this year's SXSW Interactive proved that entrepreneurs, engineers and scientists have unparalleled ability to shape the future of health care through collaboration.

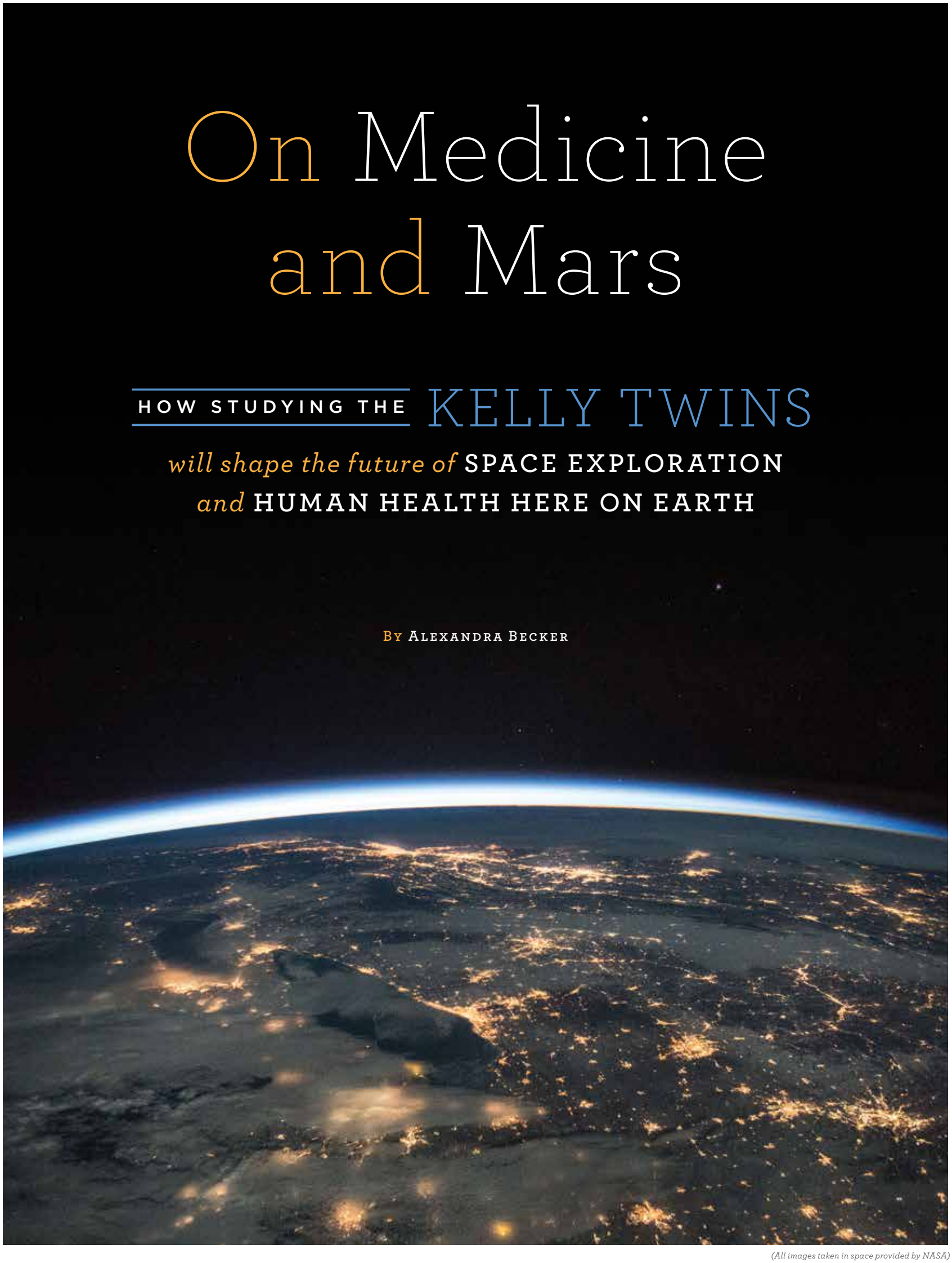
"I think the Texas Medical Center has a tremendous role to play in all of these problems, but the common element [...] is that there are many opportunities for people who write software or for people who make hardware or for people who do technology in general to have huge impacts," said CareSet co-founder and hacktivist Fred Trotter. "You can make a relatively small impact, relative to the whole problem, on any one of those problems, and you can save tens of thousands of lives. You can change hundreds of thousands of lives for the better." ■

> "In a system where the focus tends to be on adult health care and innovation, the ability to support those companies willing and interested in focusing on advances in pediatrics is crucial."
>
> — JENNIFER ARNOLD, M.D.
> *Medical Director of the Pediatric Simulation Center at Texas Children's Hospital*

On Medicine and Mars

HOW STUDYING THE KELLY TWINS *will shape the future of* SPACE EXPLORATION *and* HUMAN HEALTH HERE ON EARTH

By Alexandra Becker



(All images taken in space provided by NASA)

As the city of Houston approached midnight on March 1, 2016, NASA astronaut Scott Kelly landed on Earth—in Kazakhstan, to be exact—after having spent the previous 340 days in orbit. It was the longest consecutive period of time any American had ever been in space, but Scott's mission wasn't just about breaking records. Close to 400 experiments took place during his year on the International Space Station (ISS), with he himself being perhaps the most important of them all.

One of NASA's primary objectives in Scott's extended deployment was to study the effects of longer duration space travel on the human body with an eye toward future missions, including a human-piloted trip to Mars. To collect the necessary data, Scott underwent extensive medical evaluations prior to launch, collected frequent samples while aboard the ISS, and is slated to undergo rigorous medical assessments now that he has returned to Earth's standard gravitational pull. It's all expected to provide researchers with invaluable insight into the myriad known and unknown ways weightlessness might influence the interworking of human biological systems, but the experiment has a twist: Scott has an identical twin.

Captain Mark Kelly, the elder of the brothers by six minutes, is himself a retired astronaut and has been serving as a control subject here on Earth—undergoing many of the same tests and collecting numerous samples of his own. Of course, Mark isn't a perfect benchmark: the pair have been eating different diets, engaging in varying levels and types of physical activity, and, at least while Scott was in space, embracing daily routines in stark contrast to one another. Aboard the ISS, Scott's day-to-day was characterized by a regimented schedule in a confined and fixed environment. Mark, on the other hand, spent the past year traveling around the country with his wife, former Congresswoman Gabrielle Giffords—who survived an assassination attempt in 2011—advocating for gun violence prevention on behalf of their organization Americans for Responsible Solutions.

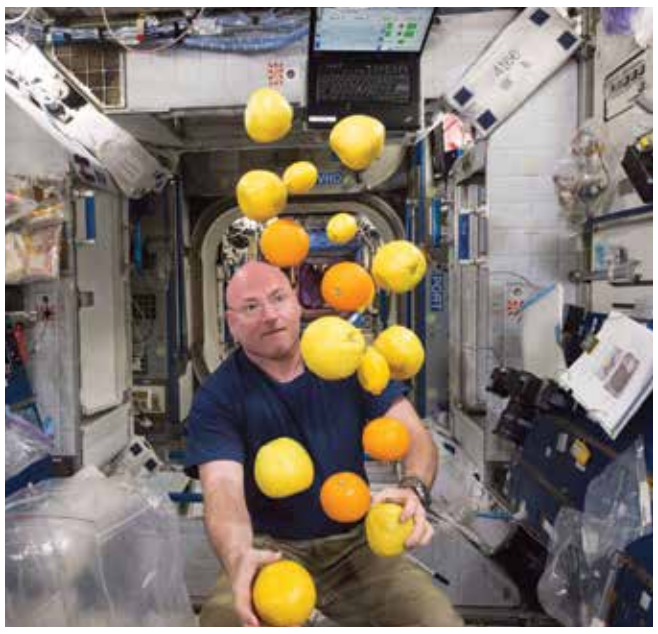
While the customary scientific method may cringe at how seemingly unempirical the baseline data might be, the twins' different environments are actually the point. With nearly identical genomes, scientists have the opportunity to delve into the molecular-level details of the twins' DNA, RNA, proteins and metabolites and tease out genetic changes that may have been caused by spaceflight itself. Essentially, their hope is to answer the age-old question of nature vs. nurture—just, you know, in space.

The potential applications won't stop with mankind landing on an asteroid or setting up camp in a Martian crater.

> "There have been very few integrated omics studies where you look at the genome, transcriptome, proteome, metabolome and microbiome together, and nobody has ever done this kind of study with twins before."

— GRAHAM SCOTT, PH.D.
Vice President, Chief Scientist and Institute Associate Director for NSBRI and Associate Professor at Baylor College of Medicine's Center for Space Medicine and Department of Molecular and Cellular Biology

OVER THE COURSE OF
THE ONE-YEAR MISSION,
SCOTT KELLY TRAVELED
143,846,525
MILES



> “I don’t think it’s an exaggeration to say that everything we learn about the human body, whether it’s in space or on the ground, benefits all of us here on earth.”

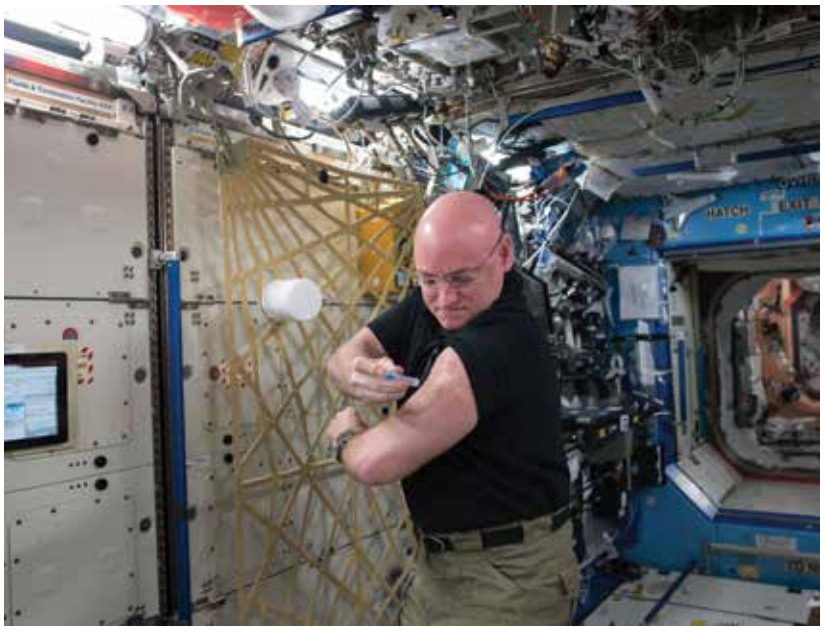
— JOHN CHARLES, PH.D.
Chief Scientist for NASA’s Human Research Program

As with anything NASA has ever done, the aptly named Twins Study will benefit more than just the mission at hand or the astronauts involved.

