2025, Issue 2

MSK News

MEMORIAL SLOAN KETTERING CANCER CENTER

Inspiration & Innovation

The hopeful stories behind our newest discoveries

ALSO INSIDE

Managing "Scanxiety"

A New Drug for Ovarian Cancer

Going Nuclear Against Cancer

Memorial Sloan Kettering Cancer Center

Pediatric hematologist-oncologist Dr. Michael Ortiz with his patient Sienna at MSK Kids

Dear MSK Community,

If you ask the 21,000 people who work at MSK what inspires their tireless commitment to our mission of ending cancer for life, you will hear remarkable responses.

Stories about the courage and resilience of the people we care for, an epiphany early in a young scientist's training that shaped the course of their life's work, and the personal heartbreak that results in a vow to improve the lives of others.

- Our cover story is about unforgettable 4-year-old Sienna, who was diagnosed with a rare kidney cancer on Christmas Eve 2024. Her cheerful resilience inspires her MSK care team, whose devotion to their patients inspired her family to help others by raising money to study rare cancers through Cycle for Survival.
- In these pages, you will learn how, more than a decade ago, MSK laboratory scientists and clinicians encountered a handful of ovarian cancer patients who had an exceptional response to a certain therapy, while others did not. Energized to understand why the responders survived, researchers kept at it, which led, in May of this year, to a new FDA-approved treatment — and a new lease on life for a retired kindergarten teacher and mother of three.
- You will also read about MSK's innovative and ongoing pursuit of better ways to eradicate hidden cancer cells that would otherwise be missed. This approach, called "theranostics," uses radioactive drugs that can both find cancer cells and simultaneously destroy them with incredible precision, resulting in fewer side effects and a better quality of life for patients.
- You will discover how an MSK surgeon used a first-of-its-kind surgical implant that would avoid amputation of a patient's leg after a serious infection, healing her body and helping her return to her own practice as a physician.
- At MSK, inspiration begins with the crucial one-to-one relationships that are the foundation of our cancer care. As you'll see, these deeply personal connections led a group of MSK radiology nurses to develop recommendations to help patients deal with "scanxiety" — the fear felt by so many patients undergoing an imaging test.

This kind of compassionate, innovative care embodies what makes MSK nurses the best of the very best. It's why MSK was recently recognized for the third time with Magnet™ designation, one of the highest honors a healthcare organization can achieve in nursing excellence.

Yes, fighting cancer is often sobering and difficult work, but it is also full of hope. We believe you'll be inspired by the people in this issue and their relentless determination to improve the lives of cancer patients everywhere.

Sincerely,

Selwyn M. Vickers, MD, FACS
President and Chief Executive Officer

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How Michelle Smith-Levitin's leg was saved, thanks to a first-of-its-kind surgery by Dr. Jonathan Forsberg.

To learn how the MSK Giving community is supporting a better future for cancer care, scan here.

Sienna's Story

When 4-year-old Sienna skips into MSK Kids wearing rainbows and a big smile, the whole space lights up.

"Despite facing this very serious disease and going through difficult treatment, Sienna is always so happy and upbeat," says her doctor, pediatric hematologist-oncologist Michael Ortiz, MD.

"In the recreation center, she walks right up to the other kids and starts talking to them," adds **nurse practitioner Talia Sauerhaft, NP.** "She lifts the spirits of everyone around her."

Ask anyone at MSK Kids, the pediatric program within Memorial Sloan Kettering Cancer Center (MSK), and they'll say they're inspired every day by patients like Sienna in their drive to treat cancers in children.

"Our group tends to handle a lot of hard-to-treat cancers, where there often isn't any standard guidance on what will or won't work best," Dr. Ortiz says. "We collaborate with scientists and doctors across the hospital and elsewhere to figure out how we can best help our patients."

And in their search for the right treatment, making the entire family feel hopeful and cared for during an overwhelming experience is a priority for the whole MSK Kids team.

"We spend a lot of time getting to know these kids and their families," Dr. Ortiz says.

A Child Receives an 'Unthinkable' Diagnosis

Sienna's parents, Chris and Tara, were devastated to get the news that would change the course of their lives.

"There are days in a parent's life that don't just alter the future, they fracture reality," Chris wrote on his LinkedIn page. "For our family, that day arrived on Christmas Eve 2024, when we heard the unthinkable: *Your daughter has cancer.*"

It was Wilms' tumor, a type of kidney cancer that is rare — it's diagnosed in only about 500 children in the United States every year. Reeling from their daughter's sudden diagnosis, Tara and Chris managed to focus quickly and took her to MSK Kids, where they first met with Dr. Ortiz.

Dr. Ortiz, one of the leaders of the MSK Kids' Rare Tumors Program, is a world-renowned expert in Wilms' tumor and other pediatric kidney cancers. He has led several clinical trials investigating more effective, less toxic ways to treat Wilms' tumors.

These therapies must strike a delicate balance: They have to be strong enough to eliminate the cancer, while sparing patients from side effects as much as possible. This is especially important for childhood tumors like Wilms', where the average age

of patients at diagnosis is between 3 and 5 years old. The cure rates for Wilms' tumor are high — up to 90% — but patients may face a lifetime of side effects from the treatment, including infertility and heart and kidney problems.

Two days after her diagnosis, Sienna was admitted to MSK. **Pediatric surgeon Joshua Honeyman, MD**, performed an eight-hour operation the next morning to remove her left kidney and adrenal gland and some of the surrounding lymph nodes.

After recovering from surgery, Sienna quickly embarked on 33 weeks of chemotherapy under the guidance of Dr. Ortiz.

Sienna also underwent two rounds of radiation therapy, first to treat her abdominal tumor and then later to treat tumors that had spread to her lungs. This treatment was overseen by **pediatric radiation oncologist Suzanne Wolden, MD**. Dr. Wolden used intensity-modulated radiation therapy to protect her lungs and minimize radiation exposure to Sienna's heart.

Frequent scans and other tests of the tumor help ensure that Sienna's treatment at every step is just enough and not too much for her. "We're always trying to gauge how much therapy to give based on the biomarkers in the tumor and the response we see," Dr. Ortiz says. "Every MSK Kids patient gets treatment that is personalized to them. This is particularly important for patients with Wilms' tumor, where we do have many active treatments, but each comes with distinct risks and benefits."

Going Beyond Medical Care To Treat the Whole Child — and the Entire Family

Chris and Tara are adjusting to a new normal in their Connecticut home, where they are also raising two other children — Georgia, 5, and Bennett, 1. To juggle it all, Tara took a leave of absence from her job, while Chris works mostly from home as a workforce consultant.

