

# TMC | PULSE

NEWS OF THE TEXAS MEDICAL CENTER — VOL. 6 / NO. 3 — APRIL 2019

## Can This Mouse Help Treat Autism?

p. 18



PLANNING A FAMILY-  
FRIENDLY JAIL,  
p. 10

DIGITAL  
HOUSE CALLS,  
p. 14

NEW FRONTIERS  
FOR PHYSICIANEERS,  
p. 28



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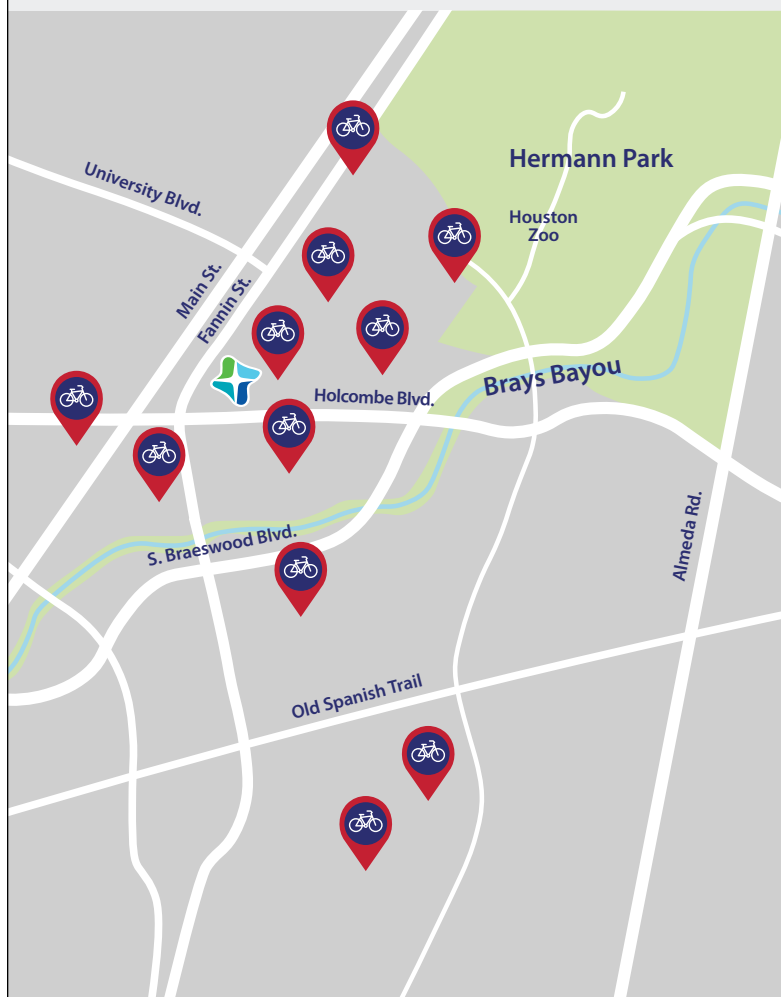






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## **WILLIAM F. McKEON**

*President and Chief Executive Officer, Texas Medical Center*

It's not every day we host royalty here at the Texas Medical Center, so my recent meeting with Her Royal Highness Crown Princess Mary Elizabeth of Denmark was already something special. But it wasn't just her title that was impressive. HRH Crown Princess Mary is a leader in health care and innovation in Denmark and, like leaders across the Texas Medical Center, she, too, is committed to advancing discovery in the life sciences.

That's why I'm so eager to work with her and the government of Denmark to establish the next Texas Medical Center BioBridge. BioBridges are important partnerships the Texas Medical Center establishes with international collaborators. These partnerships align the startup ecosystems of other nations with that of the TMC and accelerate the pace of clinical research by encouraging collaboration between academic researchers here and abroad.

In 2016, we established our first BioBridge with Australia; we followed that with a United Kingdom BioBridge in 2018. The TMC Innovation Institute is developing a reputation around the globe as one of the most vibrant life science business accelerators, thanks to its strategic location within

the world's largest medical city. Foreign partners compete to gain access to the TMC Innovation Institute because it represents the very best setting for companies

looking to establish a business base in the United States.

More clinical research is conducted in the Texas Medical Center than any other place on Earth. Incredibly, the pace of that research will accelerate as we roll out an artificial intelligence platform that's poised to transform the arduous process of matching patients to clinical trials. What once took months will soon take mere seconds.

At our meeting, experts from Denmark and the TMC shared updates on important collaborative projects already underway between Denmark and TMC institutions.

HRH Crown Princess Mary was fully knowledgeable about the emerging technology needed to advance health care in both our nations, so I was pleased to receive her invitation to visit Copenhagen later this year to formalize our partnership. Our meeting was further proof that we can always learn from our friends and colleagues around the world in our collective pursuit to advance care.

A handwritten signature in black ink that reads "William F. McKeon".



*Leading Her Royal Highness Crown Princess Mary Elizabeth of Denmark on a tour of the Texas Medical Center.*

## **TMC | PULSE**

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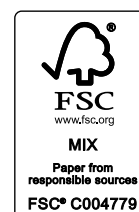
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# Table of Contents

8

“Breakthrough”  
Debuts at SXSW

21

Pediatric Hearing Services  
Hub to Launch in 2020

26

Maternal ICU Opens  
at Texas Children’s

33

TMC Innovation  
Institute, 2.0

5    Vitals: FDA approves Spravato

13   Next Med: A more active ankle

22   Spotlight: Lee Ehmke

31   Curated: Purple Songs Can Fly

34   Field Notes

36   Calendar

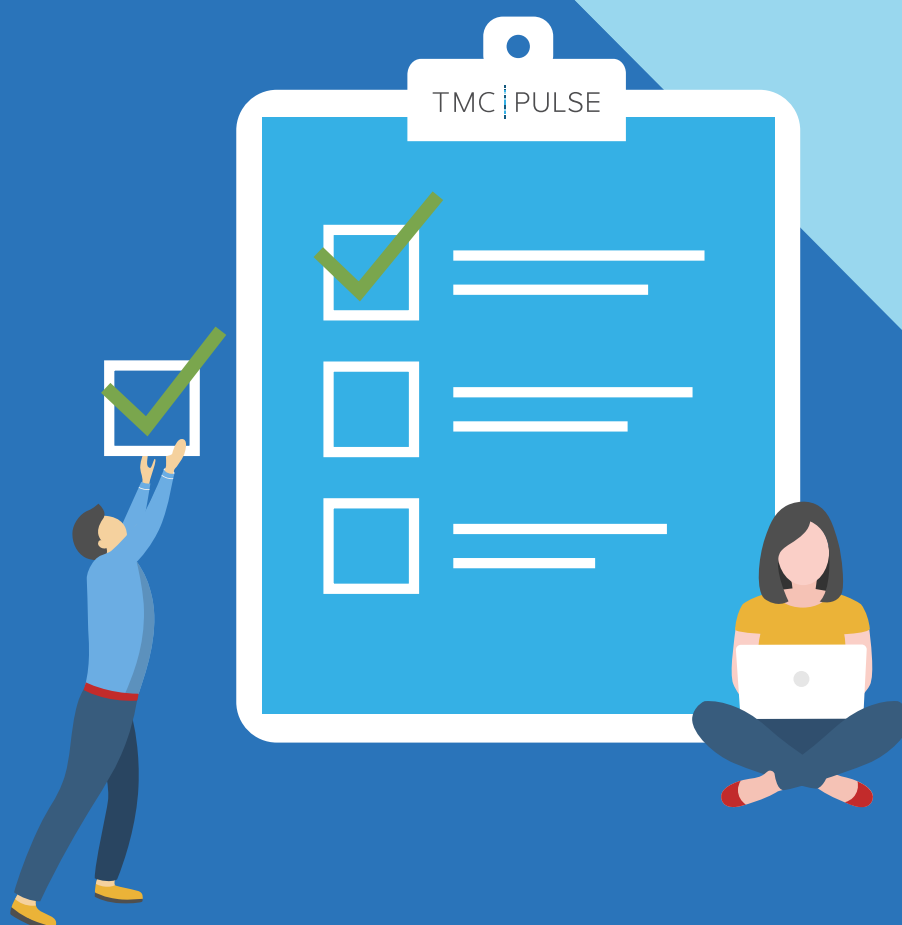
**ON THIS PAGE:** Leyla, a student at The Center for Hearing and Speech, mimics her teacher during class.

**ON THE COVER:** A research mouse peers over the side of a container in the Costa-Mattioli lab at Baylor College of Medicine.

# TMC PULSE WANTS TO HEAR FROM YOU

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## FDA approves Spravato, a fast-acting antidepressant

The first new class of antidepressant drugs in more than three decades was approved in March when the U.S. Food and Drug Administration (FDA) fast-tracked esketamine, the chemical cousin of illegal street drug ketamine, to prescribe to patients with treatment-resistant depression.

Developed by Johnson & Johnson's subsidiary, Janssen Pharmaceuticals, esketamine is marketed under the name Spravato and dispensed as a nasal spray administered under the supervision of trained health care professionals.

Ketamine is the chemical mixture of esketamine and arketamine, two mirror-image molecules. But when the molecules are separated, esketamine has been shown to be more potent. As a result, it requires a lower dosage and has a decreased risk of disassociation, tolerance and abuse.

"That's why Janssen preferred to develop esketamine. It has more robust antidepressant efficacy with less side effects," said Rodrigo Machado-Vieira, M.D., Ph.D., professor of psychiatry and behavioral sciences and director of the Experimental Therapeutics and Molecular Pathophysiology Program at UTHealth Harris County Psychiatric Center. "It's the most striking discovery in psychiatry in the past 34 years at least, so I'm very excited."

### Treatment-resistant depression is common and there is a clear unmet need for fast-acting therapeutics.

More than 16 million adults in the U.S. are affected by depression. While a variety of antidepressant medications help people, such as Prozac and Cymbalta, about one-third of patients don't respond to treatment.

"There's simply a dearth of options for patients in this refractory, treatment-resistant population," said Sanjay Mathew, M.D., vice chair for research and professor in the Menninger Department of Psychiatry

and Behavioral Sciences at Baylor College of Medicine. "Many patients cycle in and out of numerous ... first- and second-line antidepressant agents, but [esketamine] will offer something that's evidence-based and on-label for this more ill and difficult-to-treat population."

Spravato is for patients who have tried but do not respond to at least two antidepressants. While all the other antidepressants on the market take two to three weeks to take effect, esketamine and ketamine work in a matter of hours.

"Patients don't need to wait too long to have efficacy with these drugs," said Machado-Vieira, who led a clinical trial on the rapid anti-suicidal effects of ketamine in depression and alcohol abuse. "It improves symptoms in a wide range of patients who do not respond to any standard treatment."

Still, the FDA requires anyone using Spravato to take a traditional oral antidepressant, as well.

### Esketamine's long-term safety is not fully understood.

Janssen conducted five Phase 3 studies in patients with refractory depression: three short-term studies, one maintenance of effect study and a long-term safety study that showed the esketamine nasal spray provided a "statistically significant, clinically meaningful, rapid, and sustained improvement of depressive symptoms."

While the company maintains the drug is "generally tolerable" for extended use, some experts think more research needs to be done.



"I think there are a few gaps that need to be filled in terms of finding out the number of applications, how safe it is in the long term," Machado-Vieira said.

Ketamine was approved by the FDA in 1970 as a potent anesthetic for diagnostic and surgical procedures, but it wasn't until recently that clinics across the country started offering ketamine infusions to treat pain and depression.