“I don’t think it’s an exaggeration to say that everything we learn about the human body, whether it’s in space or on the ground, benefits all of us here on earth,” said John Charles, Ph.D., chief scientist for NASA’s Human Research Program.

NASA developed the Human Research Program in early 2004 to support the health and performance of individuals traveling to space, based on the acknowledgment that time spent in space does present risks. The agency had already observed higher amounts of radiation exposure (astronauts on the ISS experience as much as 20 times more radiation than on Earth) as well as fluid shifts and bone and muscle loss in astronauts returning from short stints in space, and with hopes for further exploration, a branch dedicated to the development of new methods and technologies to mitigate these concerns was critical. Working closely with the Human Research Program on this endeavor is the National Space Biomedical Research Institute (NSBRI), a consortium governed by 12 institutions, including Texas Medical Center members Baylor College of Medicine and Rice University, dedicated to reducing the human risks inherent in long duration spaceflight while also translating their research into applications for advancing human health here on Earth. When the Twins Study was initiated—after an innocent question from the brothers themselves—the Human Research Program and NSBRI put out an industry-wide call for proposals. Ultimately, 10 investigations covering a wide scope of scientific inquiry were selected, and thus began a first-of-its-kind broad-spectrum analysis of how the human body adjusts to zero gravity, radiation exposure, isolation and the unique stressors of the spaceflight environment.

Two of the 10 studies look specifically at human physiology and how microgravity may provoke changes in muscles and organs such as the heart or the brain. One of these studies, jointly led by NASA and the Dana-Farber/Harvard Cancer Center, will study metabolomic and genomic markers of atherosclerosis as related to oxidative stress, inflammation and vascular function, taking an in-depth look at the cardiovascular health and function of Scott and Mark before, during and after the mission.



ON AVERAGE,

the INTERNATIONAL SPACE STATION

IS

220 MILES

ABOVE EARTH'S SURFACE

The second of the physiology studies involves proteomics—the study of the structure and function of proteins—to understand fluid shifts in the body and the potential association of those shifts with visual impairment and intracranial pressure. Without gravity to pull fluids like blood down toward the legs, the balance of the body's fluids changes, which may explain the altered vision so many astronauts describe after several months in space and after returning to Earth.

A third study covers behavioral health. Understandably, long duration space flight, characterized by a confined and foreign environment, the absence of friends and family, and few if any creature comforts, could provoke fluctuations in mental capacity and overall function. This investigation, organized by the University of Pennsylvania Perelman School of Medicine in conjunction with Pulsar Informatics, a tech company that creates tools to measure behavioral performance, hopes to identify some of the effects spaceflight may have on perception and reasoning as well as decision-making and alertness.

Another investigation, managed by Northwestern University's Feinberg School of Medicine, Rush University Medical Center and the University of Illinois, covers microbiology and the microbiome, which is the study of the microbial ecosystem within the human body. The microbiome is often cited as a "second human genome" and has been heralded as the key to groundbreaking new treatments for a wide variety of common conditions and diseases. This investigation will utilize metagenomics sequencing to compare the microbiome in the GI tracts of the twins to determine how their dietary differences and unique stressors may affect the interplay of the trillions of tiny organisms living in their guts.

The remaining six research investigations fall under a broad category known as omics, a field of molecular study that takes into account the integrative nature of various biological forces, many of which happen to end in the suffix "-omics" (think genomics, transcriptomics, epigenomics, proteomics and metabolomics). These investigations will examine genetic changes between the twins as well as variations in proteins and metabolites in biological samples such as blood, saliva, urine and stool, covering a broad spectrum of analysis including whole genome sequencing, epigenetics, biochemical profiles and immune response, among others.

One of the omics studies, run by NASA and Colorado State University, will take a comprehensive look at the telomeres in Scott and Mark's DNA and the telomerase concentrations in their cells. Telomeres are regions of repetitive nucleotide sequences that serve as "caps" at the end of each chromosome, intended to protect the end of the strands of DNA during replication. Over time, as an organism ages and its chromosomes engage in ongoing replication, its telomeres become shorter. Thus, measuring a person's telomere length will indicate a true age of that person's cells—researchers believe that telomere length will be based not only on age as it relates to time but also on environmental factors such as diet, radiation exposure, disease or a host of other stressors.

By comparing Mark's and Scott's telomeres, scientists may get a glimpse at the molecular-level effects of space travel on cellular

aging, something that will be necessary to understand before sending a crewed mission to Mars, but that may also provide invaluable insight into how we view and subsequently treat issues related to aging here on earth.

"Space seems to accelerate, at least with some of our body's systems, the effects that we would see when somebody ages," explained Graham Scott, Ph.D., vice president, chief scientist and institute associate director for NSBRI and an associate professor within Baylor College of Medicine's Center for Space Medicine and Department of Molecular and Cellular Biology. "So in addition to it being a good model for stress in general, spaceflight may also be an analogy for aging. In reference to our study of the telomeres, we're going to be gathering data to see if Scott's telomeres are shortening more rapidly than his brother's."

"Many of the effects of being in space on astronauts—bone loss, changes in balance and decreases in immune function—look a lot like aging on Earth, even though the causes are different," echoed Julie Robinson, Ph.D., chief scientist for the International Space Station Program. "Astronauts are some of the healthiest people out there. So when we look at the genes that are involved in the effects in space, we can gain insights into the functions of those genes and systems that can be valuable for finding innovative ways to treat disease back here on Earth."

The results could have widespread value in the medical world, since many of the diseases and conditions that most often plague humans have origins in the passage of time. Even more, telomere research has promising applications in cancer research, with studies showing that telomere dysfunction is common in tumor development and that malignant cells experience seemingly unlimited telomere extension capabilities.

As Charles previously explained, anything NASA and the research institutions learn about the human body in preparation for years-long space travel will inevitably prove useful to medicine here on Earth, because the human body is still the human body, wherever it may be. Furthermore, the process of the research itself is expected to have groundbreaking implications in the medical field and beyond. Its design is revolutionary in breadth and scope, not only because of the variables (identical twins and space), but also because of the integrated nature of the studies and the kind of data being collected.

"There have been very few integrated omics studies where you look at the genome, transcriptome, proteome, metabolome and microbiome together, and nobody has ever done this kind of study with twins before," said Graham Scott. "The Twins Study will create a blueprint or framework for how you might approach these kinds of really ambitious integrated omics studies moving forward."

In addition, the detailed evaluation of Mark and Scott's individual genomes harks to the rapidly growing field of personalized medicine, also known as precision medicine, in which diagnosis and treatment is tailored to the individual based on molecular-level analysis and genetic makeup. The researchers will be studying the brothers in such detail that both were asked to meet on multiple occasions with genetic counselors from Baylor to discuss the ethical implications of knowing so much about their DNA.

BETWEEN THE TWO OF THEM,
MARK *and* SCOTT KELLY
HAVE BEEN TO SPACE
8 TIMES

Because a mapped genome has the potential to expose genes that carry inherited diseases like Alzheimer's or Parkinson's, counselors help individuals understand the risks and benefits of knowing their genetic results, as well as disease management options, if needed.

"One researcher told us that after the study is over, they're going to have more information on Scott and myself than any other human ever," Mark said. "It will be interesting. Being an engineer, and someone who thinks that data is important in making decisions, I'm inclined to say that I'd like to know everything. I'm prepared for bad news; I think bad news is better than not knowing at all."

It's a lot of data and information, not just for NASA and the twins themselves, but for universities, medical centers and cancer hospitals interested in developing the best methods for understanding diseases and developing future therapeutics. And while it will be invaluable in some ways for the future of space travel and medicine alike, many unknowns will remain, and there will still be much to do after the study is completed.

"We understand that we won't be able to generalize our results to the whole population of astronauts or people on Earth based on this one study," explained Charles. "The study of one astronaut and his twin brother is not going to solve problems or answer questions conclusively or rigorously. But it will show us areas for future investigations. We'll look at where significant differences have occurred and focus our future research on those opportunities."

In the meantime, the twins continue to work closely with NASA to collect samples and undergo clinical assessments. And aside from the obvious differences—Scott's fatigue from what he's described as "extreme jet lag" and Mark's significantly better tan—most of the variances won't be made available to the public for quite some time. Scientific analysis on the bulk of the samples isn't scheduled to begin for at least another six months, and the researchers will then need to coordinate their findings and collaborate on a publishable set of outcomes. It is just the beginning of a long and difficult journey, but nobody goes into fields like aeronautics or genomics because they're easy. They pursue this work because it is the path to exploring Mars, to developing successful cancer treatments or new drugs for heart disease—they pursue it because it contributes to the future of mankind.

When asked what Scott will miss most about being in space, he didn't say the spectacular view, the thrill of the spacewalks, or the relative peace and quiet of the ISS, casually orbiting the earth every 92 minutes. He said it was the challenge.

"Doing this job is something that's very challenging, very difficult, and then working hard at it and then just being fulfilled by your success," he said. "The implications of you messing things up are so severe that it makes it more rewarding. It's kind of like why I wanted to be a pilot in the Navy and land on the aircraft carrier. It's not because I thought landing on the aircraft carrier would be fun, it's because I knew that it was hard and there was risk and it was important." ■

Editor's Note: At the time of press, Scott Kelly announced he would be retiring from NASA, effective April 1. He will continue his participation in the Twins Study.

A YEAR IN SPACE

On March 1, 2016, NASA Astronaut and Expedition 46 Commander Scott Kelly and his Russian counterpart Mikhail Kornienko returned to Earth after a historic 340-day mission aboard the International Space Station.

While aboard the ISS, Scott collected biological samples, monitored his heart rate and blood pressure, and scanned his heart and eyes using ultrasound technology.

HE ALSO...

EXPERIENCED OVER

10,000

sunrises and sunsets

SAW THE ARRIVAL OF

SIX RESUPPLY SPACECRAFTS

UNDERWENT

120

medical tests

SPENT

640 HOURS

ON A TREADMILL

COMPLETED THREE

SPACEWALKS

TRAVELED

AT THE SPEED OF

17,150

MILES PER HOUR

UH Cougars Talk Politics

Students got a once-in-a-lifetime learning opportunity when the University of Houston hosted a Republican Presidential Primary Debate

By Britni N. Riley

(Credit: University of Houston)

The University of Houston has garnered national attention over the past year with not only its number-eight nationally ranked football team, but also for being selected as a host site for a Republican Presidential Primary Debate.

The process to host the debate began in May 2015, when the university submitted its bid to NBC News and Telemundo to be a host site.