"A lot of people ask us how we're coping, how we're doing so well," Tara says. "I tell them we're just following Sienna's lead, because she's incredible. She is our guide."

Keeping spirits up is an essential part of care at MSK Kids. There is play therapy, guided meditation, music therapy, and dance and movement classes. For older pediatric patients, a teen lounge provides a space to hang out, play video games, and meet others facing the same challenges.

Child life specialists are available to help children and their families get through potentially frightening medical procedures and hospitalizations.

"One thing we really focus on is to decrease stress and anxiety for kids who are coming into the hospital," says **child life specialist Beth Kramsky, MS**, who has worked with Sienna and her family. "We help explain their illness and what's happening to their bodies in ways that are developmentally appropriate for each child."

Sienna recently celebrated her fourth birthday at MSK with her parents, Tara and Chris; her sister, Georgia; and her brother, Bennett.

"Walking through that door on York Avenue, there is a moment where the weight on our shoulders is lifted. There is just this level of safety and trust, where we know Sienna is in the right hands."

—Chris, father of MSK Kids patient Sienna

Sienna tries out a stethoscope on nurse practitioner Talia Sauerhaft. At MSK Kids, patients are encouraged to safely play with medical equipment to make it seem less scary.

Child life specialists have different ways to support patients in the hospital. Books can help children gain a better understanding of their illness. Children can play with stuffed animals, such as a "chemo duck," to learn about port access and other medical procedures.

"Every patient is different, so we try to create special stuffed animals, dolls, or action figures to match their own lines or 'tubies,'" Kramsky says. "We also allow children to safely play with the medical materials, to desensitize them to equipment and address fears they might have about the hospital."

It's all part of giving young patients a sense of control. In some cases, they can even participate in their own treatment.

At Sienna's chemotherapy appointments, her sassy, sunny disposition shines through. She delights in being able to help the nurses flush her port. After blood draws, she reminds her nurse to shake the tubes. And when asked whether she's going to be a nurse when she grows up, Sienna replies, "Of course I am."

The well-being of siblings matters too. Kramsky has met with Sienna's sister, Georgia, a few times. "Being separated from her mom and sister has been especially hard," Kramsky says. "It's been really helpful for Georgia to be able to see where Sienna goes when she's at the hospital."

Chris and Tara say Dr. Ortiz and the entire MSK Kids team have given them strength and confidence. "Walking through that door on York Avenue, there is a moment where the weight on our shoulders is lifted," Chris says. "There is just this level of safety and trust, where we know Sienna is in the right hands."

"Dr. Ortiz explains everything super thoroughly, a thousand times if we need him to," Tara adds. "He understands this is all new to us, that we don't speak that language. He will spend hours with us answering our questions."

Despite all the challenges they are facing with a young child in cancer treatment, Chris and Tara are still finding time to give back. Tara led a Cycle for Survival team that raised nearly $100,000 for MSK research on rare cancers — including pediatric cancers.

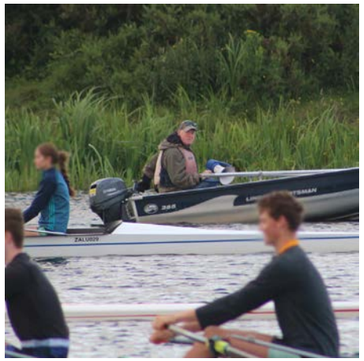
Chris frequently writes eloquent and widely shared posts on LinkedIn about his family's experiences and his deep respect for Sienna's care team. The family also started a GoFundMe page, with a commitment to donate any funds not needed for Sienna's care to Dr. Ortiz's research program.

For Dr. Ortiz, the ability to find successful treatments, while comforting children and their parents during their darkest moments, continues to drive him. "When our patients come back to see us years later," he says, "and we see them thriving, happy, and growing up just as expected, nothing could be more inspiring to continue this mission." •

Dr. Ortiz's research is supported by the MSK donor community, including Children's Cancer Research Fund, Deborah and Kevin Bhatt, and Cycle for Survival.

Caring for the Whole Person

How the MSK Head and Neck Service Treats People Facing a Difficult Diagnosis



James (at rear, in motorboat) coaching competitive rowers in Ireland

James Mangan is a world-class rowing coach who has led elite teams in his native Ireland and in the United States all the way to the Olympics. So when he learned he had a serious skin cancer, he was concerned not only for his health but for his ability to continue the work he loved.

"To me, it's not just a job or a career," he says. "It's something I've spent my whole life doing and become quite successful at, because I love coaching."

James says he found a kindred spirit in **head and neck medical oncologist Lara Dunn, MD**, as she laid out a treatment plan for squamous cell carcinoma, a type of skin cancer, which had spread to his parotid, a salivary gland.

"As a coach, you have to be very honest with athletes but also empathize with them and kind of manage their emotions," he says. "With her, it was like I was with a good coach. She's one of the most amazing people you can meet."

For Dr. Dunn, their rapport grew as they talked about their families. "I really want to know what's important to my patients," Dr. Dunn says. "Cancer may be very dominant at the time we meet, but it is only a small part of who they are as a person."

Dr. Dunn is one of more than 70 experts on the head and neck team at Memorial Sloan Kettering Cancer Center (MSK). The service was founded in 1914 as one of the first in the U.S. to specialize in the treatment of head and neck cancers, which now encompass more than 20 types of malignancies affecting the vocal cords, sinuses, oral cavity, salivary glands, ears, and more.

MSK specialists are globally renowned for their expertise and for their work in pioneering research and clinical innovations that continually improve the lives of patients.

The bedrock on which everything rests, says **head and neck surgeon Richard Wong, MD, Chief of the Head and Neck Service**, is a determination to help patients regain their health while also living their best lives after cancer.

"If this was your own mother or brother," he says, "what do we think would work best?"

Finding Alternatives to Life-Changing Surgery

For James, the answer was immunotherapy, which uses the body's own immune system to help fight cancer.

James' cancer journey began when he was diagnosed at home, in Ireland, after he noticed lumps on his neck.

Doctors in Ireland concluded he had skin cancer that had spread and recommended major surgery. "They were

James Mangan came to MSK from his native Ireland seeking a less invasive treatment for skin cancer that had spread to a salivary gland. The immunotherapy he received at MSK meant he did not need major surgery, dramatically improving his quality of life.

“I was so relieved when they told me they couldn’t see any more cancer. I almost couldn’t believe it.”