"Since it was [working] so fast, many clinics started providing off-label ketamine for patients with depression," Machado-Vieira said. "No one with depression, especially treatment-resistant depression, would like to wait two to three weeks to have the medication kick in—especially in the first week of treatment with standard antidepressants when patients are at much higher risk for suicidal attempts."

### Prepare for sticker shock.

Because ketamine has not been approved by the FDA to treat depression, infusions aren't covered by insurance and can be costly. In Houston, patients pay out-of-pocket anywhere from \$500 to \$1,350 per ketamine infusion.

Spravato ranges from \$590 to \$885 per treatment session. The first month's induction phase consists of two treatments per week. After that, patients move into maintenance, during which they receive one treatment every week or every other week.

Because Spravato has been approved by the FDA, it's important to note the list prices don't include insurance coverage, rebates or discounts.

"It's something we've all been waiting for," Mathew said. ■



# Too Much Toothpaste? It's a Thing.

*Excessive fluoride can harm young teeth*

BY BRITNI R. McASHAN

At home in the Heights neighborhood of Houston, Shannon Alfonso helps her 2-year-old daughter, Lizzie, brush her teeth twice a day.

"Lizzie really likes to brush her teeth when she sees that I'm brushing my teeth," Alfonso said. "She's very independent and she likes to brush her own teeth, but I keep an eye on her and help her sometimes to make sure she is getting a good cleaning."

Contrary to what many parents assume, a good cleaning does *not* mean an abundance of toothpaste.

A new report from the Centers for Disease Control and Prevention (CDC) examined the use of toothpaste and toothbrushing patterns among 5,157 children and adolescents from 2013 to 2016. The report found that nearly 40 percent of children ages 3 to 6 used too much toothpaste.

Several issues can arise when children 6 and under use excessive amounts of toothpaste.

When children use too much toothpaste with fluoride, they run the risk of fluorosis, a cosmetic condition that can change the coloring of teeth, said Gregory Olson, D.D.S., professor and chair of pediatric dentistry at The University of Texas Health Science Center at Houston (UTHealth) School of Dentistry. In severe cases, fluorosis can cause pitting in the teeth.

"This is all age- and amount-dependent," Olson said. "For the general population, it is better to use a toothpaste with fluoride, but for children, it is better to use a toothpaste with a lower amount of fluoride. Not only do kids have trouble as they are developing their dexterity, but a lot of kids don't spit



*Shannon Alfonso supervises while daughter, Lizzie, brushes her teeth.*

out toothpaste and you don't want them swallowing it all."

There are benefits to brushing with and without toothpaste, he added.

"Brushing well without toothpaste, you can remove the plaque. Brushing with toothpaste that has some fluoride, you can strengthen and harden your teeth," Olson said.

The CDC, the American Academy of Pediatric Dentistry (AAPD) and the American Dental Association (ADA) recommend that children ages 3 to 6 use a pea-size amount of toothpaste and that children under 3 use a smear of

toothpaste the size of a grain of rice.

Although these recommendations are directed at children under the age of 6, who do not typically have permanent teeth, the health of baby teeth is vital to a person's oral health over a lifetime, Olson said.

"People think they are just baby teeth and you get a second chance," he said. "These baby teeth hold space for normal growth and development and if you lose space too early, you're more likely to have crowded teeth that do not look nice or function well. If you get a lot of decay early on, it's almost like

setting up the environment. You lose your baby teeth, but you still have that bacterial environment that is actually at a higher risk for infecting or causing problems for grown-up teeth."

The best way for children to achieve optimal oral health is to have a dental home.

"Kids need a pediatric dentist to supervise them the same way their pediatrician does," Olson said. "If you are a parent, you have a lot on your plate and this is just another issue."

The CDC, AAPD and the ADA recommend children be seen by a dentist after their first baby tooth comes in and no later than age 1.

"We took Lizzie to the dentist for the first time at 1," Alfonso said. "Our pediatrician recommended a list of pediatric dentists for us to see and our dentist has helped us with brushing guidelines and getting Lizzie off of her pacifier."

Because some Houstonians do not have a regular dental home or even access to a toothbrush and toothpaste, Olson is proud that UTHealth dental students help to fill some of the gaps in providing dental homes for children in the greater Houston area.

"We have two mobile dental clinics ... and our dental students rotate through several clinics in the community to do cleanings, screenings and educational events," Olson said. "Through these clinics patients can get basic oral hygiene implements like toothbrushes, toothpaste and, if they are in pain, they can be seen and have care provided. A lot of it is just getting out there where people are and trying to identify their need." ■



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# “Breakthrough” Debuts at South by Southwest

Documentary traces decades of immunotherapy research by Nobel laureate James Allison

BY CINDY GEORGE

The most compelling sequences in the “Breakthrough” documentary, which premiered at South by Southwest (SXSW) in Austin, Texas, are the seconds when the face of immunologist James Allison, Ph.D., fills the frame amid superimposed images and film of his loved ones lost to cancer.

His mother. His uncles. His brother, Mike Allison, who lost his battle with metastatic prostate cancer one week before the immunologist’s own prostate cancer diagnosis.

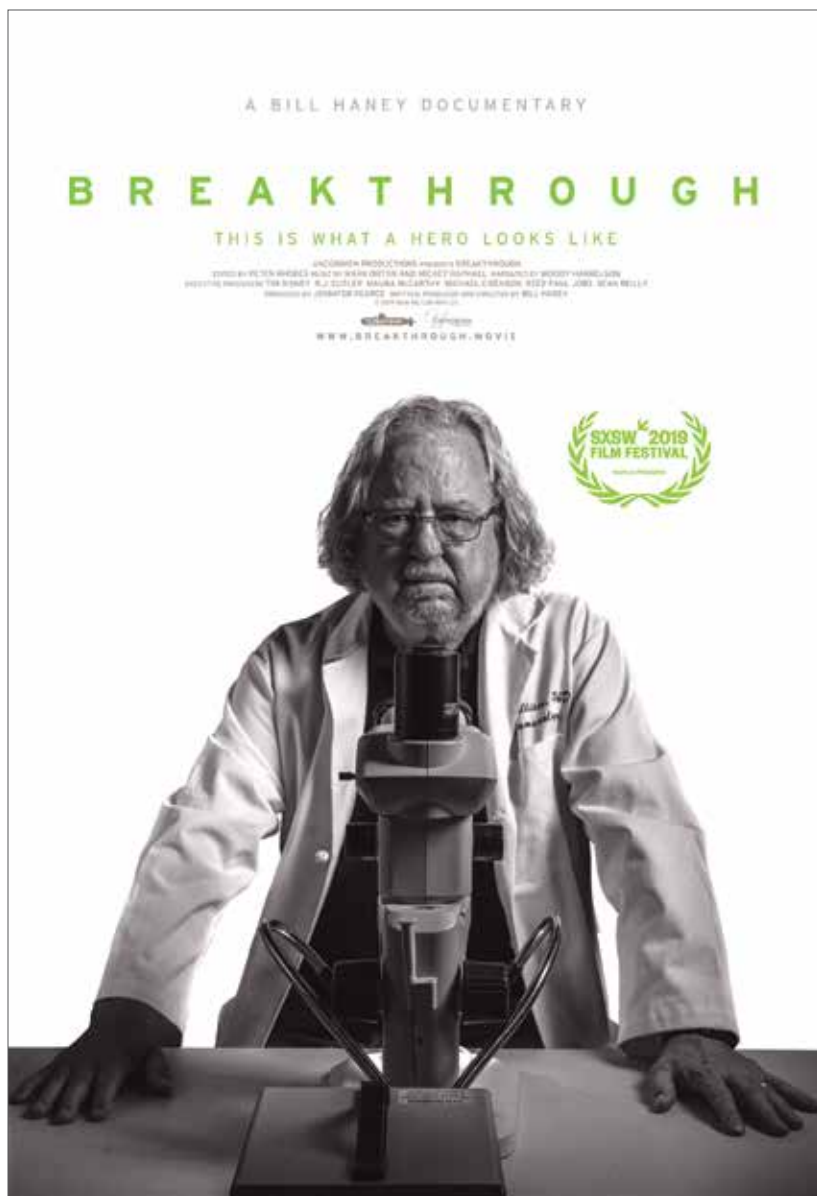
Allison, 70, was awarded the 2018 Nobel Prize in Physiology or Medicine jointly with Japanese immunologist Tasuku Honjo, M.D., Ph.D., for the discovery of cancer therapies that stimulate the immune system to attack tumor cells. Treatments developed from Allison’s work have extended the lives of thousands of people with advanced disease, though certain cancers have responded better to immunotherapy than others.

“Breakthrough,” directed by Bill Haney, follows Allison’s professional and personal journey over several decades. The film’s world premiere at SXSW brought Houston innovators to the epicenter of a festival celebrating the ways people push the limits of creativity and progress through film, music and interactive media.

## This is what a hero looks like

The film opens with a shot of downtown Alice, Texas, where Allison was raised by a father he describes as a “country doctor” and his doting mother, who died of lymphoma when he was 11. The soundtrack for that first scene is the scientist playing a melancholy tune on the harmonica.

With a pained voice all these



“It was 15 years-plus of being frustrated. Luckily, there were a lot of people who worked with me and kept the lights on.”

— JAMES ALLISON, PH.D.

Immunologist at MD Anderson Cancer Center

decades later, Allison describes how his mother spent a lot of time in bed and how he remembers burns on her neck, which he later learned were the consequence of radiation.

Today, Allison is a researcher

at The University of Texas MD Anderson Cancer Center who is fighting a third personal bout with cancer following a melanoma removal from his nose a few years ago.

The film is narrated by

Midland-born Woody Harrelson, with music by the legendary Willie Nelson, who hails from a town north of Waco called Abbott, to create a “holy trinity of Texas,” Haney said.

Subtitled “This is What a Hero Looks Like,” the documentary tells a deeply Texan story laced with the Lone Star State’s culture, institutions, characters, places and music—namely country and blues. Allison earned his degrees from The University of Texas at Austin and honed his fascination with understanding how T cells operate in the immune system at an MD Anderson science park in Smithville. The mutual admiration between Willie Nelson and Allison culminates in one of the final scenes of the film as the immunologist stands onstage with the outlaw country artist at Austin City Limits and plays “Roll Me Up and Smoke Me When I Die” on the harmonica.

Allison discovered a way to block a protein on T cells that acts as a brake, thus freeing T cells to attack cancer. Specifically, he developed an antibody to block the checkpoint protein CTLA-4. The film’s ongoing threads weave through his work hard-play hard drama by revealing Allison’s confidence and doggedness. Those traits fueled his determination to unravel the mysteries of T cells and create a new tool to attack cancer, without the consequences associated with chemotherapy, radiation and surgery.

The film climaxes with Allison’s move from California to New York City to personally keep the research fire stoked. He had champions, such as medical oncologist Rachel Humphrey, M.D., who took the lead in convincing Bristol-Myers Squibb to invest millions into what became ipilimumab, a checkpoint inhibitor

Visit [breakthrough.movie](http://breakthrough.movie) online for more information about the documentary.



“In a world where imaginative work is often thought of as being done by folks like me—filmmakers, poets, painters, sculptors, actors—I wanted to focus on the extraordinary creative work of scientists.”