"The chance to participate in history isn't an opportunity taken lightly," said P'nina Topham, director of media relations for the University of Houston. "Hosting a national conversation with real-life impact on our community and country is a great opportunity for our school and students, and also for our extended Cougar community."

After UH submitted the bid to host, NBC News and Telemundo made two visits to the campus to ensure it could accommodate the volume of people who would be coming in for the debate.

"Before we were selected as host site, it had been over 30 years since a primary debate had been held in Houston," Topham said. "The University of Houston is so proud to have been selected and to have our great city spotlighted in this manner."

In October 2015, the Republican National Committee suspended its partnership with NBC News following the third GOP debate in Boulder, Colorado. This suspension had a ripple effect for the University of Houston since they had been selected as a host site by NBC News and Telemundo.

"The host network selects the debate venues, not the political parties," said Adrian Castillo, chief of staff for the Student Government Association at the University of Houston. "When the RNC split with NBC News, we were in limbo as to whether we would host the debate or not."

In January 2016, CNN replaced NBC News as a broadcast partner for

> “The chance to participate in history isn’t an opportunity taken lightly. Hosting a national conversation with real-life impact on our community and country is a great opportunity for our school and students, and also for our extended Cougar community.”
>
> — P’NINA TOPHAM
> *Director of Media Relations at the University of Houston*

the debate. A large team immediately conducted another two site visits to the University of Houston to determine if it was a suitable host site for their needs.

“In many ways, we had to fight for this debate twice,” Topham said. “We are even more proud that two different national news networks saw the power of hosting the debate here on our beautiful campus.”

The goal of hosting the debate at the University of Houston was not only to show the rest of the country all that the school has to offer, but also to give students, faculty and alumni a once-in-a-lifetime opportunity to be part of the historical event.

“This debate came at a pivotal moment in the election cycle—right before 'Super Tuesday'—and it was important to us to involve our students and community in public discourse in every way possible,” Topham said.

In addition to hosting the debate, the school planned a series of events to involve students and the community. During the week of the debate, students were invited to attend a Q&A session with Anderson Cooper, moderated by faculty and students from the Valenti School of Communication; tour the Google Media Filing Center and Spin Room set up for reporters; participate in a mock debate; and attend a series of lectures educating students and community members about the electoral process and about major topics the candidates would be covering.

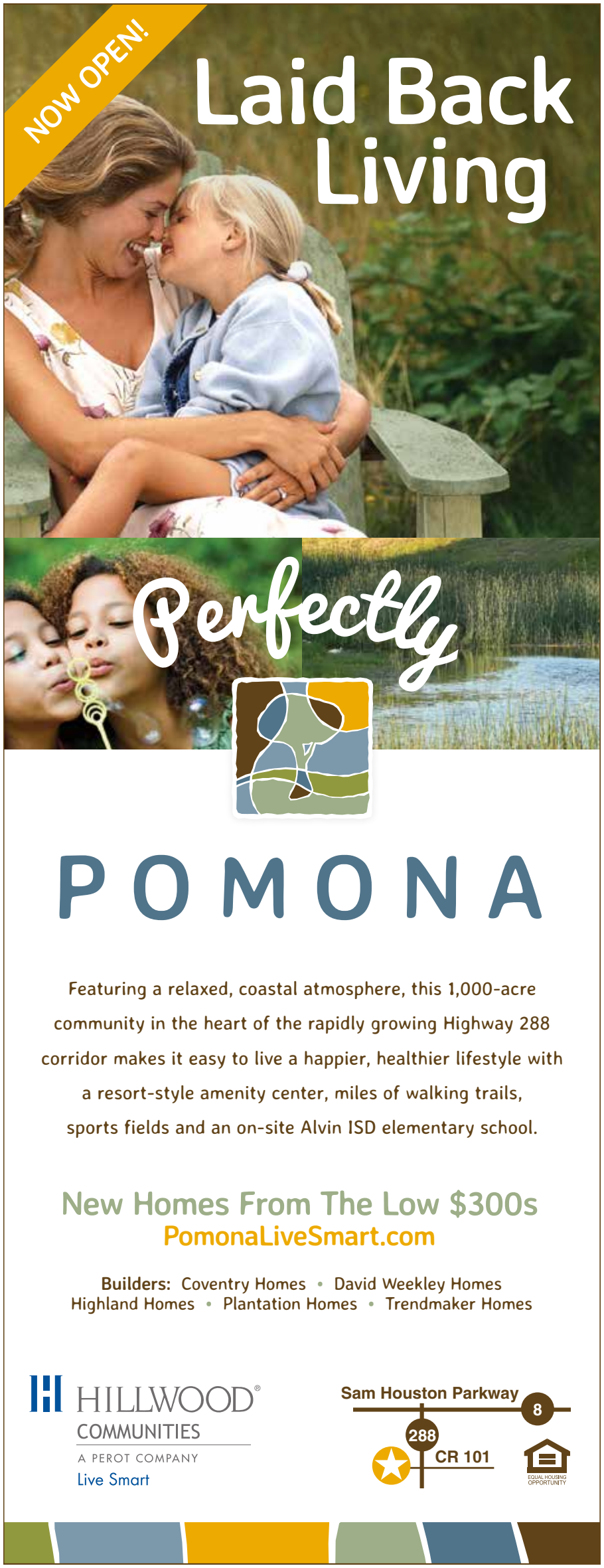
“One of my favorite events I participated in was standing in as a candidate during the mock debate to test camera angles, sound and time for the networks,” said Marijose Flores, a senior public relations student at the University of Houston. “It was great because I got to go on stage and stand at the same podiums as the candidates.”

For those who were not able to attend the debate inside the Moores Opera House, the school set up watch party locations for students, faculty and staff. Valenti School of Communications students live-tweeted the debate, managed interactive polling and issued live reports during commercial breaks, viewed by watch party attendees.

“It was really exciting as a student to take all of the things I have learned in class and use them for the debate,” Flores said. “Seeing other students also perform in their field was an opportunity that I will always remember, and it is a great start for us right before we begin our careers in communications.”

Regardless of politics, the university, student body and community were honored to host the Republican Presidential Primary Debate and have the national spotlight on the University of Houston.

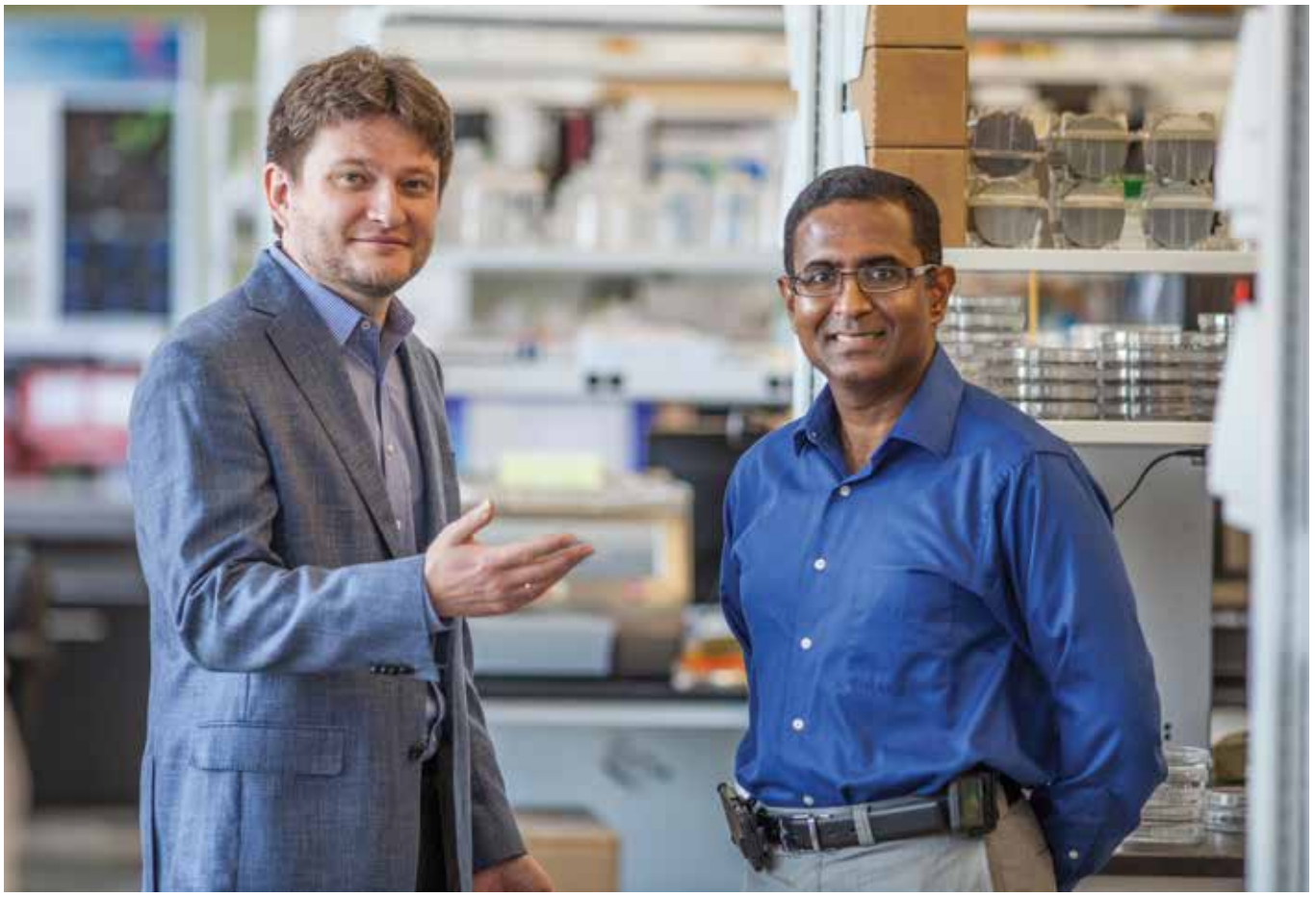
“As a university, we have come a long way in the past few years,” Castillo said. “We are reaching new heights and achievements every day; along with our football team winning the Peach Bowl, we are a powerhouse in athletics, academics and with our civic engagement.” ■



Screening Made Simple

A paper-based screening test for sickle cell disease has the potential to save millions of lives

By Shea Connelly



A partnership between the University of Houston's Sergey Shevkoplyas, Ph.D., and Alex George, M.D., Ph.D., of Texas Children's and Baylor, resulted in the simple paper screening test.

Each year, approximately 300,000 babies are born worldwide with hemoglobin disorders like sickle cell disease. Often their survival depends on the circumstances of their birth. For babies born in the United States, advances in diagnosis and treatment have led to a drastic reduction in mortality rate. For those born in countries like Angola, however, which has one of the highest rates of sickle cell disease in the world, the prognosis is markedly worse. The desire to combat this disparity led to a unique collaboration between biomedical engineers and physician-researchers to develop a low-cost, low-tech screening test with the potential to save millions of lives in medically underserved areas.