—James Mangan, MSK patient

talking about doing some really severe surgery,” James recalls, “which is something I don’t like thinking about anymore.”

Friends encouraged James to get a second opinion in the U.S., where he lived for 20 years. He eventually came to MSK for a consultation with Dr. Wong. He found that the cancer was extensive and in close proximity to a facial nerve. The two facial nerves each control the motion of one side of the face and are critical for smiling, blinking, and facial expressions.

Surgery to remove the cancer might involve removing the facial nerve, which would be severely disfiguring. “If you cut a facial nerve,” explains Dr. Wong, “the entire side of the face becomes paralyzed and drops, similar to a stroke.”

Instead, he thought James was a good candidate to try immunotherapy, in the hope it might shrink the cancer enough to reduce the severity of surgery. Dr. Wong sent James to Dr. Dunn, whose research and clinical expertise includes immunotherapy.

Dr. Dunn put James on a medicine called cemiplimab (Libtayo®). This is a kind of immunotherapy known as a checkpoint inhibitor, which makes tumor cells easier for immune cells to identify and destroy. The results were — in a word — remarkable.

The cancer shrank significantly in a matter of months. James then underwent a much smaller operation to remove a tiny focus of residual cancer. And his facial nerve remained completely intact. James was also able to avoid receiving radiation therapy after his surgery.

He’s now cancer free.

“We explained the options to James, and he decided that he wanted to stay with immunotherapy alone and not have a larger surgery or radiation,” says Dr. Dunn. James continued on the cemiplimab for eight more months and has now completed his treatment.

“I was so relieved when they told me they couldn’t see any more cancer,” recalls James. “I told Dr. Dunn I almost couldn’t believe it. Now that’s what you call quite a good day.”

James returns to MSK periodically for exams to make sure the cancer has not come back. “He leads an active life as a coach, and we hope this immunotherapy approach will benefit him for a long time to come,” says Dr. Dunn.

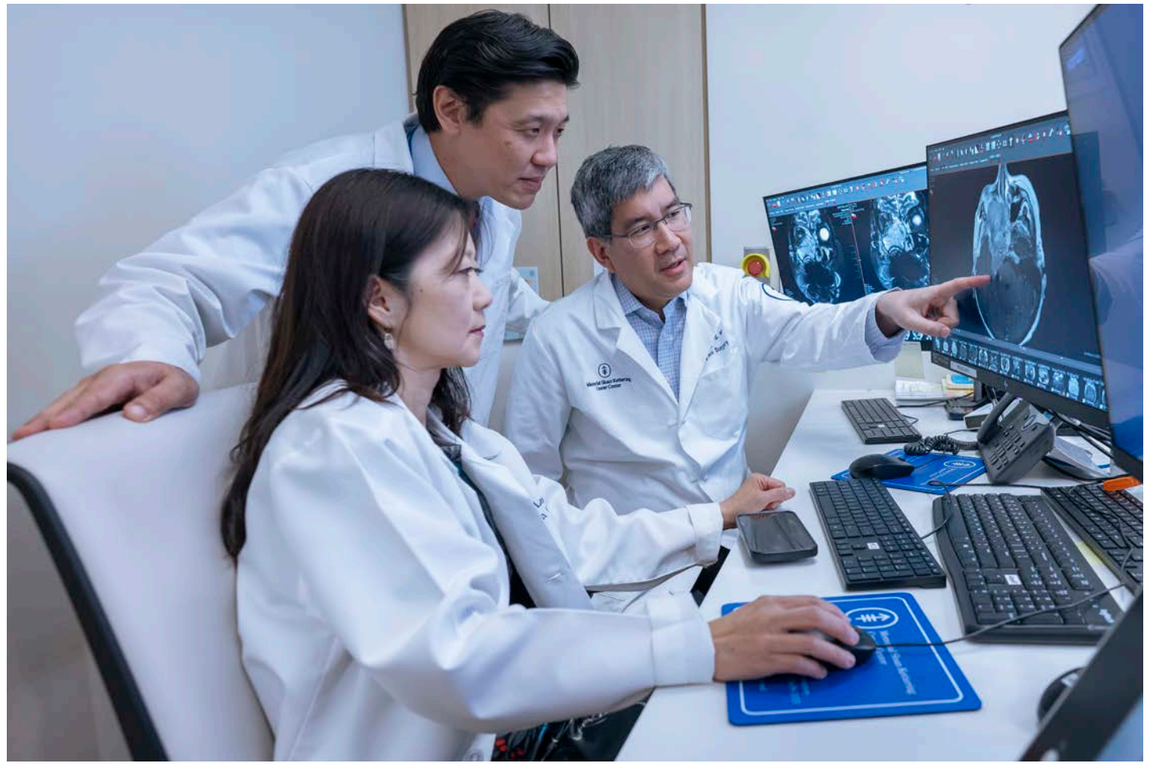
Head and neck medical oncologist Dr. Lara Dunn examines James during one of his periodic visits to ensure the cancer does not come back.

Surgery That Considers Life After Cancer

Dr. Wong says finding the right balance between treatment and quality of life is an MSK expertise. “We’re always very focused on what life may look like for a patient after treatment,” he explains.

Thyroid cancer is another of many examples where doctors offer successful treatment while minimizing side effects. “We do a high volume of thyroid cancer surgeries here and manage patients with aggressive disease,” says Dr. Wong. “However, many other people have very small thyroid cancers that can remain dormant for many years and pose no threat. For these people, we offer surveillance programs where we monitor the disease but don’t treat it unless necessary. Many patients are able to avoid surgery completely.”

Many surgeries have been modified to focus on minimizing side effects and to expedite more rapid recovery. Skull base tumors present a particular challenge, since these are located below the brain and near the eyes, in anatomic areas that are difficult to access. Minimally invasive approaches to removing skull base tumors now make it possible for skull base surgeries to be performed through the nostrils, using intraoperative imaging, to avoid facial incisions. Similarly, selected vocal cord cancers that impair a person’s voice can be removed with special techniques using a microscope and laser.



From left: Radiation oncologist and early drug development specialist Dr. Nancy Lee, medical oncologist Dr. Alan Ho (standing), and surgeon Dr. Richard Wong work closely with specialists across the Head and Neck Service to ensure the best outcomes for patients.

Game-Changing Clinical Trials

Another pillar of excellence is research that stretches from the laboratory to patient exam rooms.