— BILL HANEY  
Director of “Breakthrough”

drug known as Yervoy that worked even though tumors got larger before they shrank. The company also settled on a different gauge for success—measuring patient survival over time instead of early tumor shrinkage. Clinical trials were complete in 2011 and the drug was approved that year by the U.S. Food and Drug Administration.

Most of the people who appear in the film attended the premiere and sprang to their feet when asked to stand, including Allison’s current wife and research collaborator, MD Anderson oncologist Padmanee “Pam” Sharma, M.D., Ph.D.; his former wife, Malinda Allison, who

was married to him for two decades while he chased his dream of understanding T cells; Sharon Belvin, who received his immunotherapy treatment in a trial and remains cancer-free to this day; as well as fellow researchers, Bristol-Myers Squibb executives and his college professor.

### Immunotherapy story is not finished

In a Q&A with the audience after the hourlong film, Haney explained his interest in telling this story and finding a standout in the “immunology revolution” who could lead a documentary.

“There was only one person,” the director said. “In a world where imaginative work is often thought of as being done by folks like me—filmmakers, poets, painters, sculptors, actors—I wanted to focus on the extraordinary creative work of scientists.”

Haney also wanted to show that there are compelling characters committed to solving the world’s biggest challenges.

“Jim and the extraordinary people—a number of whom are here today—have shown us exactly what a team of gifted folks led by an inspiring, empathetic, extraordinary leader with a real sense of

imaginative purpose can do if they work collaboratively, if they use real facts to form conclusions, if they test, if they share their information, if they partner with a bigger community. Look what science has done. These problems aren’t insurmountable; they just have to be surmounted by thoughtful, purposeful people focused on things bigger than themselves.”

Allison, who is the chair of immunology at MD Anderson and the cancer center’s first Nobel laureate, said he was overwhelmed to see so many of his years of research compressed into a film.

“It was 15 years-plus of being frustrated,” he said. “Luckily, there were a lot of people who worked with me and kept the lights on.”

He also emphasized that the immunotherapy story is not finished.

“We’ve got a lot of work to do to figure out how to bring it to everybody,” Allison said. “It’s a journey in progress.” ■

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# Planning a Family-Friendly Jail

*The Harris County Sheriff's Office is laying the groundwork for a host of improvements*

BY RYAN HOLEYWELL

It's a cold afternoon, and Houston's Harris County Jail is bustling with activity. Family members are lining up in the lobby, handing over IDs in exchange for visitor badges and directions outlining where to proceed in order to meet with loved ones. This is one of the four visitation days per week and, for many, the process won't be easy.

Parking can be inconvenient and expensive. The jail's interiors, in drab grays and greens, are far from welcoming. Visitors are required to pass through metal detectors. And, even sheriff's department leaders will acknowledge the jail staff could be a bit more cordial.

Then, there's the waiting. Visitation itself is capped at 20 minutes, but the whole process can take an hour or two. The ordeal often leaves family members frustrated and feeling like they're the ones being punished.

The toll is especially great on children.

"If I put myself in their shoes—a child's shoes—I'd be scared," said Maj. Mike Lee, who leads mental health and diversion efforts at the jail. "It's a chaotic process they're observing. The buildings are intimidating. There's nothing friendly about it."

Today, leaders at the Harris County Sheriff's Office—which oversees the jail and the thousands of inmates being held there at any time—are hoping to change that, paying particular attention to the needs of children with incarcerated parents. The jail spent most of last year working with researchers from Texas Children's Hospital, Baylor College of Medicine and The University of Texas Medical Branch at Galveston to identify ways to better serve kids who have parents in the jail. The Texas Medical Center Health Policy Institute provided a grant to support that work.

The results were so informative, the jail just won a grant from the U.S. Justice Department's National Institute of Corrections, which is working with jail leaders to implement reforms.

## Forgotten victims

Parental incarceration can have a negative impact on a child's life that lasts well into adulthood, sometimes leading to neurodevelopmental and

“Kids who've grown up in this situation tell us, 'It would make a huge difference if I could just hug my mom or dad.'”

— CHRISTOPHER GREELEY, M.D.  
*Vice chair of community health at  
Baylor College of Medicine's pediatrics  
department; chief of public health  
pediatrics at Texas Children's Hospital*

cognitive challenges, health experts say. Those kids—seen as the “forgotten” victims of crime—have huge needs that, until now, didn't garner much attention from the jail. Under the leadership of Harris County Sheriff Ed Gonzalez, who took office in 2017, that's changing.

About 92,000 children in Harris County have a parent who comes through the jail in any given year. As part of the research, the jail started asking the 300 to 400 inmates who are booked daily about the number and ages of children they have. In Harris County's jail, the nation's third largest, half of all inmates have a child under the age of 18.

As Gonzalez sees it, improving the experience of those children is a key way the jail can help break the cycle of crime.

“This jail wasn't designed and built with the needs of children in mind, but we're determined to do better because our community's children deserve it,” Gonzalez said at an event earlier this year.

In the coming months, the jail plans to update its website with details about the logistics of visitation—hopefully making the process less confusing. Additional plans include stocking lobbies and visitation areas with children's books and playing children's programming on television monitors. Visitation areas could get a makeover. The sheriff's department may even reconsider its processes for arresting suspects when a child is present.

But most significantly, the jail is investigating how and if it can implement “contact visitation,” or face-to-face meetings between inmates and their loved ones. Today, virtually all in-person visitation is “non-contact,” which means inmates and visitors are separated by thick glass and communicate via phone. For jails, non-contact visits are safer and easier, since they reduce the risks of physical conflicts and the transfer of contraband.

The absence of touch takes a tremendous toll on inmates and their loved ones, especially their kids, researchers say. Families named contact visitation as the single greatest way the jail can support them.

“Kids who've grown up in this situation tell us, 'It would make a huge difference if I could just hug my mom or dad,’” said Christopher Greeley, M.D., vice chair of community health at Baylor's pediatrics department and chief of public health pediatrics at Texas Children's.

Non-contact visits dehumanize parents, he said, which can have negative, long-term effects on families. It's important to remember that those non-contact visits don't just punish inmates; they punish vulnerable children, too, Greeley added.

“I don't want [my son] to see me in jail, not through the glass,” one inmate told the researchers. “I'm okay with this orange jumpsuit, but seeing me and not being able to touch me ... it might crush him.”

## Families deserve better treatment

Another priority of the sheriff's office will be improving the training of the frontline staff who coordinate visitation, according to Lee. Several families told researchers they won't come to visitation because they feel like the jail staff treats them like inmates.

“We acknowledge we could benefit from some customer service training,” Lee said. “Your job isn't to be the judge and the jury. It's to be the [corrections] officer, to be impartial, to treat people with respect.” ➡



Maj. Mike Lee stands outside of the 1200 Baker Street Jail in Houston.

“ If I put myself in their shoes—a child’s shoes—I’d be scared. It’s a chaotic process they’re observing. The buildings are intimidating. There’s nothing friendly about it. ”

— MAJ. MIKE LEE

*Leader of the Mental Health and Jail Diversion Bureau, Harris County Sheriff’s Office*

In the past, visitors might wait in line for nearly an hour before learning they were at the wrong location, Lee said. Today, the jail lobbies are staffed with volunteers carrying iPads loaded with inmate information. They can quickly tell visiting families which of several jail buildings houses their loved ones, and whether those inmates have had visitation rights suspended.

But the single greatest need facing these families is food, said Nancy Correa, senior community initiatives coordinator for public health and primary care at Texas Children’s Hospital. Financial hurdles can arise quickly when a breadwinner is placed behind bars and other family members suddenly become responsible for a child they weren’t planning to support.

There’s also a serious emotional toll on families, said Melinda Garcia, coordinator for Angel Tree, a support group for children of incarcerated parents and their caretakers that meets monthly at Second Baytown Church.

Children may feel anxiety, shame, confusion, depression or anger when a parent is in jail or prison. Often, schools can’t provide help because the family doesn’t inform school leaders of the situation. And some families don’t even tell children when a parent is jailed. Instead, they provide creative excuses, such as ‘Mom is on a business

trip’ or ‘Dad is training to be a superhero.’ “Part of the issue is the caregivers don’t know the duration they’ll be in jail,” Correa said.

Given those needs, the jail hopes to provide information to caretakers on how to talk to kids about incarceration and to connect them with agencies and nonprofits that can provide financial, emotional or mental health support.

Jail officials know that some critics may scoff at their attempts to embrace a softer side, arguing that jail is *supposed* to be unpleasant. But Lee is adamant that family members shouldn’t suffer from poor treatment. After all, those families haven’t been accused of crimes, and most of the people in jail haven’t been convicted. Jail leaders also believe addressing the trauma facing these kids is just the right thing to do.

“Regardless of what the adults in their lives may have been accused of,” Gonzalez said, “we want to make sure [these children] have an opportunity.” ■





### A more active ankle

For amputees, finding the best prosthetic for their lifestyle can be a challenge, but most agree that the closer the device comes to mimicking its biological counterpart, the better.

That's the thinking behind Empower, the only lower leg prosthetic with an active ankle joint. Now in its third generation, the prosthetic was originally designed by MIT biophysicist and mechanical engineer Hugh Herr—himself a double amputee—and is now distributed by the German prosthetic company, Ottobock.

What sets the battery-powered device apart is the way it propels the foot forward, said Danielle Melton, M.D., director of the Amputee and Orthotics and Prosthetics Program at TIRR Memorial Hermann.

"It's the only powered ankle that does plantar flexion—the 'step off' movement," said Melton, the principal investigator for a recent pilot study of the device at TIRR. "Most prosthetic feet are stationary, and more advanced feet use hydraulics or are external-powered to allow more movement. The Empower is unique in that it actually powers the amputee forward."

That propulsion imitates life-like movement of lost muscles and tendons, which is said to normalize gait, reduce stress on joints and help wearers with longer distances and uneven ground. But the device is not ideal for everybody, as it is heavier than a typical prosthetic foot and produces a motor-like noise.

"The patient population that I think it benefits most are the healthy, very active patients who walk a lot on uneven terrain and out in the community," Melton said. "The Empower supplies the energy, or power, that otherwise they would have to exert to walk those steps, so it decreases fatigue and improves walking speed, walking distance and reduces pain in their sound leg, particularly for those walking 10,000 steps a day or more."

Another study comparing gait movement while wearing the Empower ankle is scheduled to begin at TIRR in the near future. ■







# Digital House Calls

Telemedicine study shows early benefits for children with medical complexities

BY CINDY GEORGE

Nathan Lingenfelter was born healthy in July 2012.

His life was transformed six weeks later after losing consciousness and nearly succumbing to SIDS, or sudden infant death syndrome.

"There was no pulse. There was no heartbeat. There was nothing," his mother, Cheryl Lingenfelter, said.

A frantic hour crammed with multiple interventions saved his life.

"I had to do CPR while my mom called 911," Lingenfelter said.

"The paramedics came and did CPR. He was taken to Sugar Land Methodist, where he was revived.

It was 20 minutes from when I started CPR. Judging from the brain damage on the MRIs, it was probably over 30 minutes."

Now 6, Nathan doesn't walk or talk. He breathes on his own, but requires a ventilator. The loss of oxygen to his brain for half an hour resulted in a severe mental deficiency; developmentally, he functions like an infant three to six months old.

But, Nathan's denim blue eyes are animated. At about 50 pounds, he is still light enough for his mother and full-time caretaker to carry—but not for much longer.