In 2011, a partnership between Texas Children's Hospital, Baylor College of Medicine, Chevron and the Angola Ministry of Health led to the development of the Angola Sickle Cell Initiative. Since the program's launch, over 136,000 newborns have been screened in Angola. Though this marks significant expansion of sickle cell disease screening in the country, Sergey Shevkoplyas, Ph.D., a University of Houston associate professor of biomedical engineering and adjunct professor of pediatrics at Baylor, Gladstone Airewele, M.D., associate professor of pediatrics at Baylor and director of global programs at the Texas Children's Hematology Center, and Alex George, M.D., Ph.D., co-director of the Sickle Cell Program at Texas Children's Hematology Center and an assistant professor of pediatrics at Baylor, still saw room for improvement.

"The protocol currently used is something called isoelectric focusing, IEF, which is basically a gel where you run protein samples to look for the sickle hemoglobin," George said. "It's a very effective, robust technology that's been used for a long time in the U.S. The problem is, first of all it's relatively expensive. It's about $5 a sample, which is a lot of money in Angola. Secondly, it takes a lot of resources. You need electricity, you need gels and also there's a long turnaround time."

IEF tests typically take about a month from sample collection to obtaining a result. By that time, parents have left the hospital with their newborns and notifying them of the test results can be difficult. George said the follow-up rate for babies who are diagnosed is typically between 30 and 50 percent, a significant problem when patient survival depends on early initiation of prophylactic treatment.

"One of the major complications early on is infection," George said. "Babies with sickle cell disease are very prone to infection by a couple of bacteria. Historically, 50 to 90 percent of babies would die from these infections before reaching the age of five."

Since the advent of prophylactic penicillin treatment, that percentage has been drastically reduced here in the U.S., where very few babies die from sickle cell-associated infections in early childhood. In sub-Saharan Africa, it's a different story. George and Shevkoplyas aim to change that with a simple piece of paper—a screening test that costs less than 15 cents.

"We position our test as a very inexpensive way to screen every baby born in Angola for identifying those at risk of having sickle cell disease," Shevkoplyas said. "When you start talking about countrywide population screening, every cent counts, especially in a country with limited health care resources."

The paper-based test screens for sickle hemoglobin, or hemoglobin S, the abnormal hemoglobin those

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> — SERGEY SHEVKOPLYAS, PH.D.
> *Associate Professor of Biomedical Engineering at the University of Houston*

suffering from sickle cell disease carry in their red blood cells. When deoxygenated, hemoglobin S polymerizes and causes the red blood cells to develop a rigid, sickle shape. These unusually shaped cells can have difficulty passing through blood vessels, resulting in blockages that lessen the amount of oxygen delivered to bodily tissue.

"The idea of the test is, you do a heel stick on an infant. You take the blood, mix it with the hemoglobin solubility buffer, wait a few minutes, then use a disposable pipette to put it on the paper," said Nathaniel Piety, a Ph.D. student in Shevkoplyas' lab at UH. As the stains on the paper dry, blood containing hemoglobin S will develop a distinctly different pattern from normal blood, as the molecules of deoxygenated hemoglobin S clump together in a dark center spot rather than spreading evenly.

The idea of using stains on paper to analyze hemoglobin S came from a flash of inspiration that occurred as Shevkoplyas was engaged in a simple, every day task: brewing coffee. Looking at coffee stains on a napkin, Shevkoplyas wondered why it dried into certain shapes.

"It's a uniformly colored liquid, so why does it make these interesting patterns?" he recalled thinking. He considered various papers he had read by physicists studying coffee stains and why they form the way they do. "I thought, 'Why don't we try the same thing for sickle cell disease?' And so, here we go, it actually works."

As a result, with very little training and the most basic of resources, any health care worker can administer the test and be able to tell within minutes whether an infant has sickle cell disease, carries the sickle cell trait, or has neither disease nor trait. In November 2014, with the support of a pilot grant from the Baylor College of Medicine Center for Global Initiatives, George and Piety traveled to Angola to compare the effectiveness of the test to the standard of care. In Angola, they were able to teach local workers how to administer and interpret the test within just an hour of training.

"The standard screening test takes a lot of training and requires a lot of equipment, and then to interpret the results takes a lot of effort," George said. "I think our test is also more accurate than the gel. Often we would have what we thought was a false positive, when our test said a patient has sickle cell disease and the gel said no. But when the gel test was repeated, it would come back positive."

The paper test has additional applications even beyond basic screening. With some simple image analysis, it can also fairly accurately quantify the amount of hemoglobin S in the blood. This could make it useful during transfusion therapy, which is one of the main ways to manage sickle cell disease.

"You're shooting for a target amount of sickle hemoglobin [during transfusion therapy]," Piety said. "If you stay below that level you'll be relatively healthy, but you don't necessarily know if you've hit that target, or gone far beyond it, causing negative side effects of over-transfusion."

Clinicians could administer the test to patients throughout transfusion therapy, and use something like an app on their smartphone to snap images of blood stains and analyze the amount of hemoglobin S in the blood sample. While this doesn't provide a perfectly precise number, Shevkoplyas and his students found it is accurate enough to be useful in the clinic.

"This would let clinicians know, 'Can we stop now? Should we keep going?' and allow them to tailor the therapy more to an individual," said Piety, who was recently awarded a two-year predoctoral fellowship from the American Heart Association to develop the test as a tool for monitoring hemoglobin S levels at the bedside.

Halcyon Biomedical Incorporated, a startup company Shevkoplyas co-founded, received a Small Business Innovation Research (SBIR) grant from the National Institutes of Health to commercialize the test. In collaboration with Halcyon, Shevkoplyas and George recently applied for follow-up funding from the NIH with the hope of running more studies and eventually seeking FDA approval. Their ultimate goal is for the test to become a routine screening tool for all babies born in Angola and perhaps around the world.

"This really has applications not just in sub-Saharan Africa," George said. "As we develop these low-cost, high-efficiency technologies for other countries, they could come back to the U.S. and potentially reduce the cost and improve the quality of health care here."

Shevkoplyas and George said this innovation is symbolic of the opportunities for collaboration that are rife within the medical center. The large population of patients, numerous opportunities for research and institutionalized interest in improving global health all contributed to making the project possible.

"You have everyone coming together, with the support of the Angola government, Chevron, Baylor, Texas Children's, UH—we bring it all together to make an impact on actual patients," Shevkoplyas said. "This is a dream for any biomedical engineer. Here we have a chance to, in a relatively short period of time, make this test available for use in clinical practice and make a real impact on the health and wellbeing of millions of children worldwide." ■

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>
> — ALEX GEORGE, M.D., PH.D.
> *Co-Director of the Sickle Cell Program at Texas Children's Hospital and Assistant Professor of Pediatrics at Baylor College of Medicine*

University of Houston Ph.D. student Nate Piety demonstrates how to use the new screening test.

HOUSTON-BORN AND RAISED, MARIO ENRIQUE FIGUEROA JR., "GONZO247," ARTIST, FOUNDER AND CHIEF OF OPERATIONS FOR AEROSOL WARFARE, IS KNOWN FOR HIS VIBRANT MURALS THAT CAPTURE THE SPIRIT OF HOUSTON, AS WELL AS HIS CREATIVE INVOLVEMENT WITH PROMOTIONS FOR THE HOUSTON ZOO, HOUSTON DYNAMO AND, MOST RECENTLY, THE 2016 NCAA MEN'S FINAL FOUR. HE SAT DOWN WITH TEXAS MEDICAL CENTER EXECUTIVE VICE PRESIDENT AND CHIEF STRATEGY AND OPERATING OFFICER WILLIAM F. McKEON TO REFLECT ON THE HISTORY OF GRAFFITI ART AND HIS OWN PERSONAL JOURNEY FROM AN ANXIOUS YOUNG STREET ARTIST TO A FIXTURE ON HOUSTON'S ART SCENE.

Q | *Tell us about your formative years.*

A | I was born and raised here in Houston and am very proud of it. My parents immigrated here from Mexico. My mom is from a very small farming community, right across the border from Brownsville, Matamoros. It's like 10 minutes past the border. My dad comes from further south, an area called Michoacán. Both came to the United States. By sheer luck and the power of God, I was born here in Texas. But I tell people, before I claim to be Mexican, before I claim to be American, I claim to be 100 percent Texan. I am very proud of being from this area, and I try to take Houston and Texas anywhere I go.

I grew up here on the east end, Second Ward to be exact, and growing up, we were surrounded by family. Every day we were visiting some other family member. The bulk of my family lived and still lives here in the east end. So it was family, it was church, and always good times. I think I was always artistically inclined. I was always creative, but I didn't start drawing much until I was a little older—I would say seven, eight, nine. One thing that really affected me, and I think really helped me to see something different, was I had family that lived up on Canal Street. And if you have ever driven up the east end in the last 30 years, there is this mural that was painted by now famous artist Leo Tanguma. At the time, it was the biggest mural in Houston, and I believe it was also the biggest mural in Texas.

The mural was dedicated in '73, I was born in '72. So pretty much my entire life I saw this mural while driving up and down Canal Street. At that age, the scale of the work was so incredible

to me. I couldn't fathom how someone could paint that large. The mural was called 'The Rebirth of our Nationality,' and it spoke heavily on the Chicano movement of the late '60s and '70s in Houston and overall. I didn't really understand the content, but the images were so powerful, I got a lot of emotion out of it. But that really inspired me. I thought, 'Man, it would be great if one day I could create something this big.' In the mid '80s, I started listening to what was, at the time, this really underground counterculture music called rap.

Back then, Houston got everything last. So hip-hop in general started filtering into Houston. And for those who don't know, rap music is one part of the hip-hop culture. So there are four elements in the hip-hop culture: rap is the vocal, DJing is the musical side, break dancing is the dance form of it and the final element is graffiti art. Graffiti is the visual language component of hip-hop. So they are called the four elements, and those four elements are what create hip-hop.

Nowadays, unfortunately, it has gotten so commercial that the only thing that is highlighted when you say 'hip-hop' is the music, the rapping. But that's just one small part of a bigger culture. So that's kind of how I fell into this, through the music first, and then the break dancing, then the turntables. And this was right at the time when MTV was starting to pop up, and more content was starting to arrive, so through the music I would see the guys on the stage, and in the background was always something really colorful. And that was what started to catch my eye. Once I figured out what it was and who was doing it and how it was done, I was immediately drawn to that genre. I finally found an art form that I connected with. I found an art form that I understood and I found an art form that I felt I could use as a medium or a vehicle to express myself.