“We’re curing more patients, so they live longer and better,” says **medical oncologist Alan Ho, MD, Chief of the Head and Neck Oncology Service**. “Having said that, it’s quite clear that the existing options are just not good enough. And that’s where clinical trials come in.”

Dr. Ho’s research focuses on targeted drugs that attack the molecular characteristics driving a patient’s tumor, which can play a role in fueling cancer’s growth.

He is encouraged that the pace of research for head and neck cancers at MSK is constantly improving, bringing new treatments to patients sooner. “In the past 15 years, we’ve done over 10 trials involving different salivary tumor types,” he says. “And those trials have really moved the needle in helping patients.”

Improving quality of life and reducing side effects is also a major focus of research for the radiation oncologists. Dr. Ho praises the “game-changing” clinical trials for patients whose cancers are positive for HPV — the human papilloma virus — that are led by **radiation oncologist Nancy Lee, MD, Service Chief, Head and Neck Radiation Oncology**. “She and her team are dramatically reducing the amount of radiation we give to these patients without reducing the cure rate,” says Dr. Ho.

It’s more evidence, he says, “that how our patients live after treatment is a very close second to curing them. It’s just so important.”

For James, life after treatment remains active and full, including spending time with his family and raising money for cancer research. He continues to coach high-level rowing teams, which he says is more rewarding than ever. “I really feel I’m mentoring and developing young people.”

He’s also very conscious of remaining healthy. “I take care of myself by staying out of the sun and eating right. Coaches don’t live a very crazy life anyway,” he says with a laugh.

He believes in minimizing stress and credits Dr. Dunn for her calming influence.

“If I have questions, I know I can ask. I feel comfort knowing I’m in the hands of Dr. Dunn and the people of MSK.” •

Dr. Wong’s research is supported by the MSK donor community, including The James & Judith K. Dimon Foundation and Leerom and Karolina Segal.

Dr. Wong holds the Jatin P. Shah Chair in Head and Neck Surgery and Oncology.

These Postdocs Came From Across the Globe To Train at MSK

Their stories are all different — the daughter of farmers in rural China, the first scientist in a family of English professors, the child from a small town in Italy who never stopped asking "Why?"

But one thing unites them: They left behind family and friends, their familiar cultures, and often their native languages to join a research lab at Memorial Sloan Kettering Cancer Center (MSK).

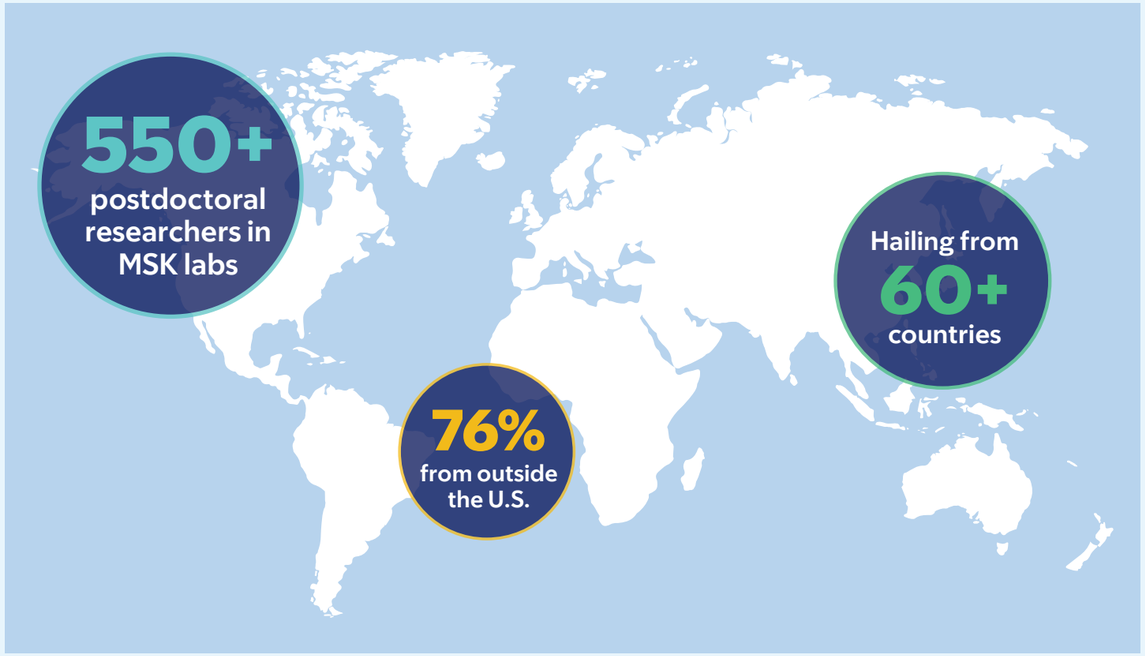
MSK labs are home to more than 550 postdoctoral researchers who are pursuing an additional period of training and research after earning their PhD. Seventy-six percent of them hail from outside of the United States, from more than 60 countries — from Finland to Pakistan, Canada to Costa Rica. For many, this will be the final leg of a decades-long journey to launch a career in science.

The diversity at MSK is more than just a diversity of background and language and culture, it's a diversity of thought and perspective — which strengthens our ability to make scientific discoveries, says **Joan Massagué, PhD, MSK's Chief Scientific Officer and Director of the Sloan Kettering Institute**, who is a native of Barcelona, Spain.

"Scientists come from all over the world to train at MSK," says Dr. Massagué, who holds the Marie-Josée and Henry R. Kravis Chair. "And when they leave, the training and mentorship they received here become part of the scientific discovery happening around the globe."

Competition for academic jobs is extremely high, with only about 1 in 5 postdocs eventually landing a tenure-track position. MSK's placement is much higher than that average — more than 40% of departing MSK postdocs secured an academic or clinical faculty position in the U.S. or abroad within five years of leaving MSK. Many others go on to take positions in industry, government, or at a nonprofit.

"While the world continues to be divided in many ways, science is one of the great unifiers," Dr. Massagué adds.



Sukrit Singh, PhD

Computational and Systems Biology Program

Though Sukrit Singh is the first scientist in his family, he says that growing up surrounded by writers and academics also gave him a deep appreciation for the written word.

"Through them, I learned the importance of written communication with the public, as well as within research," he says.