Not only must Cheryl Lingenfelter change her son's diapers and manage his feeding

tube and treatments, but she must also negotiate a never-ending cycle of medical appointments. Those trips require a load of essentials—Nathan's wheelchair, extra diapers, medications, breathing gear and a change of clothes. That's all planned and packed before she loads him into her SUV, drives from their Sugar Land home, unloads, hopes he doesn't acquire an illness in the office, reloads and returns home.

But relief has come through friendly medical faces on Cheryl's iPad.

For several months, Nathan has been enrolled in a telemedicine study at the UT Physicians High Risk Children's Clinic.

## Can virtual visits improve care?

Nathan now can be observed and treated at home through a telemedicine app on his mother's tablet.

"It's almost like FaceTime, in a way, where we can see each other and I can move it so I can show them what he's doing," Cheryl said. "It's really helpful, especially when it comes to his breathing issues. They can see exactly what I'm talking about."

Adding virtual home visits grew out of an ongoing effort to improve services offered by the High Risk Children's Clinic, according to medical director Ricardo Mosquera, M.D.

"For the physician, it's nice

because it helps you to determine what to do with the patient," he said. "Sometimes, they call me on the phone and I am not sure if they need to be seen or not. It's a nice tool because I can see with my eyes and determine the next step for them."

Mosquera, a pediatrician and pediatric pulmonologist, has led the clinic since its 2010 founding by faculty at UTHealth's McGovern Medical School. He now has 400 patients.

The medical team is made up of 11 specialists whose collective expertise covers neurology, genetics, infectious disease, gastroenterology, nephrology and physical medicine and rehabilitation—comprehensive care for fragile youngsters with medical complexities.

"I wanted to avoid fragmentation of care for those patients," said Mosquera, an associate professor of pediatrics at McGovern Medical School. "We wanted to put everyone together at the same time and in the same place."

Early on, Mosquera conducted a two-year study examining the medical team approach in the then-outpatient clinic. The results, published in the *Journal of the American Medical Association* (JAMA) in 2014, said this outpatient team strategy cut costs by \$10,000 per child per year and decreased the number of sick children, hospital admissions, intensive care entry and emergency department visits by half. ➡



**Left:** Nathan Lingenfelter, 6, has a virtual medical appointment with pediatrician Ricardo Mosquera, M.D.  
**Right:** Cheryl Lingenfelter holds her son outside their Sugar Land home.



*Cheryl Lingenfelter is the primary caregiver for Nathan, who was brain-damaged after losing consciousness as an infant.*

Now, clinic officials want to determine whether virtual visits can maintain the standard of care where high-risk patients spend most of their time—at home. A Texas Medical Center Health Policy Institute grant provided about \$100,000 to support the clinic's two-year telemedicine study by funding software and data tracking. Many of

the clinic's patients are on mechanical ventilation and require other equipment, Mosquera said, which make in-person visits stressful.

"It's extremely difficult to do home visits all the time, so I said: Let's do telemedicine and take advantage of the technology," he said, adding that he always keeps the overall mission in focus:

"We have to determine if telemedicine is safe for this population."

### Early data appears promising

The research began in September with 365 patients. Half are now using telemedicine and the other half are continuing with their regular clinic appointments.

"We wanted to make sure the technology was good, that we could see the patient well, we did not lose the signal and we wanted to be HIPAA-compliant," Mosquera said, referring to the Health Insurance Portability and Accountability Act of 1996, which requires the privacy and security of patient information.

The first interim data analysis in early March showed promising results.

"So far, we know we are not harming the patients," Mosquera said. "If you prescribe medicine over telemedicine without putting your hand on the patient, [the fear is] maybe you are going to miss something or maybe you're going to create more problems. I don't think that's the case. I think it's going to be good for the patients, but it's important to do the study to demonstrate that to people and to convince the payers in the future that this is a safe way to save money and to improve outcomes in the patients."

### Telemedicine reduces in-person visits

For Cheryl Lingenfelter, telemedicine has been a life-changing and time-saving advantage. Her husband, James Lingenfelter, works as a brass instrument repair technician and professional musician while she home-schools their three older children and cares for Nathan.

"I've always just believed that whatever God brought into my life, he would give me the ability to do," Cheryl said. "I couldn't do this without the High Risk Clinic."

Nathan has been a clinic patient since 2015 after a six-week stay at Children's Memorial Hermann Hospital for respiratory failure.

Telemedicine allows Mosquera to adjust Nathan's breathing supports more often without increasing the frequency of in-person visits.

"With telemedicine, we change his respiratory settings every week," the physician said. "He doesn't have to wait until the next visit with me. I can help him. I can support him better. The main thing with Nathan is that sometimes he doesn't take deep



breaths because his brain doesn't send a signal for him to breathe the right way, so we have to help him with additional machines."

### An emerging access-to-care tool

Thomas Kim, M.D., a leading telehealth crusader in Texas who advocated for changes in the state's telemedicine laws during the last legislative session, said children with special medical needs are among those who can benefit most from this method of health care.

In 2017, Senate Bill 1107 removed rules that required face-to-face consultation between a patient and physician providing a telemedicine service if the physician had never seen the patient. The law also compels insurance plans to cover services delivered via telehealth, so long as the consultation is not simply audio or written—the appointment must involve more than a phone call or text. Most of the act took effect in 2017, with the remaining sections taking effect

on Jan. 1, 2018.

"That is the first step in what I am hoping is a continued journey in making telehealth more accessible and more helpful to the people who need it," said Kim, who is based in Austin. "Telehealth care is health care. Full stop. It is simply a means to delivering actual health care."

A study published in *Health Affairs* in December found that 15.4 percent of physicians worked in practices that used telemedicine for a broad range of patient interactions. Radiology, psychiatry, cardiology, pathology and emergency medicine were among the medical specialties with the highest rate of physician-to-patient telehealth use. The data was derived from the American Medical Association's 2016 Physician Practice Benchmark Survey and provided the first nationally representative estimates of physicians' use of telemedicine.

"Any provider could develop what I call the skill of telehealth," Kim said, "which is to say: How do I leverage technology to help me



When Cheryl Lingenfelter takes Nathan to the doctor, she must also haul his wheelchair, diapers, clothing, leg braces, medications and breathing gear.

do my job better and deliver better care for my patients?"

Kim envisions mobile devices—specifically smartphones—as the health care delivery platform of the future. Receiving telehealth insurance reimbursements at the same rate as in-person visits, he added, is "the next hill to climb."

Mosquera's next challenge is to determine how to make his clinic

more helpful to the parents and other people who take care of his patients.

"I feel really good about this program. We love our patients," he said. "I'm going to keep going. I want to keep doing more. I want to be the best program in the country for children with medical complexities." ■

# Beauty

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# Can This Mouse Help Treat Autism?

New research from Baylor College of Medicine shows promising results

BY ALEXANDRA BECKER





Not only is there no cure for autism spectrum disorder, but there is no one-size-fits-all approach to treatment.

Individuals with autism spectrum disorder (ASD) struggle by varying degrees to communicate and interact with others. Often, they exhibit repetitive behavior and become agitated when a particular routine or ritual is changed. Symptoms can range from severe to mild and many parents choose a combination of behavioral interventions and medication to help control symptoms and associated medical conditions. One in 59 children in the United States is diagnosed with ASD, according to the Centers for Disease Control and Prevention.

Currently, no existing therapies completely mitigate the many manifestations of the disorder, but scientists at Baylor College of Medicine may be close to a truly groundbreaking discovery.

According to a paper published recently in the journal *Neuron*, Mauro Costa-Mattioli, Ph.D., and first author Martina Sgritta, Ph.D., have successfully reversed social deficits associated with ASD in mice through a simple, bacterial-based therapy. The unconventional approach has widespread potential for the development of noninvasive therapies for autism and suggests a future in which the microbiome plays a major role in the treatment of neurological conditions.

### A deeper understanding

Research by Costa-Mattioli and Sgritta showed that the administration of the bacteria species *Lactobacillus reuteri* led to specific changes in the brain that restored social behaviors in their mice models—mice that are bred to have autism. Previous research by this team and others indicated that *Lactobacillus reuteri* increased oxytocin levels in the brain, but had not determined the channel of communication by which the microbe affected the brain.

“In this research, we determined that the vagus nerve and the oxytocin-dopamine reward system were both necessary for the social behaviors to be restored,” explained Sgritta, a postdoctoral associate in the Costa-Mattioli lab at Baylor. “When we cut the vagus nerve, the treatment with the bacteria had no effect. When we prevented the oxytocin to bind to its receptors in the specific brain area involved in social reward, the bacteria was not able to have an effect either. So *L. reuteri* needed both the vagus nerve and the oxytocin receptors to restore the behavior.”

That deeper understanding of the mechanisms involved plays a critical role in analyzing exactly how the bacteria restored social behaviors in the mice models, since increased levels of oxytocin—also known as the “love hormone”—are related to a boost in sociability.

Another key finding of the study relates to the different mouse models the researchers used—each bred for different variations of autism, including genetic, environmental and idiopathic. They discovered that no matter the type, the outcome remained essentially the same.

“The goal of a treatment right now is to ameliorate the life of a person with ASD,” Sgritta said. “What we found was that no matter the origin of the disorder, we were able to correct social behavior through the *Lactobacillus reuteri*.”

The bacterium is already commercially available and considered safe—it is often used to treat colic in infants, said Costa-Mattioli, the Cullen Foundation Endowed Chair of Neuroscience and director of the Memory and Brain Research Center at Baylor.

“There are no secondary effects and there is no toxicity,” he added.

While the new ASD research has only tackled social behaviors thus far, the results could extend beyond their original potential.

“There are three symptoms which define the disorder: social deficit, repetitive behavior and language impairment,” Costa-Mattioli said. “Through this research, we have only reversed one leg of autism in the mice—the social deficit. But the other two legs, we haven’t tested.”

This research comes on the heels of an up-and-coming field of study focused on the gut microbiome, a group of microorganisms in the gut that breaks down food and protects the body from germs. For scientists already well-acquainted with the latest research, which suggests that the gut microbiome plays a key role in everything from regulating the immune system to influencing neurological processes, the connection between a bacteria species and social behavior doesn’t come as a surprise.

“The connection is not shocking,” Costa-Mattioli said. “What is shocking, though, is that we may end up with a particular strain of bacteria as a way to treat this brain disorder. We have trillions of bugs in our guts, and it may be one of these bacterial species that could be used to ameliorate specific symptoms.”

### Looking to the future

The bacterium *Lactobacillus reuteri* originates in the gut and has been found in breast milk. For the study, the researchers boosted its presence by putting it into the water the mice drank on a daily basis.

Interestingly, its prevalence has decreased over the past few decades, especially in highly developed and industrialized countries.

“A colleague of mine at the University of Alberta, Jens Walter, has studied the evolution of this bacteria over the years, and, comparing the gut microbiota of U.S. people and non-industrialized areas, he has discovered that this bacterial strain was not detectable in the gut of westernized human populations, while it was found in the gut of people living in rural communities,” Costa-Mattioli said. “So, perhaps diet, or stress, or all these conditions have eliminated this bacterial strain from our gut. If you go and you look at people here in Houston, you will maybe have a hard time finding this bacterium at all. But if you go to native populations or study the microbiome of people from 50 years ago, the probability that you would find it is higher.”