Q | *Graffiti has had some negative connotations in the public, as well. What is the origin of graffiti, and how did you personally find your way down this path as an artist?*

A | Of course, everyone has their own history and everyone has their own version of what happened. But for the most part, a big part of what we consider today to be modern-day graffiti was started in Philadelphia. Most people think it started in New York, but it started in Philadelphia and spilled over to New York. At one point, Philadelphia was considered the graffiti capital of the world. But then it spilled over to New York, and once it got attached to the subway system in New York, that's when it really just exploded.

And part of the stigma is that graffiti is illegal. For the most part, a lot of it is in the sense that that's how it started. A bunch of kids were using public mass transit as their rolling billboards to convey their messages. So, being here in Houston, we aren't East Coast, we aren't West Coast, we are what we call the 'third coast.' And there was no graffiti, or at least nothing that I saw or could reference. Sure, there were the scribbles and miscellaneous writings on the wall, but it wasn't graffiti as in the modern-day New York style. It was just handwritten stuff. So knowing what I wanted to do, knowing there wasn't much influence here or anything I could use as a gauge, I realized I had to go research it. And this was back in the mid '80s, very early '90s, and there was no Internet. So where does one go for information? And I thought of the library. So I went to the library and I started looking for anything. I wasn't really sure what I was looking for, but I figured there had to be a book or something written about it.

Nowadays, if you go to the bookstore, there is a whole category just dedicated to graffiti and street art. Well, back then, I wasn't so lucky. I had to dig using those ancient technologies like the card catalog. So I went through the card catalog looking for graffiti, and there was maybe one card. And the first book I found was about why people write on the bathroom walls. And I kept digging and finally found this card that said, 'The Faith of Graffiti,' so I thought that sounded promising. I went and grabbed the book and it was written by Norman Mailer, and at the time I had no clue who he was, but it turns out he is a Pulitzer Prize winner. Very famous. So I read that book, and as weird as it sounds, that was probably the first book that I ever really read, if that makes sense. I felt the book was written about me and for me at the same time. He was one of the first intellectuals to look at graffiti not as in kids who are lunatics and vandals, but he took more of an analytical perspective, and it helped me understand a lot of what was going on.

> "Before I claim to be Mexican, before I claim to be American, I claim to be 100 percent Texan. I am very proud of being from this area, and I try to take Houston and Texas anywhere I go."

So reading that book, I near memorized it, and then I started quoting it, and people thought, 'Man, this is a pretty intellectual dude.' And I would say, 'Well, it's not me, it's Norman Mailer.'

I'm paraphrasing, but we live in a society where to own property is to have an identity. It's about what you drive, where you live. So when you have an area like New York back in the day, the younger people back then, you don't own things, basically you are owned. You don't have any property. To have the opportunity to be able to grab a can of paint and go to a subway train or climb a billboard and put your name on there, you are essentially letting the world know that you exist. And a lot of this was younger kids just wanting to have a voice, wanting to say that they exist, and wanting to be able to show people that whether you like it or not, I'm here and want to be heard. And that's kind of where I was at the same time. The difference was, here in Houston, there really wasn't anyone else doing it.

Of course, yes, in the initial stages of this entire thing, there was that illegal aspect of it. And that's actually a big drive for the younger generation. The best way I can say it is, until you have done it, it's really easy to knock kids for doing it. But until you go out there at night with a can in your hand, and navigate through the concrete jungle, find a place to put your name, get in and get out without being caught, it's hard to describe the adrenaline. It's very romantic in a sense of a Huckleberry Finn, Tom Sawyer adventure. Very military. You have to do your surveillance, you have to know where you are going to be, what are your exit strategies in case something happens. There is a lot that goes into it. There is a lot of pre-work before you go out and do it. And it's fun to navigate all of that.

And that's how I started out doing it. I'm not a hypocrite. I don't hide my past. I would go out and become this midnight Picasso. But even back then, I did my best to find areas that were already dilapidated, areas that people already gave up on. So for me, my mission was, 'Why can't I turn this into something beautiful? It's already decayed anyway, so why not have some beautiful decay?' So that was kind of what I was doing.

But then, in 1990, I was graduating from high school and was at that point when you can go in a million different directions. And I didn't really have a vision yet. I knew that I liked art, and that was about it. I knew I was doing graffiti. So the school that I ended up graduating from brought a motivational speaker to come out and he was high-fiving everyone and telling everyone, 'You're going to be somebody.'

So he was talking about all of the things that people do after high school. Some of you guys are going to college, some of you are applying and got accepted. Some of you are going to the military or straight to the workforce. So he gave all of these options as to what people normally do. And I was in the back, thinking, 'Man, my life must really suck because none of those options appeal to me.' Toward the end of his speech, he said something to the effect of, 'Before you go off and do whatever it is you are going to do for the rest of your life, I will ask you one question: What's the one thing that you love to do so much that you would be willing to do it for free?' And for me, that was graffiti. I do it for free anyway. And he said, 'Whatever you are thinking about, you should do that as your career.'

And that just blew my mind. Graffiti as a career? But of course, he is a motivational speaker, so he makes you believe you can do it. So I got really excited. And back then, in 1990, graffiti was still brand new in Houston.

(Photo provided by Mario Enrique Figueroa Jr.)

And it was definitely lumped in with gang-related activity, although I was never associated with any gang, but it was just negative—vandalism, mischief. But I had a vision. I wanted to become a full-time graffiti artist. Well, how do you do that? I don't know. That's the challenge.

One of the biggest things that I had to do was shed light on what I was doing. And part of that was I had to step out from behind the shadows. I realized that people fear the unknown. So as long as everything is in the dark, it is never going to get the light of day. So at that time now, there were other people writing graffiti, and they kind of looked at me like I was crazy, like I was selling out. Why would I come out? I just figured I saw a long-term vision. I wasn't looking at today, I was looking at 15 years from now, 20 years from now, where are we going to be. So I figured there has to be a face for this—not that I was the official spokesman and represented everyone. But I thought if I could talk to people, shake someone's hand, communicate what was going on and educate the public, the easier it would be for them to appreciate or even accept. And little by little, that's what started happening.

I also figured out that if you are going to make money and sell your art, you have to put it in galleries, like put it in museums. There are a lot of options. So, I went to the yellow pages—the old-school Google—and I looked up art galleries or basically anything that said 'art' in the phone book. I just went everywhere. I said, 'Hey, my name is Gonzo, I want to sell my art here.' And it was funny because pretty much everyone said, 'You're a gang member.' 'This is vandalism.' 'Graffiti isn't art.' 'Get out of here or I'm going to call the cops.' And I was really taken aback. I thought this was it, this was my ticket.

At the time, it wasn't considered art. It was slowly making its way through the art community. But I realized, in the '80s, graffiti was coming off of the subway trains and it was moving above ground onto walls and into galleries, so again, going back to the library, I started digging for more info. I pulled every book off the shelf that was art in America, art news, all of the art publications that they had from 1980 to 1990, because I knew that was when that transition was happening, and something in there had to be something that I could use. I felt like Indiana Jones, digging through the catacombs, and sure enough, flipping through those pages, every now and then I would see an ad for an exhibition featuring 'Crash' at this gallery. Perfect. I would write down the information and go home and write letters. 'Dear so and so. My name is Gonzo. I live in Houston. I saw this ad from a magazine back in the 1980s and I am trying to get information about the artist.'

Writing letters, it was like notes in a bottle. I was just throwing them out there. And this was not email. You put a stamp on it, you put it in the mailbox and you wait. It was a waiting game. And every now and then something would trickle in. But little by little, through that paper pushing and hustling, I started making connections, and through that, I started meeting some of the original, old-school New York subway artists. And I think, at least my impression is, that they probably took a shine to me because I was just this kid from the middle of nowhere interested in what they were doing. So I think that was helpful because we would befriend each other, and develop pen pal relationships, and send photos back and forth of what was happening. So that really also helped show me the vision.

Q | *There seems to be a unique naming convention used among graffiti artists. Tell us a bit about that.*

A | In the graffiti world, looking more at the historical true nature of the game, the graffiti name is whatever name you choose to write on the wall and a number associated with it. That's a true graffiti name. Because back in the day in New York, when the kids were writing graffiti, there would be one guy who was writing Cliff. And then another guy from another part of town, they have never met, he is writing Cliff on the upside of town. And the trains would cross and now there are two Cliffs on a line. Which was which? Did you see my new piece? That one wasn't mine. And so to distinguish who was who, they figured out a really cool system of adding either the street number you lived on, or the apartment number you lived in. So you can now be Cliff183, because you lived on 183rd Street. Or you could be Cliff62, because you live in apartment 62.

Q | *So why Gonzo?*

A | I needed an identity. I couldn't just go out and write my real name on the wall at night. I mean, I could, but why would you? I was trying to find an identity, and a couple things happened. Growing up, people liked to call me Gonzo, and I always thought it was a Muppet.

But one day I ran across the definition of the word. I had no idea it was an actual word, I thought it was just a Muppet. And when I read the definition—unconventional or unrestrained, zany, eccentric, extreme—I immediately connected with the definition. It described who I was, what I was doing, how I was doing it, how I was living life, and I just connected.

So, being from Houston, we don't really live on numbered streets, and I never grew up in an apartment, so I had to come up with a number to make my name real. So at the time, I thought 24 hours a day, seven days a week. That was how graffiti was part of my life—constant. And I stuck with Gonzo247, and then, I want to say mid to late '90s, I was watching TV and there was a commercial about Walmart being open 24/7. Any time something gets to the Walmart level, it's dead. So I was like, 'I can't be 247. That's just not cool. That's not what I want to be anymore.' So I dropped the numbers for a while, and I was just Gonzo. But to be honest, I missed that component of my name. It was like a half name. So I thought about it and really liked the numbers, so I brought them back, but say Gonzo 2-4-7, not 24/7.

So I like the traditional aspect of keeping the name and number. Nowadays though, it has gotten crazy. It's to the point where if you write the same name as someone else, there's trouble. There is no sharing of the

> “There was pressure on me to create something that was who I am, but I also didn’t want to offend or scare anyone off. So the piece was created and very fortunately, the response has been overwhelmingly positive, to the point where this has become a landmark and an icon for the city.”

name anymore. I think, fortunately, it’s almost like trying to get a Twitter handle or email address, if you are old enough to be in on the start of it. Now all of the good names are taken. So I was fortunate that I latched on to Gonzo.

Q | *Is there a piece here in Houston you are most recognized for?*

A | I think the most notable today is in Market Square. And that was a great project. It was, I guess you could say, an experiment. Houston First contacted me with this idea. Long story short, I was part of a photo campaign to advertise Houston as a cool place to be. They were doing a spread of creatives in Houston and had curators, art directors and artists, and I was fortunate to be included in this photograph to represent the street art community, to show that Houston is in touch with that.