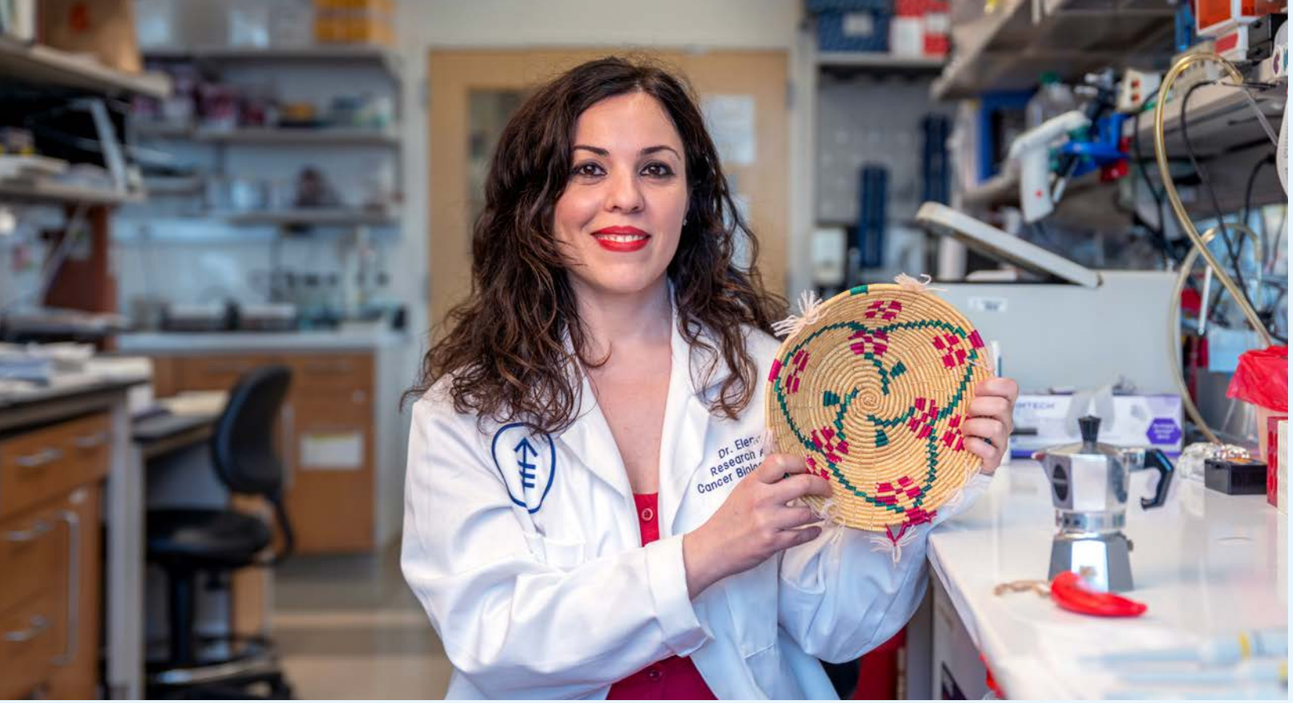
An early interest in science and "tinkering around with things" ultimately led him from a childhood spent in New Delhi and Singapore to Washington University in St. Louis, where he earned an undergraduate degree in chemistry and a doctorate in biophysics — which uses physics, chemistry, and math to understand biological systems.

This combined passion for biomedical research, computation, and science communication followed him to MSK, where he joined the lab of **computational biologist John Chodera, PhD**, in 2021.

Today Dr. Singh's research focuses on the physical basis of cancer therapy resistance — combining laboratory experiments and computational analysis to better understand why some cancers can overcome our best treatments.

"Ultimately, I hope to pave a path toward physics-based precision medicine, where we use physics and artificial intelligence to better match the mutations in a patient's tumor with the therapies tailored specifically to them," he says.

Dr. Singh aspires to launch an independent lab, where his group would continue tackling vital cancer research questions.



Dr. Elena Spina poses with some mementos from her native Italy — including a basket from Campana, handwoven by her grandmother.

Elena Spina, PharmD, PhD

Cancer Biology and Genetics Program

A curious child growing up in Campana, a small town in Calabria in southern Italy, Elena Spina always wanted to know *why* things were the way they were — and was never entirely satisfied with the answers she received.

"No one in my family was a scientist, so pursuing a career in science felt unfamiliar — but I didn't let that stop me," she says. "And growing up in a small town doesn't give you many professional opportunities, so I knew I had to leave home to pursue my dreams and career, which meant living far away from my parents and sister and childhood friends for many years."

She initially studied to become a pharmacist at the University of Calabria and then went on to earn a PhD in translational medicine, which aims to bridge the gap between laboratory discoveries and patient care.

"I wanted to understand what actually drives disease, how it evolves, and how we can truly intervene effectively," Dr. Spina says.

She compares her journey to MSK to a "train ride through the unknown." Her scientific passion and persistence took her from Italy to the U.K. to New York City. All the while, Dr. Spina was immersing herself in multiple scientific disciplines, including cancer biology, stem cell biology, and developmental biology.

"My research began with trying to understand why some breast cancer patients become resistant to therapy — which led me to study cancer stem cells, known for their ability to self-renew, a property that underlies both tumor relapse and drug resistance," she says. "This sparked my interest in how normal tissues transform into cancer and in understanding how the processes that are essential for normal development are hijacked by cancer cells."

At MSK, Dr. Spina is a member of the Massagué Lab, where her research focuses on uncovering the cellular and molecular mechanisms that allow tumors to spread to other organs.

She, too, aspires to lead her own lab.

"My goal is to create a lab environment where young scientists feel empowered to think independently, to be excited about discovery, and to be the best version of themselves — the same way my mentors have inspired me," Dr. Spina says.

Xiuzhen 'Suzanne' Chen, PhD

Cancer Biology and Genetics Program

A life spent pursing scientific research was almost unimaginable to Xiuzhen Chen, who grew up in a farming family in LanXi, in rural east-central China.

"I was the first woman in my village to go to university," she says. "I was interested in science, but I did not know this was what I wanted to pursue as a career until I tried alternative paths and learned what I did not like to do."

After college, she used her undergraduate and master's degrees in biology to secure a job at a top pharmaceutical company, which allowed her to help support her family financially. But she soon found the repetitive nature of the work made her miserable.

"One year earlier, the job was my dream, but when I finally flew to Switzerland to begin my doctoral studies, it felt like an escape," Dr. Chen says.