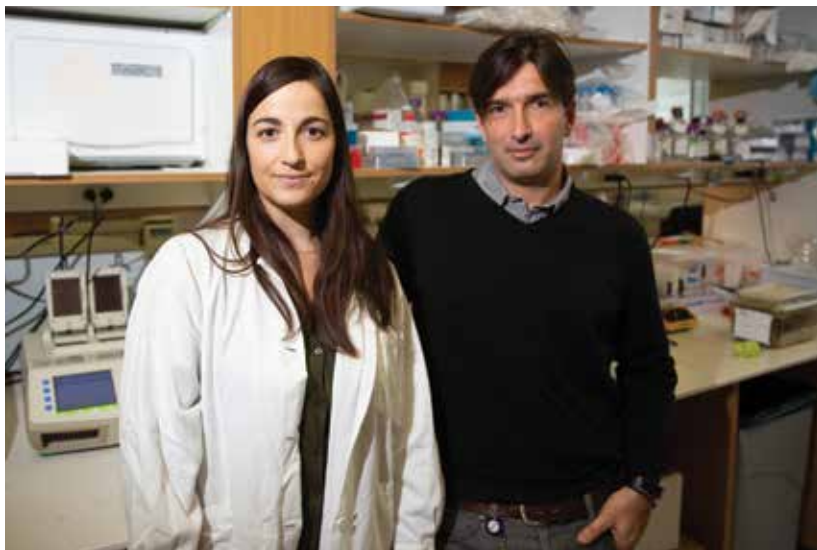
Is it possible, then, that the disappearance of this bacterium correlates with the increase in diagnoses for ASD? In other words, if Costa-Mattioli and Sgritta’s research shows that *Lactobacillus reuteri* can restore a key symptom of autism in mice, could a lack of *Lactobacillus reuteri* be a cause of autism? ➡



**Facing page:** At the Costa-Mattioli lab at Baylor College of Medicine, scientists are studying a potential new therapy for autism spectrum disorder.

**Top right:** Martina Sgritta, Ph.D., is a postdoctoral associate in the lab.





Sgritta and Mauro Costa-Mattioli, Ph.D., the Cullen Foundation Endowed Chair of Neuroscience and director of the Memory and Brain Research Center at Baylor College of Medicine, in the lab.

Costa-Mattioli urges caution in this line of thinking.

“First, we don’t know the answer. But it’s also important to point out that ASD is believed to be caused by many different factors,” he said. “Perhaps a small population of cases of autism could have a pure microbial component, but it goes beyond this. *Lactobacillus reuteri* can be compared to an aspirin. What our study has shown is, despite the reason why the mouse is autistic, the bacterium helps restore social function. There are many reasons why you could have a headache, but it doesn’t matter the reason; when you take an aspirin, it could be effective in treating the headache.”

“ There are three symptoms which define the disorder: social deficit, repetitive behavior and language impairment. Through this research, we have only reversed one leg of autism in the mice—the social deficit. But the other two legs, we haven’t tested. ”

— MAURO COSTA-MATTIOLI, PH.D.

*Cullen Foundation Endowed Chair of Neuroscience and director of the Memory and Brain Research Center at Baylor*

Looking to the future, this non-invasive treatment could someday be offered to humans with ASD, but the researchers stress that more studies, including clinical trials, need to be completed before the treatment could be safely and appropriately administered.

“Be careful when reading this news and all other research—we have to wait for a clinical trial,” Sgritta said. “And don’t self-medicate. These findings need to be studied in humans first.”

Nevertheless, the results are promising, Costa-Mattioli said.

“It is non-invasive and perhaps could someday just be added to yogurt or taken in a pill form or perhaps with water,” he said. “It is still extremely early to envision this, but if this were to be true, I think not only will we have to change the way we think about the disease, but also new treatments.”

Treatments that will, perhaps, offer new hope for the 1 in 59. ■



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# Pediatric Hearing Services Hub to Launch in 2020

*The Center for Hearing and Speech collaborates with Texas Children's Hospital*

BY CINDY GEORGE

A new building planned for the Texas Medical Center will unite The Center for Hearing and Speech with professionals from Texas Children's Hospital under one roof to provide more robust services to thousands more children with hearing loss.

The center's new 42,000-square-foot facility, slated to break ground this year and open in 2020 near State Highway 288 and South MacGregor Way, aims to serve twice as many patients annually than the current campus on West Dallas.

"A lot of our kids have other issues, so they end up going to Texas Children's to get those issues addressed. It would be a lot easier on the families if we could locate closer or in the Texas Medical Center," said Alan L. Smith, The Center for Hearing and Speech's board chairman.

The Houston agency teaches listening, speaking and literacy skills to children with hearing loss. For patients without private insurance or government health coverage, the charge for services is based on a sliding scale determined by household income. In 2018, the nonprofit served more than 8,000 children—from infants to 18-year-olds—through an audiology clinic, a speech-language pathology clinic and The Melinda Webb School, all housed in one facility.

The center employs seven master's-level speech-language pathologists, nine master's-level teachers of the deaf and seven doctorate-level pediatric audiologists.

"If kids can listen well and they develop proper speech, they have a much better chance of reading well," Smith said.

A vital part of expanding services and improving outcomes through the joint venture includes the Texas Children's medical professionals—including ear, nose and throat physicians—who will practice in the new building.

"Joining forces with The Center for Hearing and Speech is a natural fit, as our commitment to treating children with hearing loss is unmatched," Larry Hollier, M.D., surgeon-in-chief at Texas Children's, said in a statement. "We look forward to working together in a highly collaborative manner to enhance the care



**Above:** Students Emma and Giuliana work with their teacher, Diana Dehler, at The Melinda Webb School, part of The Center for Hearing and Speech. **Below:** Student Kira in class.

provided to children across our area."

Smith, president and CEO of Rockcliff Energy, first encountered the center more than a decade ago after his daughter was born premature and deaf.

"Thanks to technology and people introducing us to the center and Texas Children's, she got cochlear implants," he said. "She went to The Center for Hearing and Speech from the time she was about 24 months old until pre-K."

Tiffany Grace Smith, now 11, received auditory verbal therapy and other specialized services. Even with other challenges that aren't hearing-

related, she's on the path to mainstream and higher education opportunities, her father said.

Alan Smith joined the board a few years ago, as leaders were envisioning a new home for the center.

"We want to double the

number of kids we're serving—double the audiology patients, double the speech therapy and double the size of the school," said Smith, who became board chairman in May 2017. "We thought it was important for us to remain neutral and not become a part of a hospital, to continue to have the compassionate care that we exhibited toward our clients and patients and to keep the audiology and the speech and the school all under one roof—that's our secret sauce."

Co-locating with Texas Children's professionals emerged as the right option to meet those goals.

Already, the center's \$22.5 million capital campaign has raised \$7.5 million. Smith said the nonprofit plans to split the proceeds of the building sale with its co-occupant, The Harris Center. After vacating the structure this summer and factoring the cost of a temporary location, leaders estimate adding another \$10 million to the fund.

"By June, we will have at least \$17.5 million, so we'll have \$5 million or less to go," Smith said.

Founded as the Houston School for Deaf Children seven decades ago, The Center for Hearing and Speech is the most comprehensive resource for pediatric hearing loss in Texas and the region's only facility offering audiology, speech pathology and spoken language education at a single site. ■





**LEE EHMKE** is the president and CEO of the Houston Zoo, which welcomes approximately 2.5 million visitors annually. He arrived in Houston in 2015 after leading the Minnesota Zoo and, before that, working for 12 years at the Bronx Zoo in New York. Ehmke spoke with *TMC Pulse* as the zoo was finalizing its Texas Wetlands exhibit, part of a major transformation in which half of the zoo will be redeveloped by its 100th anniversary in 2022.

**Q | From what I've read about you, you seem like you're doing exactly what you've wanted to do since you were a kid.**

**A |** I think that's absolutely accurate. There were a couple of detours along the way. But for as long as I can remember, I've loved animals and was interested in learning about them and going to zoos. My earliest memory in life was actually going to the zoo in Fresno, California and seeing a rhino. I was just instantly fascinated by zoos. I read every book I could find on zoos. I had supportive parents. We'd go on cross country trips all summer long to national parks and zoos in a VW van.

**Q | You started your career as a lawyer and quickly pivoted to designing zoo exhibits. Why the change?**

**A |** I was doing environmental law, which was mostly about trying to stop bad things from happening. It was rewarding, but I saw what was starting to happen in zoos. In the 1980s and 1990s, there was a movement in the zoo world to create new, natural habitats, and there was a new focus on conservation and conservation education. That was an interest of mine, and I knew there were people who did this for a living. That was the trigger for me to go back and study landscape architecture.

**Q | Zoo exhibit design is a pretty niche field to study.**

**A |** It is, and it was especially small at the time. None of the professors I studied with knew much about zoo design. There were probably 100 people in the world doing it, if that. I networked a lot. I met everyone who was doing the kind of work that inspired me. Before I even graduated from my master's program I was offered a job at the Bronx Zoo doing exhibit design. I finished the program, drove across the country and never looked back.

**Q | I read a book that described your approach to zoo exhibits as "sensitive and imaginative." What does that mean?**

**A |** When you're designing exhibits in a zoo, you are really thinking about three different user groups and their needs, which aren't necessarily the same. First and foremost are the animals. But you're also creating spaces for guests to appreciate the animals, as well as spaces for the people who care for the animals. It's about finding the happy medium between all three of those sets of clients.

It's also really important that all the animals be seen in the context of their natural environment. Animals taken out of that context become caricatures. People should understand that if you want these animals to survive, you need to have

the environments that support them. That's the implicit message of these natural habitat exhibits. Even if people don't read a word at the zoo, they're hopefully getting a sense of that.

**Q | It used to be that zoos grouped animals by species, but now they're increasingly grouped by habitat. Why are zoos making that change?**

**A |** That's certainly one direction zoos have taken, and we're doing that here. It's moving away from what's called "taxonomic exhibitry," which is basically an encyclopedia-style or museum-style way of showing lots of similar animals together. That's interesting, but in terms of teaching the things that are really important for people to understand—the interconnections of animals with the world, including their environment, plants,







geology and water systems—it's easier and more compelling to show it a different way.

**Q | You have several projects in the works, and half the zoo is being redeveloped. What's on the horizon?**

**A |** We really want this zoo to embody the idea that a zoo is about saving animals in the wild. For our new exhibits, we've chosen places and animals that we're already committed to helping in the wild. In some cases, we're expanding our field conservation efforts to relate to the animals in the zoo. That becomes the storyline we're trying to convey to people.

As part of our capital campaign we launched publicly about a year ago, the first project coming along is the Texas Wetlands. We're hoping for a public opening Memorial Day weekend. We picked

three species to focus on that were, at one point or another, on their way out: the American alligator, the bald eagle and the whooping crane. All of them are in different stages of recovery. We're trying to inspire people and show them that when people care enough, good things can happen.

**Q | What else is on the way?**

**A |** The next exhibit is called South America's Pantanal. It's the world's largest inland wetland, located mostly in Brazil. It has jaguars, capybaras, tapirs, anacondas and hundreds of species of birds. We have a longstanding series of programs we've been supporting down there. We're expanding our support of that and using that as the storyline of the exhibit. That will open in 2020.