So through that, I was asked to create a piece of artwork that they could include in the media packet. I painted a canvas that was probably three or four feet, and we did a high-resolution scan and they used that image, and it was great. And they ended up liking that image so much, they said, ‘Wow, this is cool. Can you reproduce this on a larger level?’ And I said yes. And they said, ‘How big can you go?’ And I said, ‘How big of a wall can we get?’ So we were scouting locations, and it just so happened that Treebeards downtown used to have a mural on the side of the building that depicted Market Square. It was more traditional, had fruits and vegetables, and it was a beautiful mural, but unfortunately the wall had structural damage, so they essentially had to take that wall down and rebuild it. So they had just rebuilt that entire wall, and now where there used to be color was just cinder block. And they found out about this idea and said, ‘Well, we have a wall here. We used to have a mural up and we would like to get something new.’ So it was decided to do that.

When the word got out that a graffiti mural was being put up, there was some pushback, like this was going to ruin the neighborhood. There were some doubters. There was pressure on me to create something that was who I am, but I also didn’t want to offend or scare anyone off. So the piece was created and very fortunately, the response has been overwhelmingly positive, to the point where this has become a landmark and an icon for the city. And I really don’t think any of us thought it would go that far. To the point where I want to say that two years ago, Instagram put out this report and this was the number one image that was tagged or posted for Houston that year, to give you an idea of how big that mural became.

Q | *How much has the field evolved to allow for a demand for the commissioning of street graffiti?*

A | I’ve been very fortunate, or probably too stubborn to give up on this dream. But it has been a journey to get to this point. It definitely wasn’t overnight success. I don’t even like to use the word success. But I am a full-time artist. This is what I do for a living, and I am very appreciative any time anyone wants to work with me. I just recently completed a wall for the Dynamo. They did a really cool unveiling of their new uniform, and asked me if I could paint this giant wall as part of the media release. And I did that in like 12 hours, the side of a building. It was a challenge.

I have a lot of great things in store for 2016. I’m actually currently working on some design work for the NCAA Final Four. I’m designing the actual bracket that will be used for the tournament, among other things. So it’s always exciting. I have done work with a lot of great companies here in the city. And people will ask why I am doing this corporate work, but I feel that companies are people too. And any time they want to work with a local artist or support local arts, how can you deny that they are reaching out? It’s easy to say, ‘Don’t do corporate work. You are going to sell out.’ But at the same time, it’s like what’s the point of having that attitude if they are reaching out to have you create something that is going to broaden their reach and talk to another audience or demographic? I think that’s a perfect vehicle to also share the art form.

But on top of that, I also do private commissioned artwork, where people come in and see what I do and they commission me to do private work. And we just recently founded the first street art museum, which is another vehicle for us to be able to showcase the history, document, preserve the culture, and be able to use that as an educational tool to show people where it came from so they can appreciate where it’s at now.

Q | *Any closing thoughts?*

A | I applaud the work that the medical center is doing. It is such a big part of my life in the sense that the medical center took care of my mom when she had leukemia. The medical center just recently took care of my father-in-law who has Parkinson’s. The medical center employs my aunts and uncles at all levels, and other family members. And I feel that it is such a big part of the city. It is obviously its own city within the city, but I enjoy the fact that when I drive through the city, I can see downtown, I can see the medical center, and be proud of what we have here. ■

(Photo provided by Mario Enrique Figueroa Jr.)


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BAYLOR'S HUFFINGTON CENTER ON AGING WORKS *TO BETTER SERVE A SWIFTLY GROWING OLDER POPULATION THROUGH CLINICAL CARE, RESEARCH AND EDUCATION*

By Shea Connelly

The end of World War II brought an unprecedented baby boom that forever changed United States demographics. Now those babies have grown up and continue to have an impact on the structure of the U.S. population. In 2012, the population aged 65 and over was estimated to be 43.1 million. By 2050, it's expected to almost double to 83.7 million, according to the U.S. Census Bureau.

As the population ages, resources are limited in terms of specialized care for the elderly. That's where Baylor College of Medicine's Huffington Center on Aging comes in. Through clinical care, research and education, the Huffington Center aims to increase understanding of the processes of aging, as well as train physicians to provide critical specialized care for the aging population.

"Normal aging is not a disease, but there are some aspects of what's called 'altered presentation of disease' that are not commonly understood by all health care professionals," said Robert E. Roush, Ed.D., director of the Texas Consortium Geriatrics Education Center at the Huffington Center on Aging and a professor of geriatrics at Baylor. "Unless they've had some training in this area, they just don't know what they don't know."

When a patient suffers from illness on top of normal age-related changes, physicians face more complexity. Even a basic examination takes longer—up to an hour or more. Geriatricians also face a balancing act when treating patients, as they strive for not only longevity but quality of life as well.

"In geriatrics, we care very much about preserving function as well as ensuring that we are doing everything we can to meet the patients' goals for their health as they live out the later years of their life," said Angela Catic, M.D., program director of the Geriatric Medicine Fellowship Training Program and an assistant professor at Baylor. "That may mean finding solutions that allow them to remain in their homes, working on making sure they're continuing to interact with their family and social support in the community, whatever it is that makes their life meaningful."

The Huffington Center works to achieve its mission through three main area of focus: research, education and patient care. In terms of research, the center seeks answers to questions like: What causes aging? What can be learned from animal models about aging processes? Are there ways to intervene or slow down the aging process?

The Huffington Center also has the largest geriatric fellowship program in Texas. Six fellows, who have already completed residency, spend a year with the Huffington Center. They work in the clinic twice a week, at TMC institutions like Baylor's Park Plaza Senior Care Clinic and the Michael E. DeBakey Veterans Affairs Medical Center Houston. Fellows complete an academic project and take a variety of courses, from a basic introduction to geriatric medicine to an overview of research principles. A small number of fellows stay on for a second year, during which they focus more intensely on education or research.

Srijana Rai, M.D., is currently a fellow at the Huffington Center. She said the collaborative opportunities in the Texas Medical Center and the ability to work in so many different settings drew her to Houston.

"When I did internal medicine and decided to take geriatrics, I thought, 'It's part of internal medicine, only focused on a different age.' But when I actually started, I could see there's a difference between a general adult and geriatric adults," Rai said. "From physiology to the way they react to drugs, it's different in geriatric patients."

Following the completion of her fellowship program, Rai will begin a three-year fellowship in hematology-oncology, with the goal of working in geriatric oncology. She said a close relationship with her grandfather originally attracted her to the field, a commonality among many geriatricians.

"Most will tell you they had very close relationships with grandparents or older family members or older people within their community, which gives them an appreciation for this part of our population," Catic said. "Most geriatricians will also tell you they enjoy complexity. Not only are most of our patients very medically complex, but we are also facing issues around social complexity involving families and trying to navigate through changing functional status toward the end of their life."

Programs like the Huffington Center are taking great strides toward preparing the medical community to serve the aging population, but Catic, Roush and Rai each stressed the importance of exposing all health care workers to geriatrics, from physicians and nurses to researchers and beyond.

"You're going to see elderly patients regardless in a hospital or clinic setting," Rai said. "It's good to have geriatric experience and I strongly recommend that for all medical students and residents."

Roush, who has worked at Baylor since 1972 and was involved in the founding of the Huffington Center in 1988, said he has seen a lot of progress in his years of working in geriatrics.

"There's more understanding of the complexities of normal aging overlaid by disease processes and how we can help older people. The main problem is this imbalance in supply and demand, and it's important to meet the growing health care needs of this burgeoning population," he said. "Everybody should look at it this way: 'If I'm lucky, someday I'll be an older person. What do I want it to look like when it's my turn?'" ■

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>
> — ANGELA CATIC, M.D.
> *Program Director of the Geriatric Medicine Fellowship Training Program at the Huffington Center on Aging at Baylor College of Medicine*

Delivering Hope

After a brain tumor left him unable to walk for nearly a year, a 10-year-old Haitian boy traveled to the Texas Medical Center to receive a life saving surgery

By Britni N. Riley

David Sandberg, M.D., with patient Caleb and his mother Bernita, and at right with the care team at Hospital Bernard Mevs in Haiti. (Credit: Memorial Hermann)

For the past three years, UTHealth pediatric neurosurgeon David Sandberg, M.D., has led a group of nurses from Children's Memorial Hermann Hospital and residents and physicians from McGovern Medical School to Haiti to provide neurological care for Haitian children who would otherwise not receive it.

The team members use their own vacation time to travel to the Hospital Bernard Mevs in Haiti for five days in early December, leaving Houston with suitcases packed to the brim with medical supplies they collected over the past year to ensure they have everything they need to care for their patients as they do here in the United States.

"The need is overwhelming," said Sandberg, director of pediatric neurosurgery at Children's Memorial Hermann Hospital and Memorial Hermann Mischer Neuroscience Institute (MNI) at the Texas Medical Center. "There are no pediatric neurosurgeons in Haiti, and families come from all over the country for care when they hear that a team from the United States is coming. Most of the children have diseases which are very advanced because of their lack of access to care."

"It is like doing a year's worth of work in five days," said Linda Mobley, operating room clinical coordinator at Children's Memorial Hermann Hospital. "We will see and treat as many patients as we can and we usually work from sun-up to sun-down every day."

During their most recent trip in December 2015, Sandberg and his team met a 10-year-old boy named Caleb who had been unable to walk since March 2015. After an examination, Sandberg realized Caleb was suffering from hydrocephalus—a buildup of fluid in the cavities deep within the brain—caused by a massive tumor in his brain. The tumor had been growing and pressing down on Caleb's brainstem, leaving him with severe headaches and unable to walk.

UTHealth pediatric neurosurgeon Manish Shah, M.D., Sandberg's partner at Children's Memorial Hermann Hospital and MNI, and a fellow volunteer in Haiti, performed an endoscopic third ventriculostomy—a minimally invasive procedure to treat the hydrocephalus. Caleb's headaches improved. He still needed surgery to remove the tumor, a procedure that would take eight hours and would not be safe to perform in Haiti, given the lack of resources.

"Caleb's tumor had reached a critical point and it was causing severe pressure on his brainstem, which controls heart rate, blood pressure and breathing," Sandberg said. "Short of us going to Haiti and finding Caleb, he would have eventually slipped into a coma and died."

Once Sandberg returned home, he immediately began working to bring Caleb to the United States for surgery. His first stop was to see Susie Distefano, chief executive officer of Children's Memorial Hermann Hospital.