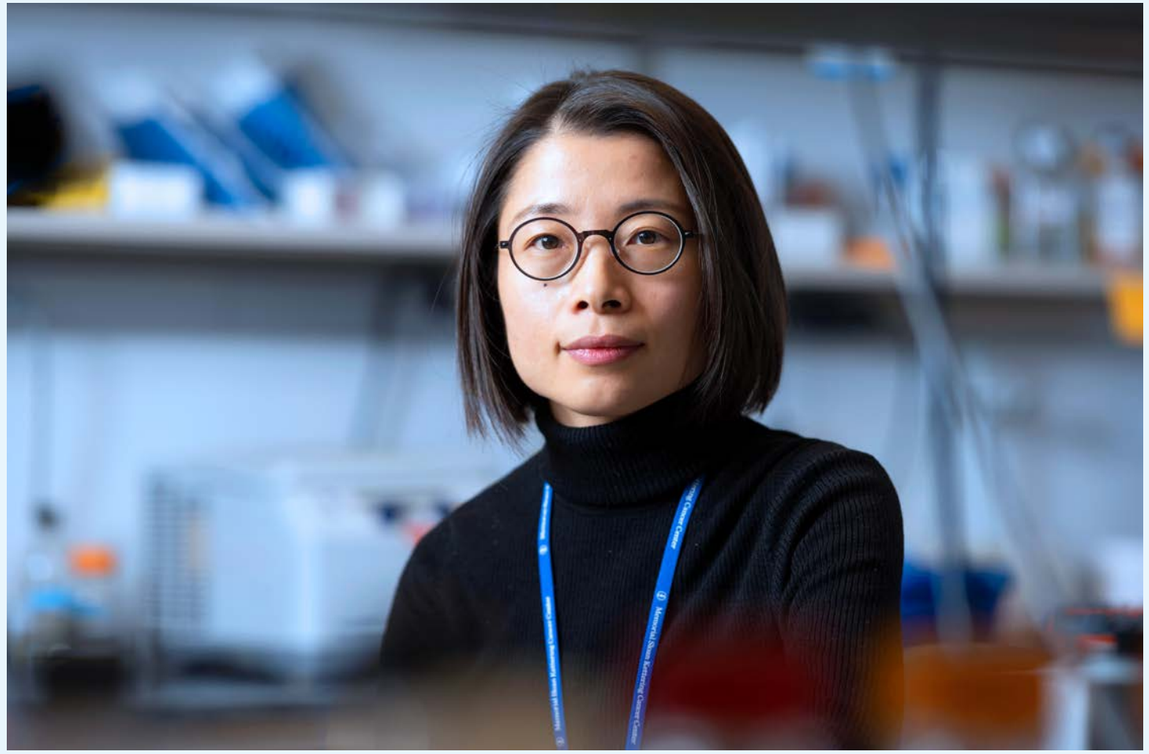
After earning a PhD in biochemistry and cell biology from ETH Zurich, she joined the lab of **MSK molecular and cell biologist Christine Mayr, MD, PhD.**

Here, Dr. Chen's research has focused on messenger RNAs (mRNAs) — which are best known for their role as a temporary copy of a gene's instructions, carried from a cell's nucleus to ribosomes in the cytoplasm, where proteins get made.

"I am working to discover what else mRNAs do beyond this well-known protein-coding function," she says.

In 2024, Dr. Chen was the lead author of a paper in the premier biology journal *Cell* that unveiled a previously unknown role for mRNAs — one that is pivotal for cellular signaling and organization. The discovery sheds new light on foundational cellular processes and on the molecular basis of developmental diseases like fragile X syndrome.

She recently accepted a position as an assistant professor of biology at New York University, where she plans to continue to work on fundamental questions that deepen the human understanding of health and disease. •



SCANXIETY
It's Real

Like so many cancer patients, Stacey Kaminsky suffers from acute anxiety around her regular scans after treatment of stage 3 breast cancer.

The cancer may be gone, but for many patients the medical tests continue, and so do the fear and worry.

Now, a group of radiology nurses at Memorial Sloan Kettering Cancer Center (MSK) say it's time to bring awareness — and relief — to the countless patients and their caregivers across the country suffering from anxiety related to radiology scans, an experience that has been dubbed "scanxiety."

"Even our healthy patients have this," says **MSK radiology nurse practitioner Ashley Hole.** "It stays with them even when they are in remission."

That's certainly true for Stacey Kaminsky, who was diagnosed with stage 3 breast cancer eight years ago. "I have the same level of anxiety for follow-up care as I did back when I was diagnosed," she says. "Every time I hear the word MRI, my stomach drops."

After surgery and dozens of rounds of chemotherapy and radiation, there is no evidence of disease. But Stacey still gets regular scans to check for cancer recurrence and to help diagnose the cause of painful side effects from treatment, including back pain, neuropathy, and fibrotic tissue in her arms. One PET scan found a noncancerous brain tumor that now also requires annual scans.

"It's petrifying, because you never know what they're going to find," she says. "Will they find a tumor? Is my fibrotic scarring worse? What's wrong with my spine?"

After one PET scan, her fear was so intense she left the room and vomited. "I have canceled appointments because I just couldn't take it," she says.

Scanxiety Is Normal

Stacey's anxiety was so debilitating, she sought help from **MSK psychiatrist Michael Rosenthal, MD.**

Dr. Rosenthal told her that scanxiety is not only common, it's to be expected: "I would argue it's a normal human response to a very scary life-threatening experience."

Dr. Rosenthal reassures patients who may still feel on edge years after showing no evidence of cancer. Just walking in the door for a scan can trigger a stress response.

"Of course it feels like life and death, because at one point it was," he says. "Your body still reacts that way, and that's a normal emotion. It brings you back — your body remembers, and your mind remembers what it was like to get that bad news."

Help Starts Here

Seeing so many patients and caregivers struggle with scanxiety, MSK radiology nurses formed a team and set out to find a solution. Diving into dozens of studies, they discovered that while scanxiety is widespread, it's often not acknowledged. "Giving patients the term 'scanxiety' to succinctly express the feeling of distress they are experiencing has been critical," wrote Hole and co-authors Jaclyn Adronico, Kelly Bonenfant, and Mary Elizabeth Davis in a report published in the *Journal of Radiology Nursing*.

"Even our healthy patients have this. It stays with them even when they are in remission."

—Ashley Hole, MSN, RN, FNP-BC, CPON

The nurses took their findings and developed training for professionals as well as a detailed brochure for patients and caregivers that offers a wide range of calming techniques for various situations. For some, the anxiety can be worse before a scan. For others, it's during the procedure. For most, the hardest time is waiting for the results. The first coping technique is for patients to talk about how they are feeling.