A third project that's a little smaller is reconfiguring our bird exhibits to be more focused on

the conservation work we're doing with our bird collection. That will free up some space and allow us to build the signature project of the whole campaign, which will have a Galapagos Islands theme. As soon as you come in the front of the zoo, you'll see sea lions in an edge-of-the-ocean habitat, with lava cliffs and desert landscape down to the water. There will be wave action and loud, barking sea lions. Then you'll go into a series of exhibits that show different environments that are similar to the Galapagos Islands, featuring things like giant tortoises and iguanas, and underwater exhibits with sharks and rays. ➡



**Q | How do you see the zoo fitting in with Hermann Park and the medical center?**

**A |** In Hermann Park's master plan, one of the issues they're trying to address is the congestion and parking challenges we all share. One of the solutions would be to look at some space that's park land on the other side of Cambridge Street and do a pedestrian overpass into the park that would lead people to the west side of the zoo. When that happens, we could rethink the west entry, and that would become more of a main gate as opposed to a secondary gate, which it is now.

The whole edge of the zoo along Cambridge is something we'd like to make more inviting. Cambridge Street can be viewed as a barrier. The zoo is really, really close [to the medical center]. We'd love for people in the area to take advantage of it even more than they currently do. We're a great refuge for the patients and families using the medical center. Every day you can see people who've maybe had a tough time, and coming to the zoo is such a great outlet. The proximity allows that to happen.

“... we're a great refuge for the patients and families using the medical center. Every day you can see people who've maybe had a tough time, and coming to the zoo is such a great outlet. The proximity allows that to happen.”

**Q | What international work has the Houston Zoo been doing lately?**

**A |** I just got back from Rwanda. I got to meet with several of our partners over there on gorilla conservation issues. We've been supporting a group in Rwanda, called the Gorilla Doctors, who are veterinarians helping to take care of the wild gorillas in national parks in Africa.

Some zoos hire a lot of scientists to become the field arm of the zoo. We tend to look for people in those countries already, who are doing good

work, and find ways to support them. In some ways, that support is financial, but other times it's about setting up a website or a business plan or PR efforts. We use all the expertise of our staff. It's not just the biologists.

**Q | Are there any animals the Houston Zoo is lacking that you'd love to have?**

**A |** I think hippos are pretty awesome. We hear that from the guests, too. We used to have a hippo, probably more than 20 years ago. But, like many animals 20 or 30 years ago, it wasn't housed in a way that was appropriate, to be honest. Hippos are a challenge because in the wild they live in big herds. They're not solitary animals. And although everyone thinks of hippos being underwater, the other half of their life is spent grazing. At night, they go miles from the water and eat grass, and that's what their primary food is. How do you do a hippo exhibit that really shows the full range of their behavior in a 55-acre zoo?

**Q | There's a close connection between the zoo and the Texas Medical Center.**



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Medical experts here provide treatment to the animals and patients often visit with the animals. How important is that relationship?

**A |** It's a pretty unique relationship. We've worked with Baylor College of Medicine on a partnership on the elephant herpes virus, which is a major problem for elephants in zoos and somewhat in the wild. We're now at the point that we can treat outbreaks when they do happen, which wasn't possible five or six years ago.

Our ZooMobile program takes animals and educators into the community. It's spent some time at Ben Taub Hospital and several of the children's hospitals to bring the zoo to people who can't come to the zoo. It can be uplifting.

**Q |** The Houston Zoo is competing with social media and streaming services for people's leisure time, yet attendance is still strong. Why do you think interest in the zoo remains robust?

**A |** It's a real encounter. You're looking into the eyes of another living being. I've tried VR goggles, and they're kind of cool, but it just doesn't



Credit: Courtesy of Houston Zoo

A new Texas Wetlands exhibit at the Houston Zoo, shown above in a rendering, will open later this year.

compare with reality. Sure, we're looking at how to use technology to augment and extend the zoo experience. But the reason people come is that connection with other living things.

**Q |** You're 61. What do you want people to say about your impact on this zoo, or maybe the field as a whole, at your retirement party?

**A |** I want people to acknowledge the amazing team of people at the zoo who are super talented and dedicated to what we do here. I want people to know that, as a group, we've delivered on this idea

that the zoo saves animals in the wild. It's more than 450 incredible people here, plus our board, the community and our partners all over the world. I want people to see what a group of very committed people can get done.

I don't think I've ever been in a community that so universally loves the zoo in their city. They love it, in part, because of their memories. But I also hear constantly: "It's improved so much." And that will only increase. ■

Lee Ehmke was interviewed by TMC Communications Director Ryan Holeywell. The conversation was edited for clarity and length.

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# Maternal ICU Opens at Texas Children's Hospital

*New unit offers four beds for mothers in need of critical care*

BY ALEXANDRA BECKER

Earlier this year, Jacqueline Elizondo was diagnosed with the flu. She was 35 weeks pregnant. By the fourth day of her illness, she could barely move and her breathing had grown labored and painful. She called her doctor, who sent her to Texas Children's Pavilion for Women to get a lung X-ray. As Elizondo watched the worried technicians conferring with nurses, she could tell something was terribly wrong. Almost immediately, she was admitted to the hospital. Technicians could barely find a vein for her IV because she was so dehydrated. Soon, a nurse took her hand and told her she would be going to a brand-new unit, one created especially for pregnant women in need of critical care.

In her room with shiny, state-of-the-art equipment, Elizondo found herself surrounded by "an army of doctors." They tried breathing treatments, to no avail. Finally, they explained that she would be undergoing an emergency C-section—that in order for her to get better, she needed to first have her baby.

That army soon delivered a healthy little boy. A week later, after recovering from bacterial pneumonia and sepsis in that very same room, Elizondo finally took him home.

Her life was saved in an intensive care unit (ICU) unlike any other in Texas.

## Dedicated space

Located in the labor and delivery unit of Texas Children's Pavilion for Women, the new four-bed maternal intensive care unit opened in January. Dedicated to obstetric (OB) intensive care, the unit offers a specialized, private space for high-risk expectant and postpartum mothers. Staffed 24/7 by a pulmonary critical care team, a maternal-



**Above:** Jacqueline Elizondo, who was a patient in the new maternal ICU at Texas Children's Pavilion for Women, holds her son, Atlas. **Facing page:** Lynda Tyer-Viola, Ph.D., vice president of Women's Services and Professional Development and Research at Texas Children's Pavilion for Women, and David Muigai, MBChB, medical director for the maternal ICU, stand in the new unit.

fetal specialist team and nurses certified in intensive care and advanced cardiovascular life support, the space has all the capabilities of a typical ICU as well as the most advanced obstetric equipment and fetal monitoring systems.

The new unit accommodates women who have been diagnosed

with certain high-risk pregnancies or severe postpartum complications, including placenta accreta, sepsis, cancer, congenital heart defects or hypertensive disorders. Although Texas Children's Hospital has been offering these services since opening the Pavilion in 2012, this is the first time dedicated space has been set

aside for these clinical cases.

"Even in most advanced academic centers, pregnant patients are usually placed with a general adult ICU population, and then they call in the OB doctors to help them manage, but there are very few standalone OB critical care units that are dedicated just to taking care of mom and baby," explained David Muigai, MBChB, an intensivist trained in both pulmonary and critical care medicine who serves as the medical director for the maternal ICU.

Placing a pregnant or postpartum woman in a traditional ICU can be problematic if the care team is not familiar with the nuances and complications associated with obstetrics.

"Women during pregnancy have varied, unique changes to their physiology related to how the heart works, how it pumps, the amount of blood volume they have in their body, when that volume will shift—you need to know obstetrics and you need to know intensive care," said Lynda Tyer-Viola, Ph.D., vice president of Women's Services and Professional Development and Research at Texas Children's Pavilion for Women.

"We see the sickest of the sick, and I think having that comprehensive team of experts right here makes a huge difference in timing and in implementing life-sustaining therapies," added Liz Bolds, one of the nurse specialists staffing the new unit.

Although the focus is on highly specialized clinical care, the hospital also wants the maternal ICU to be a place for families.

"We expect and encourage families to stay with the patients," Tyer-Viola said.

Already, the team has observed benefits to carving out this dedicated



space for their sickest patients.

"We had a patient who came in with very severe cardiogenic shock, who ordinarily ... we would not have managed to harness all the monitoring or the degree of monitoring that we wanted to do easily. But because of this unit, we were easily able to hook her up to all the hemodynamic monitoring that was needed," Muigai said.

Cardiologists also seem to feel more comfortable in the room because it looks and feels like an ICU.

"Before, people would walk into the labor and delivery unit and they were bumping into moms and dads who just had a baby, so they were very happy and walking up and down the hallway," Muigai said. "In the middle of all that there is this really sick woman in this room, and sometimes it didn't have the same gravitas. I think having this location and having these services here, you can tell they are feeling the depth, the gravity of the issue, as they come in through the doors."

### Maternal mortality rates

The United States is under intense scrutiny for alarmingly high maternal mortality rates, with Texas ranking especially poorly when it comes to mothers dying from causes related to pregnancy or childbirth. More than 60 percent of maternal deaths are preventable, according to some estimates.

"Too many moms are dying unnecessarily from avoidable, critical conditions," Muigai said. "When moms first present to health care workers with acute or critical maternal conditions, a lot of times health care workers are not equipped, either with the knowledge or familiarity or the infrastructure, to deal with those conditions."

Part of the problem is that there has been a shift away from investing in maternal care.

"Community hospitals are actually moving away from caring for pregnant moms and obstetric care in general, so that now obstetric care tends to be centered in large cities or academic hospitals," Muigai said. "You can't really impact maternal mortality if you don't provide the

regional centers with somewhere that they can send their very sick moms. And that's where we come in."

The need for specialized services is so critical that in 2013, the Texas Legislature passed the maternal levels of care designation law, requiring designation for all maternal care facilities in the state by their ability to provide certain levels of care. Under the new rule, effective March 2018, designation will become an eligibility requirement for Medicaid reimbursement beginning Sept. 1, 2020.

Facilities will be ranked Level I through IV, with Level I being basic care and Level IV being fully comprehensive care. Texas Children's Pavilion for Women has already completed their survey for Level IV designation and is awaiting the results. The facility participated in the pilot for maternal levels of care in August, Tyer-Viola said.

"The standard for ICU maternal care is that the nursing and medical staff must be trained in high-risk OB care. Level IV designation asks for evidence that you have training on perinatal high-risk conditions for your ICU staff. ... It also states that you have to have the ability to do fetal monitoring in the ICU setting," Tyer-Viola said, adding that while most hospitals seeking the highest designation will partner with their adult medicine ICU settings, the Texas Children's maternal ICU took a unique approach in ensuring their ICU nurses are all perinatal nurses, as well.

For fetal monitoring, most adult ICUs will bring a stand-alone fetal monitor to the bedside that the perinatal team will read, Tyer-Viola said. But the Pavilion for Women's new maternal ICU rooms are linked to a central fetal monitoring system and analytics system, to ensure those patients receive the same oversight



and surveillance as any laboring patient.

The Pavilion for Women is also part of the TexasAIM initiative,

a collaboration between the Texas Department of State Health Services, the Alliance for Innovation on Maternal Health (AIM) and the Texas Hospital Association to help hospitals and clinics carry out maternal safety projects through implementing best-practices. The Pavilion for Women is sharing all of its data as well as its processes and procedures.

"We have a maternal early warning system—triggers—so it doesn't matter who the patient is, once they reach a certain point in their

blood pressure, or their pulse, their pain management, warning signs around sepsis—we activate a system that a provider goes immediately to the bedside with two specialized nurses," Tyer-Viola said.

A host of protocols help treat patients quickly and effectively.

"We've been perfecting it, and we've been able to drive down our OB adverse events, and, we believe by sharing that through TexasAIM and the talent and tenacity that we have here, that we're going to influence the maternal mortality rate," Tyer-Viola said.