"I told Ms. Distefano about Caleb. I informed her that he would need an eight-hour brain surgery, several days in the intensive care unit, MRI scans, and require anesthesia, among other things. Immediately,

> "Saving the life of any child is meaningful, but saving the life of a child from the poorest country in our hemisphere who had no hope of living without this surgery feels like our own small miracle."
>
> — DAVID SANDBERG, M.D.
> *Director of Pediatric Neurosurgery at Children's Memorial Hermann Hospital and Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center*

she said, 'Bring him!' and that was it," Sandberg said. "Most hospitals would have turned him away."

Knowing the surgery could now be done, Sandberg and his team worked on getting Caleb to Houston. They needed visas, passports and flights for Caleb and his mother. Dick Bassett, a philanthropist and friend of Sandberg's who had joined the team on the mission trip to Haiti, offered to pay for the flights for Caleb and his mother, in addition to helping Memorial Hermann with some of the surgery costs.

"Dr. Sandberg performed a miracle for my family when he removed my son's brain tumor, and I would have done anything in my power to help him bring this beautiful boy to Houston to save his life," Bassett said.

The team also needed a place for Caleb and his mother to stay for the duration of their time in Houston. Sandberg's assistant, Tacarra Logan, reached out to the Haitian community of Houston through Facebook and found that they were eager to help.

"When we heard they were coming to Houston for this surgery, we wanted to do anything we could to help," said Sheagan Nyei, who was part of Caleb's Haitian host family. "I have a seven-year-old son and if I were in this situation—in a foreign country not knowing anyone—I would want someone to help me through it as well."

After a month of planning, Caleb and his mother arrived in Houston, welcomed by the Haitian community and the Children's Memorial Hermann Hospital staff. Caleb underwent the eight-hour surgery to remove his brain tumor and was taken to the hospital's pediatric intensive care unit. Within the week, he began walking for the first time in 10 months.

"This whole experience has been a little surreal, meeting Caleb in Haiti and all of a sudden he is here in our operating room and we are able to save his life," Sandberg said. "Saving the life of any child is meaningful, but saving the life of a child from the poorest country in our hemisphere who had no hope of living without this surgery feels like our own small miracle."

During his recovery at Children's Memorial Hermann, the entire hospital came together to make sure Caleb enjoyed his time in Houston. Mobley and her grandchildren brought winter clothing for Caleb and his mother in addition to Valentine's Day presents.

"We forget how lucky our children are to live in the United States and have access to quality medical care. I wanted to share Caleb's story with my family to show them the importance of giving to others," Mobley said. "This Valentine's Day, they learned that lesson when they picked out valentines for Caleb instead of presents for themselves."

The hospital's food and nutrition services program also prepared a traditional Haitian meal for Caleb, his mother and the host family on their last night at the hospital. The meal included plantain porridge—a starchy breakfast item made with cornmeal, plantains, coconut milk, cinnamon, nutmeg, vanilla and almond extract—and brown stew chicken.

"The food here has been confusing to us," said Bernita, Caleb's mother. "It means a lot to me that they would take the time to make us a meal we are familiar with."

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Shriners Hospitals for Children-Houston has been providing inpatient rehabilitation treatment for Caleb since his release from Children's Memorial Hermann Hospital. Shriners Hospitals for Children-Houston specializes in orthopedic care and provides care regardless of the family's ability to pay. Since Caleb had been unable to walk for the better part of a year, it will take time and therapy for him to walk and move independently.

"Caleb has been through a lot over the past year and things are going to be very different for him now," said Glendaliz Bosques, M.D., medical director of the Shriners Hospitals for Children-Houston Pediatric Rehabilitation Program. "We hope that the work we are doing here will allow Caleb to find himself again and allow him to function independently."

Upon returning to Haiti, Bernita hopes that her son is able to get back to life as a 10-year-old.

"I am so thankful for Dr. Sandberg, Children's Memorial Hermann Hospital, Shriners Hospital, the Haitian community, our church and everyone else who has helped us through this experience," Bernita said. "My biggest hope is that Caleb can return to school and play with his brothers and sisters again." ■

Caleb will undergo rehabilitation to regain his stability and the strength to walk on his own.

Building Bridges

The Institute for Spirituality and Health hosts the fifth annual Conference on Medicine and Religion for the first time in the city of Houston

By Britni N. Riley

Physicians, chaplains and scholars traveled from around the world to Houston in March for the fifth annual Conference on Medicine and Religion, hosted by the Institute for Spirituality and Health.

The conference was founded by Farr Curlin, M.D., Michael Balboni, Ph.D., and Daniel Sulmasy, M.D., in 2012, in an effort to provide a deeper understanding of how religion relates to the practice of medicine. Today, 29 members from around the country make up the advisory board that plans the conference.

"About a decade ago, colleagues and I surveyed U.S. physicians from all specialties and we found, against the conventional wisdom, that physicians are not so much less religious than their patients," Curlin said. "Our goal for the conference is to build bridges between medicine and religion."

The conference was brought to Houston at the urging of John Graham, M.D., in 2012 president and CEO of the Institute for Spirituality and Health.

"The conference had traditionally been held up north in Chicago and Boston," Graham said. "By bringing the conference to Houston we were able to open it up to a whole new group of people and show everyone what a remarkable place the Texas Medical Center is."

Wendy Cadge, Ph.D., author of "Paging God: Religion in the Halls of Medicine," guided a tour of chapels in the Texas Medical Center for conference attendees.

"When I was writing my book, 'Paging God,' I toured 17 hospitals and their chapels and I found a very clear continuum: Hospitals are moving away from tradition-specific spaces to those that are nondenominational, where there is an emphasis on flowing water, light and nature," Cadge said.

The group toured Texas Children's Hospital, CHI-St. Luke's Hospital, The University of Texas MD Anderson Cancer Center and Houston Methodist Hospital to see their chapels and prayer rooms. Beginning at the far end of the continuum, as Cadge describes it, Houston Methodist's chapel is reminiscent of a Catholic or Protestant church with stained glass windows and Christian symbolism. The hospital also has a traditional Muslim prayer room and a spiritual garden.

"One of the most interesting things about our chapel and prayer room is that they are used predominantly by our staff," said Robert Kidd, director of chaplaincy at Houston Methodist. "If you were to come here on any given day, you would see surgeons, physicians, nurses and other staff members coming into the chapel and the prayer room to pray for their patients."

Of course, time in the chapel is a welcome reprieve for patients and their families as well.

"Our chapel, prayer room and meditative spaces provide comfort to our patients in their time of need," Kidd added. "We also have a baptismal font to perform baptisms and we have even done a few weddings here in the chapel for the patients."

Throughout the weekend, conference attendees participated in workshops, panel discussions and lectures about spirituality in the medical field.

"We had attendees from around the world: Japan, Cuba, Switzerland, Russia, as well as people from around the United States," Graham said. "It was fantastic to hear medical professionals from around the world talking freely about the impact spirituality can have on medical care."

The conference also included a keynote address titled, "Science, Religion and Spirituality in Global Perspective," delivered by Elaine Ecklund, Ph.D., director of the Religion and Public Life Program at Rice University.

"Throughout my career, I have been exploring the relationship between religion and science," Ecklund said. "The majority of scientists see science and religion as independent but, under certain circumstances, collaborative; in certain religious communities, I have found that science is equal to medicine and they believe medicine is a gift from God."

After working for over a year on the conference, the Institute for Spirituality and Health could not be happier with the turnout. The conference brought together medical professionals and scholars from widely different backgrounds and cultures to share experiences, and they walked away with new techniques for bridging the gap between medicine and religion.

"It was a labor of love and we are so honored to have hosted the conference here in Houston," Graham said. "I have received so much positive feedback about the weekend and I know everyone left with a smile on their face."

A Global Genomics Gathering

An annual scientific conference for human genetics and genomics comes to Houston with a focus on implementing genomics-driven approaches to disease

By Alex Orlando

> "In genetics, diagnosis runs much faster than treatment, so we'd like to emphasize treating disorders with different approaches, from drugs to interventions and changes in lifestyle."
>
> — STYLIANOS E. ANTONARAKIS, M.D.
> *President of the Human Genome Organisation*

Over the course of four days, the fourth floor of the Hilton Americas in downtown Houston served as a temporary hub for discussions of human genetics, genomics and all things Mendelian. The Houston medical community was proud to welcome the Human Genome Meeting (HGM), an annual scientific conference organized by the Human Genome Organisation (HUGO). The 2016 meeting marked the first time in decades that HUGO was held in the United States.

Offering a unique interplay of plenary lectures, symposia, workshops, poster presentations and laboratory tours, the 2016 HGM brought together genetic and genomic researchers from all corners of the globe. A unifying theme of translation wove potentially disparate threads together, tackling genomics-driven approaches in the diagnosis, treatment and management of cancer and genetic disease—all while inching toward future strategies and technologies for implementation.

"What we wanted to do with this meeting was to focus it down a proper path a bit more than previous meetings and bring experts from all across the world to bear on this issue of translational genomics," said Andrew Futreal, Ph.D., professor in the department of genomic medicine at The University of Texas MD Anderson Cancer Center, as well as the chair of HUGO's local organizing committee. "We wanted to think about it from the aspect of risk all the way through treatment and even novel approaches to understanding genomes. That way, we'll be able to interpret the coming wave of information that's being derived from more and more ubiquitous use of genome sequences, allowing for a greater understanding of human health and disease."

Striving to balance contemporary issues in cancer and genetics with technology, ethics and policy, the conference featured over 40 distinguished speakers from throughout the Texas Medical Center, across the country and beyond—covering topics such as "Interpreting Cancer Genomes," "Genome Editing" and "Mendelian Genetics"—in addition to 56 oral presentations from submitted abstracts and 60 poster presentations.

The roller-coaster history of genetic medicine is reflected in the evolution of the meeting itself. In 1991, HUGO held its first meeting with a singular purpose in mind: to collaborate on the ambitious goal of mapping the human genome.

"Initially, the goal of HUGO was to coordinate scientific efforts for the mapping and sequencing of the human genome," said Stylianos E. Antonarakis, M.D., president of HUGO, as well as professor and chairman of genetic medicine at the University of Geneva Medical School. "I remember the meetings that we held at that time were mostly working meetings; there were very few talks. You would come with your lab books that showcased the results of your mapping experiments, and your fellow scientists would do the same. Then we'd put them together and compare them. If they were the same that was great—if not, we'd try to resolve any differences."

Those targeted ambitions would define the HGM for more than 10 years—when the titular acronym actually stood for "Human Genome Mapping." Over the years, and spurred by the completion of the Human Genome Project, HUGO was forced to leave the meeting's origins behind.

"HUGO didn't have anything left to coordinate afterwards," Antonarakis said. "That led the organization to concentrate on ethics statements, policy issues and how to best advise different parts of the world on the importance of the genomic variation in phenotypes on disorders and traits. Gradually, the importance of HUGO went from North America and Europe to the parts of the world that were not that developed in genetic services, thinking and research. And that's where we are today."