The MSK team findings and recommendations are now being shared with radiology nurses and technologists around the country — even ones who don't specialize in oncology. The brochure is also available in Spanish, simplified Chinese, and Russian. This project is a result of MSK nurses' constant efforts to innovate and to share knowledge that improves patients' experiences — it was one of the reasons MSK recently earned Magnet® designation, the highest honor in nursing.

Stacey says having her feelings validated by her care team has been essential to getting through her MRI scans — the nurses and technicians talk her through every step. "Just having a reassuring voice through the machine is really helpful," she says.

Stacey at home, in Sleepy Hollow, New York, with her dog, Toledo. She says having her feelings validated by her care team at MSK has made all the difference.

Stacey now uses visualization techniques, imagining a car trip from her driveway to the hospital that will take as long the scan takes. If she arrives at her destination before the scan is over, she simply repeats empowering words to the beat of the machine's banging. It's her own healing mantra.

"I turn the banging into a chant: *Go away. Go away. I'm done. I'm done. I'm done.*" •

SCANXIETY TIPS

Schedule Worry Time:
Set aside an hour a day to worry about the scan. Imagine your worst-case scenario. Talk about it with someone. When the hour is up, get back to your day.

Keep a Journal:
Writing down fears can help you process the emotion around a scan and remind you of coping mechanisms that have worked in the past.

Do a Grounding Exercise:
You can't control the future, but right now, you're OK. Ground yourself in the present: Start with deep breaths. Focus on what you can see, hear, taste, smell. Press your feet firmly to the ground. What can you feel?

Sparked by a Discovery 10 Years Ago

A New Ovarian Cancer Drug Today

The timing could not have been worse.

Ellen Coopersmith learned she had a rare, advanced ovarian cancer in 2016, soon after the death of her husband. Her three children were still in high school.

"I couldn't die — I knew I had to beat this," Ellen says.

A kindergarten teacher living in suburban Philadelphia, she came to Memorial Sloan Kettering Cancer Center (MSK) after surgery at a local hospital. The MSK team kept the cancer at bay over the next decade with two more surgeries. She also had chemotherapy, but it didn't work.

So when Ellen's **gynecological medical oncologist, Rachel Grisham, MD,** suggested she consider joining a clinical trial, she jumped at the opportunity. Dr. Grisham was investigating a new combination of targeted therapy drugs. In earlier phase 2 testing, 44% of the patients responded to this new approach.

"I was very excited when I found out I could get into the phase 3 trial," Ellen says. She started in January 2025.

The good news came quickly. Within four months, her cancer had shrunk by 70%.

By participating in MSK research, Ellen got early access to a treatment that has dramatically decreased her tumors and changed her outlook on life.

"When you're first diagnosed with cancer, you just stop and think, 'OK, how many years do I have left, and what do I need to get done in those years?' " Ellen says. "I never thought my life would be extended like this. I could not be any luckier. Now it's exciting to think, maybe I'll get to meet my grandkids."

Dr. Rachel Grisham is leading the global phase 3 trial for a new ovarian cancer treatment.

Treating a Rare Type of Ovarian Cancer

Ellen was diagnosed with a low-grade serous ovarian cancer (LGSOC). It is rare, accounting for less than 10% of all cases of ovarian cancer. It's more common in younger women — many patients are diagnosed in their 20s or 30s.

As the words *low grade* suggest, LGSOC is considered less aggressive than other types of ovarian cancer. That's mainly because it grows more slowly. Patients diagnosed with this cancer tend to live longer, even when the cancer has spread.

However, as happened in Ellen's case, it is also less likely to respond to chemotherapy. In fact, chemotherapy is effective in fewer than 1 in 20 patients with LGSOC.

The new treatment that Ellen is receiving is a combination of two targeted drugs — avutometinib and defactinib. Based on the impressive phase 2 clinical trial results, this new therapy recently received accelerated approval from the U.S. Food and Drug Administration (FDA) for a subset of patients. It's now called Avmapki™ Fakzynja™ Co-Pack and is the first treatment ever approved specifically for low-grade serous ovarian cancer.

"We expect this therapy will become the new standard of care for many LGSOC patients," Dr. Grisham says.

How Learning From 'Exceptional Responders' Leads to New Treatments

The research that brought this treatment to life started more than a decade ago at MSK.

Ellen Coopersmith rows across the Lake in Central Park. Now that she is retired from her job as a kindergarten teacher, she enjoys spending extra time in New York City when she comes to MSK for her appointments.

Dr. David Solit's research on exceptional responders led to new discoveries about the genetic causes of ovarian cancer.

> "Not only are lab discoveries driving clinical care, but we're taking what we learn from patients back to the lab for further investigation."
>
> —David Solit, MD

In the early 2010s, targeted therapy drugs directed at cancer-causing mutations were new and not fully understood. Curiously, in some clinical trials where the drugs failed for most patients, they worked for a small number — sometimes only one or two people out of dozens. These patients would have a complete response. Their cancer would be totally eliminated, and it would not come back.

These patients were called "exceptional responders."

"We set out to understand how the biology of the tumors from those exceptional responders was different than other patients," says **MSK physician-scientist David Solit, MD**. "Why did they survive? What could we learn that would help us use targeted drugs more effectively?"

One of the first exceptional responders studied by Dr. Solit's lab had low-grade serous ovarian cancer. Researchers, including Dr. Grisham, analyzed this patient's tumor DNA and discovered it carried a defect in a protein called MEK1. In 2015, they published a paper in the *Journal of Clinical Oncology* that showed how defects in the MEK1 protein drive the growth of LGSOC.

Other labs built on their discovery and found that targeting another protein called FAK at the same time was more effective than targeting MEK1 alone. This combination approach is what has been approved by the FDA.

"This is a great example of translational research," Dr. Solit says. "Not only are lab discoveries driving clinical care, but we're taking what we learn from patients back to the lab for further investigation."

And the investigation continues. One goal of the phase 3 trial in which Ellen is enrolled is to learn more about which patients are most likely to benefit from the treatment.

"We're continuing to collect information about other genes and proteins that may be involved in this cancer," says Dr. Grisham, who is the global leader of the ongoing phase 3 study.

A Clinical Trial Gives Ellen a New Outlook on Life

Ellen says she never worried about getting an experimental therapy that wasn't yet FDA-approved. She had complete trust in her doctors. "Dr. Grisham really knows me," she says. "She understands the genetics of my disease, and she knows what my body needs in order to fight this."

Ellen also credits her surgeon, **Yukio Sonoda, MD**, for his compassionate care over the years.