Today, Elizondo stays home with her weeks-old boy, an easy baby who "eats like a champ." Her lungs have yet to completely heal, but she and her son are both healthy.

"You can't claim to be taking care of children holistically if you're not also taking care of their moms," Muigai said. "I think that is really something that is precious and is unique." ■



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# New Frontiers for Physicianeers

*Physician-engineers are poised to transform health care*

BY SHANLEY PIERCE

Medical students traditionally spend four grueling years memorizing by rote thousands of features of the human anatomy, seemingly endless biochemical pathways and scores of pathologies. They're trained to diagnose medical diseases and prescribe courses of treatment using existing technology and therapeutics. Very rarely do they engineer new devices or technologies to treat their patients.

Medicine and engineering have long been taught in separate silos, but the rapid growth of wearable technologies, biomedical devices and digital health—born from the convergence of these two fields—necessitates integrated training.

"Engineers are trained to be problem solvers, and medicine is full of problems," said Roderic I. Pettigrew, M.D., Ph.D.

Enter the physician-engineer, or "physicianeer."

This summer, 25 students will matriculate in Texas A&M University's inaugural Engineering Medicine program, EnMed for short, to earn both an M.D. and an M.S. in engineering.

EnMed is a joint project of Texas A&M's College of Engineering, its College of Medicine and Houston Methodist Hospital that integrates the medical school curriculum with engineering and entrepreneurship.

Texas A&M tapped Pettigrew to helm EnMed as executive dean.

"The convergence of the life sciences and the quantitative sciences and engineering has been gaining momentum over the last decade and a half, recognizing that this is the most logical and promising way to solve some of our greatest health care challenges," he said. "If we're going to try to tackle our biggest health care problems, we would have to have an approach based on this convergence."

Texas A&M is one of a handful of universities across the country—including Duke, Columbia, Dartmouth, Stanford and the University of Minnesota—that have established dual-degree programs.

"It became very clear that we already have a world-class engineering college and we have a health sciences center," said Carrie L. Byington, M.D., dean of the Texas A&M College of Medicine and vice chancellor for health services at the Texas A&M University System. "If we were able to pair those together, we could really become leaders in the nation in an emerging field."

As an engineering-based medical school, EnMed requires all students to have completed their undergraduate degree in engineering (electrical, mechanical, material science, etc.) or computer science. Students will begin their dual-degree program with a three-week engineering boot camp and then four years of medical school integrated with engineering and mathematics—all in Houston.

"We wanted to integrate it every day throughout the week, so the engineering side of their brain could begin to think about medical problems," said Timothy B. Boone, M.D., Ph.D., co-director of the Institute for Academic Medicine at

Houston Methodist and associate dean of the Houston campus for Texas A&M College of Medicine. "The way [engineers] are taught to think through a problem is so different than the way [doctors] think through medicine."

EnMed's physicianeers will be trained to serve a dual purpose: to diagnose medical problems and to develop new, creative solutions and treatments with an engineering mindset. In order to graduate, students are required to invent something innovative yet clinically meaningful in areas including diagnostic tools, nanotechnology, biomaterials, telemedicine and more. Students must demonstrate that they can identify a problem, develop a workable solution and create a prototype for testing.

"The kind of person we plan to train represents a new mind—different from the traditional medical mind, different from the traditional engineering mind, different from a physician who subsequently learns engineering, different from the engineer who subsequently learns medicine," Pettigrew said. "It is a new kind of brain that we really don't have now, not in any substantial degree. We don't have individuals who have been trained this way, to have this blended understanding. From this new mind, we can imagine that people will be better equipped to not only recognize problems, but have bright ideas, imaginative approaches, innovative approaches, to solving these problems and challenges."

## Interest in integrating

For Pettigrew, becoming a physicianeer has been a lifelong goal. He started with a B.S. in physics from Morehouse College, earning his M.S. degree in nuclear science and engineering from Rensselaer



Roderic Pettigrew, M.D., Ph.D.

Credit: © Rhoda Baer







Polytechnic Institute in 1973 and Ph.D. in applied radiation physics from the Massachusetts Institute of Technology (MIT) in 1977. Throughout his years in academia, Pettigrew harbored a deep interest in integrating his physics background with medicine. He researched the application of boron-neutron capture therapy for malignant brain tumors while at MIT and subsequently earned his M.D. from the University of Miami's Leonard M. Miller School of Medicine.

Pettigrew became the first director of the National Institutes of Health's National Institute of Biomedical Imaging and Bioengineering (NIBIB), an agency founded in 2002 and charged with improving health by leading the development and accelerating the application of biomedical technologies.

He admitted that he came "relatively close" to becoming the type of physician-engineer EnMed will train, but learning engineering and medicine separately isn't the same.

"I wish that I had been learning the life sciences to the same degree at the time that I was learning physics and engineering ... so I could understand the natural interplay ... of all of these disciplines," Pettigrew said. "If I'd gotten it from the beginning, I think right out of school the fountain spring of ideas of how to approach problems would have been much greater and much quicker. I think this would accelerate the production of successful creators and innovators and more effective and efficient solutions." ➡

*Left: Kevin Roark, a mechanical engineering student, works in the Zachary Engineering Center at Texas A&M University in College Station, Texas.*



## Bilinguality

While companies have developed a plethora of devices and technologies to solve health care problems, there remains a disconnect between these devices and their real-life applications.

"I had an engineered product years ago for incontinence, but it was uncomfortable and difficult to insert and remove," Boone recalled. "It worked mechanically, but it didn't fit the human body. It was just too obtrusive and certainly too painful to place and remove, I remember thinking, and this was 20 years ago. The idea was right, but the execution was completely wrong."

Translating a new piece of technology into the clinical or surgical setting isn't an exact science. Because medicine and engineering have traditionally been taught separately, there hasn't been a lot of cross talk between the two fields. Doctors have their medical-speak and engineers have their own jargon. It's easy to see how important information could get lost in

translation when two groups of people don't speak the same language.

EnMed aims to eliminate that communication barrier and train students to be bilingual in medicine and engineering.

Byington, a Mexican-American who was raised on the southern border of Texas and grew up speaking English and Spanish, knows the importance of dualities all too well. Her upbringing informed the way she views the world and medicine, motivating her to practice two specialties: general pediatrics and infectious diseases.

"Sometimes disciplines don't work well together because translation can be very difficult," she said. "The people that we are bringing will be those translators. They will be able to speak both languages. ... We need health care professionals who are experts in technology and who can translate, if you will, to engineers and others the needs of patients."

## A bigger footprint

The EnMed program will be

housed in Houston on the sixth floor of Houston Methodist's West Pavilion and at the Texas A&M Health Science Center's Institute of Biosciences and Technology.

In 2017, Texas A&M purchased an 18-story tower and a 2-story low-rise building at 1020 Holcombe Blvd., in the Texas Medical Center. After renovations, the building will support the pre-clerkship education of EnMed students and be outfitted with classrooms, a multidisciplinary teaching lab and standardized patient/simulation space, as well as a maker space equipped with specialized equipment for students to create new devices and technology.

EnMed will expand Texas A&M's presence in the world's largest medical center, Byington said.

"When you look at the ecosystem of the Texas Medical Center, by being able to bring in engineering and biotechnology, we are filling a new niche. We are adding something new and innovative to an already thriving clinical environment," she said. "We are going to

see so many inventions come out of this program. It's going to change the way that we deliver health care. The first patients that are going to benefit from it will be the patients of the Texas Medical Center."

The first class of students will graduate in 2023. Although Pettigrew said he is "not so idealistic to think that each one of these physicianeers will solve every problem in health care," he believes EnMed will prepare them for more "eureka moments."

"We're creating the fertile environment and the education that is likely to give rise to this fruit, so it's very difficult to predict what these [students] will come up with," Pettigrew said. "But we can look at history and get some idea, and see that when you take bright, imaginative minds, who have boundless creativity, who have limitless imagination, who have the potential for unbridled innovation, and give them the tools to do all of those things, it's beyond our imagination to really know." ■



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# CURATED

The Intersection of ARTS and MEDICINE

By Britni R. McAshan



Anita Kruse, founder of Purple Songs Can Fly, helps patient Jeshua Varela record his song at Texas Children's Hospital.

It's a typical Monday morning for Jeshua Varela, 12, a patient at Texas Children's Hospital. For the past few months, he and his parents have been trekking from their home in Katy to Texas Children's main campus once a week for a marathon of appointments and an intensive round of chemotherapy.

But on this visit, there is a bright spot for Jeshua. In the middle of his long day of treatment, he will get a chance to record one of his own songs in the Purple Songs Can Fly recording studio, housed in the Texas Children's Cancer and Hematology Centers.

"Sometimes I come here and just make up a song. Sometimes I think about it before and, occasionally, I think about songs in my sleep," Jeshua said.

Anita Kruse founded Purple Songs Can Fly in 2006.

"I've been obsessed with purple since I was a little girl ... but also purple has a lot of symbolism," said Kruse, who dreamed of creating a recording studio for patients ever since she began performing at Texas Children's as a visiting musician. "Purple is the combination of the two ends of the visible spectrum, red and blue. ... That is part of the

creative process when you blend two things and make something new."

After attending a 9/11 benefit concert, Kruse decided she wanted her songs to fly, as well.

"When I had the idea for Purple Songs Can Fly, I was thinking these songs can rise above illness and not necessarily literally flying," she said. As it turns out, though, recordings from the studio have flown on the space shuttle and to more than 50 countries.

As part of the program, young patients work with Kruse and other professional composers to write their own songs, which are recorded in the studio and then shared with family and friends.

When the program started, Kruse wasn't recording with patients in the gleaming purple studio she has today. Back then, she pushed a cart carrying all of the recording equipment to patients in their rooms.

Patients and their siblings, cousins or best friends can write and sing about anything they like. Topics for songs have ranged from lady bugs and Hot Pockets to what it feels like to go through chemotherapy.

"I think the process of creating something in this medium has a positive effect just because of what it is," Kruse said. "They are using their imaginations, bringing elements of music and an experience of recording that a lot of them have never had."

Kruse is not a music therapist and Purple

Songs Can Fly is not a music therapy program offered by Texas Children's—it's an enrichment activity in which children are invited to participate. With 13 years at the hospital and 2,300 songs recorded by patients, Kruse knows the program can lift flagging spirits.

It has certainly helped Jeshua.

Since he was diagnosed with acute promyelocytic leukemia in August 2018, Jeshua's life has been turned upside down. He can no longer attend school with his friends, but he has become a regular in the recording studio, always bringing his teddy bear, Osito—Spanish for "little bear"—with him.

"Coming in here to sing helps me forget that I'm even sick," Jeshua said. "I like coming in here to take my mind off of treatment."

Last year, Purple Songs Can Fly released a documentary titled "Journey to Hope," featuring six pediatric cancer survivors. The film, which was made in partnership with Texas Children's Hospital and in association with Side Yard Productions, has won 25 awards and been selected for more than 40 film festivals. On April 7 at 3 p.m., "Journey to Hope" will be screened at Memorial City Mall Cinemark Theatres, 310 Memorial City Way. ■

▶ VISIT [TMCNEWS.ORG](http://TMCNEWS.ORG) TO WATCH A VIDEO FEATURING PURPLE SONGS CAN FLY.

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# Innovation 2.0

*The TMC Innovation Institute begins a new chapter with a new leader*

BY RYAN HOLEYWELL



Thomas Luby, Ph.D., is the new director of the TMC Innovation Institute.