This year's conference kicked off with a plenary session that showcased both the storied history and daring ambitions of genomic medicine. Entitled, "At 30, Genomics Comes of Age," and led by Maynard V. Olson, Ph.D., professor of genome sciences and medicine at the University of Washington, the talk called for a serious reevaluation of priorities and processes now that genome sequencing has established a firm foothold in medicine.

"Now is decidedly the time to really think boldly about the policies that we'll need over the next decades to optimize genomics' potential to advance progress in medicine," Olson said. "This is going to be an immensely greater challenge than the one that the Human Genome Project represented. Obviously, it's greater in scale, but the real key is that we get ahead of the curve of scientific progress."

The 2016 HGM featured a "Meet the Professors" series, during which attendees—from students and postdocs to young faculty members—had an opportunity to sit down with the speakers themselves. The four-day conference also included a tour of Baylor College of Medicine's Human Genome Sequencing Center. For Antonarakis, the opportunity for a younger generation of researchers to visit real-life sequencing center—rather than experience a series of slides on a screen—is a testament to the value HGM provides its attendees.

"We'd like HUGO to continue to have more focused meetings in the future," Antonarakis said. "Next year's meeting will be on how genomics informs treatment. In genetics, diagnosis runs much faster than treatment, so we want to emphasize treating disorders with different approaches, from drugs to interventions and changes in lifestyle. We'd like to learn from the experts and each other while we explore these possibilities." ■

ACCOLADES

JENNY BARNETT-SARPALIUS has been named chief financial officer for CHI St. Luke's Health (CHI St. Luke's) CHI Texas Division. As the Division CFO, Barnett-Sarpalius represents Texas on the CHI National Enterprise Finance Operations Leadership Council, which is charged with developing the overall financial strategy for CHI. In her new role she will lead the division's financial operation, serve as a strategic partner to the division's leaders to develop and implement an effective long-term financial model, and establish a financial operational infrastructure to support the organization.

MICHAEL R. BLACKBURN, PH.D., has been named executive vice president and chief academic officer for The University of Texas Health Science Center at Houston (UTHealth). Blackburn joined the UTHealth faculty in 1997 and has served as the vice chairman of the department of biochemistry and molecular biology at McGovern Medical School at UTHealth since 2011. In 2012, Blackburn and Michelle C. Barton, Ph.D., of The University of Texas MD Anderson Cancer Center, were named joint deans of The University of Texas Graduate School of Biomedical Sciences at Houston.

MARIA ELENA BOTTAZZI, PH.D., associate dean of the National School of Tropical Medicine and professor of pediatrics at Baylor College of Medicine, has been named the recipient of the 2015 Jose Cecilio del Valle National Science Award from the government of Honduras. The award recognizes work that contributes to the nation's body of knowledge, its resources and values, as well as its development. Bottazzi's principal interest is in the role of vaccines as disease control tools integrated into international public health programs and initiatives.

PATRICIA BOWYER, ED.D., M.S., OTR, FAOTA, associate professor and director of the Texas Woman's University School of Occupational Therapy, has received the American Occupational Therapy Association Outstanding Mentor Award. Bowyer performs research that concentrates on children and teens undergoing treatment for cancer or experiencing sensory processing issues, including those associated with autism.

SAMIR DESAI, M.D., assistant professor at Baylor College of Medicine Department of Medicine, was recently recognized by the Association of American Medical Colleges Group on Student Affairs for two books he authored: "Medical School Scholarships, Grants & Awards: Insider Advice on How to Win Scholarships," and "The Successful Match: 200 Rules to Succeed in the Residency Match." The group identified the books as high-value resources in its Group on Student Affairs (GSA) Performance Framework. The GSA addresses issues in medical school admissions, student financial aid, medical student diversity, student affairs and student records at all member medical schools.

MICHAEL FREEMAN has been named senior vice president of Strategic Planning and Business Development for the CHI Texas Division of CHI St. Luke's Health. Freeman is a seasoned health care business professional with 37 years of experience in strategic planning implementation and administration, including 28 years in academic medical centers. With a primary focus on the Division's strategic plan, Freeman will facilitate the creation of plans for the suburban hospitals and work with administrative and medical staff in the development of business plans that support growth initiatives.

IMAD JARJOUR, M.D., associate professor of pediatrics and neurology at Baylor College of Medicine, was appointed to the Council of Pediatric Subspecialties by the Child Neurology Society to represent child neurology. The mission of the council is to advance child health through communication and collaboration within its network of pediatric subspecialties and liaison organizations, including the American Academy of Pediatrics and the American Board of Pediatrics.

SALLY VERNON, PH.D., chair of the department of Health Promotion and Behavioral Sciences at UTHealth School of Public Health, has been appointed to the Board of Scientific Counselors for Clinical Sciences and Epidemiology at the National Cancer Institute (NCI). As part of her duties, Vernon will evaluate and review research projects of cancer scientists and clinicians in the NCI's Center for Cancer Research (CCR) and Division of Cancer Epidemiology and Genetics (DCEG). The NCI is part of the National Institutes of Health.

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Apple, Texas Medical Center Partner to Build Series of Health Care Management Applications

The TMC|Care mobile application will extend care pathway expertise to consumer platform

On March 21, at Apple's first press event of 2016, Chief Operating Officer Jeff Williams unveiled a new iPhone application known as CareKit, aimed at capturing, storing and analyzing patient health data and providing a direct line of communication between patients and their health care providers. The Texas Medical Center is proud to announce it is partnering with Apple to use the tools developed for CareKit to develop its own application, TMC|Care.

The first version of TMC|Care will focus on supporting patients recovering from cardiothoracic surgery. The structured nature of the recovery process and the fact that it is relatively quick, around six weeks, makes it an ideal starting point.

"For a cardiothoracic surgeon, knowing the details of a patient's recovery is vital to preventing them from being readmitted to the hospital and ensuring that their health is steadily improving," said TMC President and CEO Robert C. Robbins, M.D., reflecting on his own personal experience as a cardiothoracic surgeon. "We envision that the TMC|Care app will become a valued resource for both patients and doctors to manage operative recovery as safely and efficiently as possible."

Using the app, patients will be able to track objective measurements, such as blood pressure, weight, activity and heart rate, using Bluetooth enabled devices that will automatically update the TMC|Care app on their mobile phones. Additionally, patients will provide subjective measures, such as pain levels, shortness of breath and wound healing progress, to create a holistic view of a patient's overall wellbeing.

The physician teams from TMC member institutions emphasize that TMC|Care is not intended to replace the current standard of care, nor should it override common sense if a patient feels ill and needs to be seen immediately. Rather, the app is intended to be an additional layer of support for the patient and a connection to the care team to enrich standard of care with enhanced data and information.

TMC and its member institutions are excited about the prospect of integrating data from the patient app into each health system's electronic medical record.

"This is the beginning of a deep and exciting collaboration between Apple, TMC and our member institutions with the goal of advancing health care for all patients," said William F. McKeon, TMC executive vice president and chief strategy and operating officer. "The Texas Medical Center has the largest set of clinical and research expertise on one campus. We are uniquely positioned to transform the way we connect with and support patients in the future. This is yet another example of how TMC is innovating in the life sciences to improve the health of humanity."

TMC and Apple teams are working diligently to develop and test the initial app that is comprehensive and easy to use. TMC is consulting experts across the campus to ensure that the most innovative ideas are provided.

This first version of TMC|Care marks the beginning of what is ultimately intended to be a suite of tools to aid in a variety of health-related issues. Future applications under consideration include heart surgery, congestive heart failure, chemotherapy treatment, post-cancer surgery recovery and adolescent psychiatric care support. ■

– Shea Connelly, Texas Medical Center

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713-348-4772

8-9 ***10th Annual Kempfer Functional Neuroanatomy Seminar***
Friday – Saturday, 7:30 a.m. – 4:30 p.m.
Baylor College of Medicine
One Baylor Plaza
Michael E. DeBakey Building
Kieberg Auditorium
ceowen@mdanderson.org
713-563-8710

9 ***Texas Children's Cancer Center with Baylor / UT Med Students: Brave a Shave for Kids with Cancer***
Saturday, 12:00 p.m. – 4:00 p.m.
Baker Street Pub and Grille
15970 City Walk, Sugar Land, TX
jmadams@bcm.edu
713-206-3406

11 ***Redefining Early Stage Investments (RESI) @ TMCx***
Monday, 7:00 a.m. – 8:00 p.m.
TMCx
2450 Holcombe Blvd., Suite X
resi@lifesciencenation.com
617-600-0668

New Perspectives on Reducing Stress in Parents of Children with Developmental Disabilities
Monday, 7:00 p.m. – 8:15 p.m.
St. Paul's Methodist Church
5501 S. Main St., Fondren Hall
geneticevenings@bcm.edu
832-822-4182

16 ***Donate Life Texas 2nd Chance Run***
Saturday, 8:00 a.m.
Constellation Field
1 Stadium Dr., Sugar Land, TX
ldavis@lifegift.org
713-349-2570

Art with Heart 2016
Saturday, 6:00 p.m.
TMCx
2450 Holcombe Blvd., Suite X
donna@sanjoseclinic.org
713-490-2620

18 ***The Ronald McDonald House Annual Golf Tournament***
Monday, 8:30 a.m. – 4:00 p.m.
River Ridge Golf Club
3133 Brazos Oak Ln., Sealy, TX
fbroussard@rmhhouston.org
713-795-3585

22 ***Global Health in a Globalized Texas***
Friday, 8:00 a.m. – 2:30 p.m.
Rice University's Baker Institute for Public Policy
6100 Main St., Baker Hall
blaymance@rice.edu
713-348-2735

29-30 ***7th Annual Houston Echo Review: Boot Camp for 2016 Echo Board***
Friday – Saturday, 8:00 a.m. – 7:00 p.m.
Houston Marriott Medical Center
6580 Fannin St.
cme@texasheart.org
832-355-9100

APRIL: NATIONAL AUTISM AWARENESS MONTH

Approximately one in 68 children in the United States is diagnosed with autism spectrum disorder (ASD), a neurodevelopmental condition characterized by communication difficulties, social interaction challenges, and restrictive and repetitive behaviors, according to the most recent study conducted by the Centers for Disease Control and Prevention's Autism and Developmental Disabilities Monitoring Network. There are more than 3.5 million Americans living with an autism spectrum disorder.

This month, the Texas Medical Center observes National Autism Awareness Month. The national movement encourages everyone to support autism awareness and acceptance in our schools and communities, ensuring that all individuals—whether they are directly affected by autism or not—are valued and appreciated.

FOR MORE EVENTS, VISIT TMCNews.org

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