Thomas Luby, Ph.D., seemed destined for a career in health care. As the son of pharmacists, Luby practically grew up in the back of the New York pharmacy his family owned. He studied biology as an undergraduate, but things didn't go exactly as he planned.

Originally, he hoped to become a high school biology teacher. "Then

I realized I liked working in the lab way too much," Luby said.

Instead, he earned a doctorate in immunology from Tufts University and spent the rest of his career on the cutting edge of the pharmaceutical and medical device sector. Now, he's bringing that expertise to his new role as director of the TMC Innovation Institute, the

Texas Medical Center's effort to support the development of breakthrough medical technologies. It's a role he sees as critical—not just to the future of Houston, but to the future of medicine.

"I don't think big corporations will be the innovators," Luby said. "Startups are the ones who find the solutions that eventually benefit patients."

Luby comes to the TMC Innovation Institute from his office just down the hallway where, since 2017, he's led JLABS @ TMC, the Johnson & Johnson Innovation incubator housed at the Texas Medical Center. JLABS @ TMC, the largest JLABS facility in the United States, provides startups with the infrastructure they need to build and test state-of-the-art medical technology.

Luby never expected to be a major force in the innovation efforts of America's fourth-largest city. During a lengthy career in research and development and business development with Boston-area biotech startups, Luby never visited Houston, except for airport layovers. But he says he is embracing his role helping to develop Houston's startup ecosystem.

"My role at JLABS has allowed me to see the commitment and investment that TMC is making," Luby said. "If you're a startup health care company, you have a better chance of being successful if you're here in Houston."

Luby takes the reins of the TMC Innovation Institute at a time of rapid expansion. The institute now includes the TMCx accelerator—currently in the midst of its eighth cohort of startup companies—along with JLABS, Johnson & Johnson's Center for Device Innovation, the AT&T Foundry for Connected Health, the TMCx+ incubator and coworking space, the TMC Venture Fund and the soon-to-launch TMCxi space.

"We've benefited from the work that's already been done, building these programs up from scratch," Luby said. "Now is the time to pull it all together."

A top priority for Luby will be

working with startups and corporate partners to provide them with a "seamless, integrated experience" as they interact with the multiple components of the TMC Innovation Institute. "We're going to create an experience where, when a startup walks through the door, we'll be able to help them get to the place they need to be," Luby said. "It will be service and an experience they'll see nowhere else in the world." And, he said, the TMC Innovation Institute will work not just with companies, but also with individuals who have bold ideas and are seeking help starting up new businesses.

"Tom Luby is an outstanding individual and his proven track record working with startups in Boston and within the walls of JLABS @ TMC will serve him well as he leads us through the next evolutionary phase of the TMC Innovation Institute," said William McKeon, president and CEO of the Texas Medical Center.

Luby is joined by Lance Black, M.D., who recently became the associate director of the TMC Innovation Institute. Black, who also has an engineering degree and served in the U.S. Air Force, has spent the past two years as the Institute's medical device lead, working with companies that went through the TMCx accelerator.

"We're getting higher quality startups coming through the program," Black said. "We're getting more traction with TMC member institutions. Advisors and international partners are interested in what we're doing. Things are really happening here."

Luby's long-term goal is to see more startup capital invested in early-stage companies in Houston. And he believes it's critical that more major health care companies establish significant footprints in Houston.

"We're proud of the community of startups in the medical device world we've helped to build," Luby said. "Houston is now really being seen as a place to be." ■

**1** | Deborah Martinez reacts to her results on Match Day. On March 15, students from **UTHEALTH'S McGOVERN MEDICAL SCHOOL, BAYLOR COLLEGE OF MEDICINE** and **THE UNIVERSITY OF TEXAS MEDICAL BRANCH AT GALVESTON** found out where they would train for their residencies.

**2** | **CHUCK STOKES**, the president and CEO of Memorial Hermann Health System, announced in March that he will retire at the end of 2019. He began his career more than 40 years ago as an orderly in a Mississippi hospital. Soon after, he became a registered nurse. The Memorial Hermann Health System Board will conduct a national search for Stokes' replacement.

**3** | **HSIAO-TUAN CHAO, M.D., PH.D.**, assistant professor of pediatrics and molecular and human genetics, faculty at the Jan and Dan Duncan Neurological Research Institute, and associate program director of the basic neuroscience pathway in pediatric neurology at Baylor College of Medicine, has been named the newest McNair Scholar at Baylor.

**4** | **EMILY SEDGWICK, M.D.**, who recently became the chief medical officer at HCA Houston Healthcare West, was honored with the Press Ganey Physician of the Year Award in her former role as an associate professor of radiology at Baylor College of Medicine.

**5** | **MAURO FERRARI, PH.D.**, has joined the administration at the University of St. Thomas part time as Executive Vice President of Strategic Initiatives and Community Partnerships. Ferrari was previously Chief Commercialization Officer and Executive Vice President of Houston Methodist Research Institute.

**6** | **FELICIA SKELTON-DUDLEY, M.D.**, assistant professor of physical medicine and rehabilitation at Baylor College of Medicine and investigator at the Center for Innovations in Quality, Effectiveness and Safety at the Michael E. DeBakey VA Medical Center, is one of Baylor's 2019 Women of Excellence Award recipients.

**7** | Mayor Turner declared March as Colorectal Cancer Awareness Month in Houston at a news conference at the **JOHN P. McGOVERN TEXAS MEDICAL CENTER COMMONS**, where attendees were encouraged to walk through a 20-foot long inflatable colon. The American Cancer Society recommends screening for colon and rectal cancer begin at age 45.



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Credit: Nos. 3, 4, 5, 6, 10, 11, 14, 15 courtesy photos; No. 9, John R Lewis Photography; No. 13, Dwight C. Andrews, UTHealth





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**8 | SARA SMOLLEY**, cofounder of Voiceitt, which makes automatic speech recognition technology, pitched her digital device at the **TMC EXPERT FORUM** in the Texas Medical Center Innovation Institute.

**9 | LESTER SMITH**, a Houston oilman, philanthropist and ballroom dancer, died March 14. A two-time cancer survivor and a double-lung transplant recipient, Smith and his wife, Sue, have supported several Texas Medical Center institutions, including Texas Children's Hospital, Baylor College of Medicine and Harris Health System.

**10 |** Author Diane Gonzales Bertrand poses with her books at the launch of a new partnership between **RONALD McDONALD HOUSE HOUSTON** and Arte Público Press. The partnership will bring bilingual English and Spanish language children's books to Ronald McDonald House Houston's houses and family rooms.

**11 | DICK KUO, M.D.**, professor of emergency medicine, has been named chair of the Henry J.N. Taub Department of Emergency Medicine at Baylor College of Medicine.

**12 | PATRICIA DARNAUER** is the new executive vice president and administrator of Harris Health System's Lyndon B. Johnson Hospital, a Level III trauma center.

**13 | CESAR A. ARIAS, M.D., PH.D.**, professor of infectious diseases and director of the Center for Antimicrobial Resistance and Microbial Genomics at McGovern Medical School at UTHealth, has been elected to The American Academy of Microbiology.

**14 | HELEN HESLOP, M.D.**, director of the Center for Cell and Gene Therapy at Baylor College of Medicine, Houston Methodist Hospital and Texas Children's Hospital, was recognized with the American Society for Blood and Marrow Transplantation Lifetime Achievement Award.

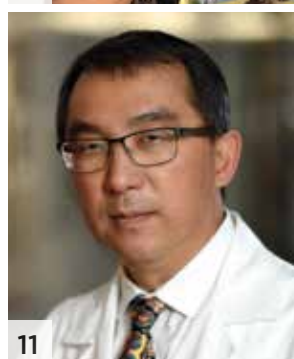
**15 |** Women in the Texas Medical Center community attended the launch of Healthy Women Houston, formed to address maternal mortality and morbidity specifically in high risk communities in Harris County. The initiative brings together key health care and social support providers, including the **MEMORIAL HERMANN HEALTH SYSTEM**, to create a new system of care for women.



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Do you have TMC photos you would like to share with *Pulse*?  
Submit high-resolution images to: [news@tmc.edu](mailto:news@tmc.edu)

# April 2019

## 4/7

### **"Journey to Hope"**

Documentary about *Purple Songs Can Fly*, a music program housed at Texas Children's Hospital, screened as part of WorldFest-Houston

Sunday, 3 – 5 p.m.

Memorial City Mall Cinemark Theatres

310 Memorial City Way

Tickets are \$7.50 and can be purchased through [worldfest.org](http://worldfest.org)

[anita@purplesongscanfly.org](mailto:anita@purplesongscanfly.org)

## 4/15

### **Transplant Caregivers Support Group**

Hosted by The Living Bank and Nora's Home

Monday, 6 – 7 p.m.

Nora's Home

8300 El Rio St.

[sspector@livingbank.org](mailto:sspector@livingbank.org)

832-831-3720

## 4/16

### **Panel Discussion: National Health Reform**

Texas Medical Center Health Policy Course

Tuesday, 5:30 – 7 p.m.

Third Coast Restaurant

6650 Bertner Ave.

Free; registration encouraged

To register and view a live stream of the event:

[www.tmc.edu/health-policy/course/](http://www.tmc.edu/health-policy/course/)

[rholeywell@tmc.edu](mailto:rholeywell@tmc.edu)

713-791-8809

## 4/25

### **Nursing Open House**

Thursday, 10 a.m. – 2 p.m.

Prairie View A&M University College of Nursing

6436 Fannin St.

[fdsmith@pvamu.edu](mailto:fdsmith@pvamu.edu)

713-797-7000

## 4/30

### **A Brief History of Research Ethics: From Nuremburg and Beyond**

History of Medicine lecture series featuring

Victor Saenz, Ph.D.

Tuesday, noon – 1 p.m.

Baylor College of Medicine

Cullen Auditorium

1 Baylor Plaza

[bat@bcm.edu](mailto:bat@bcm.edu)

713-798-6590

## EASTER AT PALMER



### **Good Friday | April 19**

Noon Good Friday Liturgy

7:00 PM Good Friday Liturgy

### **Holy Saturday | April 20**

7:00 PM The Great Vigil & First Eucharist of Easter

### **Easter Day | April 21**

7:30 AM The 2nd Eucharist of Easter

9:00 AM The 3rd Eucharist of Easter

11:00 AM The 4th Eucharist of Easter

6:30 PM The 5th Eucharist of Easter

## Palmer Memorial Episcopal Church

6221 Main Street | 713.529.6196

[PalmerChurch.org](http://PalmerChurch.org)





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### Cherokee

Rice/Museum District, \$4.9+ mil.  
Cathy Blum, 713.320.9050



### Claymore

Piney Point, \$4.3 mil.  
Sharon Ballas, 713.822.3895



### Magnolia

Bellaire, \$3.2+ mil.  
Mary Frances DuMay, 713.724.0577



### Del Monte

River Oaks, \$2.6+ mil.  
Mary Hale McLean, 713.553.4255



### Chilton

River Oaks, \$2.3+ mil.  
Colleen Sherlock, 713.858.6699



### Berkshire

Bellaire, \$1.6+ mil.  
Bonnie Laughlin, 713.805.6422



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### Bissonnet

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Heidi Dugan, 713.725.9239



### Conway

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Mary Frances DuMay, 713.724.0577



### Milton

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Kristin Tillman, 713.942.6881



### E. Mystic Meadow

Medical Center Area, \$520s  
Nancy Younger Kruka, 713.857.5299