Recently retired from her teaching job to focus on her health, Ellen, now 62, is enjoying a new chapter of life. She has more free time for long hikes, comedy clubs, and dinner with friends.

"What I love the most about my doctors at MSK," says Ellen, "is that they care about not only the *quantity* of life, but the *quality* of life that you have." •

Dr. Solit's research is supported by the MSK donor community, including the Marie Josée and Henry R. Kravis Foundation and Cycle for Survival.

Dr. Solit holds the Geoffrey Beene Chair.

Going Nuclear Against Cancer

Radiation That's More Precise and More Powerful

Cyclotron engineer Kyle Stewart works on a formulation at MSK's new laboratory dedicated to the clinical production of alpha-emitting radiopharmaceuticals — the most powerful form of theranostics yet.

A high-intensity radiation beam that penetrates the body to burn away tumors has been a standard weapon against cancer for more than a century.

Over the years, radiation therapy has improved dramatically, but its effectiveness against cancers in multiple places can be limited, and it can also destroy healthy tissues.

Now there's a new weapon in the radiation therapy arsenal that can work better for cancers that have spread — and with fewer side effects, meaning a better quality of life for patients.

“It’s been a relief to be able to go on with normal life without the cancer growing or having to deal with the effects of chemotherapy.”

—Frank Shieh, MSK patient

It’s called “theranostics,” because it combines therapy and diagnostics by using radioactive agents that first identify and then destroy individual cancer cells. After pioneering several developments in this field, MSK has new plans to expand the approach.

“We have a theranostic motto, which is ‘We see what we treat, and we treat what we see,’ ” says **nuclear medicine physician Lisa Bodei, MD, PhD, Director of Targeted Radionuclide Therapy at MSK**. “Regardless of disease, the concept stays the same — we detect the target with one radioactive substance and then treat it with a therapeutic one.”

How Theranostic Treatments Work

First, doctors infuse a patient with a radioactive drug — containing a diagnostic isotope — that binds to a specific target on cancer cells. Then, the patient gets a PET scan, a special type of imaging that “lights up” the cells to be targeted.

Once the target cells are detected, doctors inject a version of the imaging substance that is loaded with a therapeutic isotope. It works like a smart bomb to zero in on the cancer cells and emit radiation to kill them by destroying their DNA. The healthy surrounding tissues are left unscathed.

Dr. Frank Shieh with his wife, Janet, was able to receive a theranostics treatment at age 83 instead of chemotherapy when his prostate cancer appeared to be progressing. Three years later, he enjoys an active life golfing, playing piano, and visiting family.

Dr. Lisa Bodei says new targets and treatments for multiple cancers are constantly being discovered.

Theranostics offers several advantages over more conventional treatments:

- Doctors can see the exact location of cancer cells that might be invisible on a conventional scan.
- Doctors can assess if a treatment is working more quickly.
- Clinical trials can progress quickly from imaging phase to treatment phase.
- Treatment can be given to all sites of disease rather than just one at a time.

Even if theranostic treatments are not a cure, they can have a major impact in improving patients’ lives.

“It’s not just a matter of more effective therapies — it can sometimes be a better quality of life compared with standard therapies,” says **Jason Lewis, PhD, Chief of the Radiochemistry and Imaging Sciences Service**. “In many instances, the treatments are very well tolerated, and patients can continue with their normal lives.”

Destroying Prostate Cancer Cells

For Frank Shieh, theranostics have stopped his metastatic prostate cancer in its tracks. Despite surgery, radiation, and hormone-blocking drugs after his diagnosis in 2010, the prostate cancer kept returning, eventually spreading to his bones. His PSA level, a marker for prostate cancer, was rising, suggesting the cancer was still progressing.

A physician himself, Dr. Shieh knew his situation was growing desperate. By 2022, his only option was to start chemotherapy, a daunting prospect for someone 83 years old.

He connected with **MSK physician-scientist Yu Chen, MD, PhD**, who proposed that Dr. Shieh join a clinical trial testing a theranostic treatment called ^{177}Lu-PSMA-617 (Pluvicto®) for metastatic prostate cancer. This drug targets a specific protein on the cancer cell surface called PSMA (prostate-specific membrane antigen) and destroys the cell.

“At that point, I was willing to try anything,” Dr. Shieh says. “The cancer had stayed in my body for so many years, and I was anxious to get rid of it.”

MSK played a key role in developing this treatment, under the leadership of **medical oncologist and Prostate Cancer Section Head Michael Morris, MD**. His clinical trials led to approval by the U.S. Food and Drug Administration (FDA) to treat patients after chemotherapy had failed. In 2025, the approval was expanded to include patients like Dr. Shieh, who had never received chemotherapy — dramatically increasing the number of patients eligible to receive the treatment.

Dr. Shieh received five injections of ^{177}Lu-PSMA-617 for five months. By the end of treatment, his PSA had dropped dramatically and has remained extremely low for two years.

“It’s been a relief to be able to go on with normal life without the cancer growing or having to deal with the effects of chemotherapy,” he says. “Being a doctor — and my wife is a nurse — we want to do what we can to make sure patients are aware these treatments are there to help them.”

How Theranostics Can Treat Other Cancers, Like Neuroendocrine

MSK is identifying new theranostic targets in neuroendocrine cancers, which are aggressive and develop mainly in the prostate, lung, and gastrointestinal system. Dr. Bodei is leading a phase 1 trial that homes in on a target called a somatostatin receptor, found in neuroendocrine cancers in the gastrointestinal tract.

Another new target is a protein called DLL3. Dr. Lewis and **physician-scientist Charles M. Rudin, MD, PhD**, developed an imaging agent that lights it up. Their 2024 paper in *The Lancet Oncology* showed that the agent reliably detected cancer cells containing DLL3. An accompanying commentary in the journal called the research “a pivotal milestone” for treating these cancers.

This is just the beginning, Dr. Bodei adds: “We are discovering additional targets and treatments for many other cancers, including breast cancer, brain tumors, kidney cancer, melanoma, and pancreatic cancer.”

Alpha Particles and the Next Wave of Treatment

MSK is positioned for the future of theranostics with a just-opened facility in Manhattan to test alpha-emitting radiopharmaceuticals — the most powerful form of theranostics yet.

These powerful agents can now be formulated on site at the new facility, streamlining their use in clinical trials.

“We’re the first academic institution in the U.S. with a laboratory dedicated to the clinical production of these agents,” Dr. Lewis says. “A lot of pharmaceutical and biotechnology companies are knocking down the door to work with MSK on new therapies.”

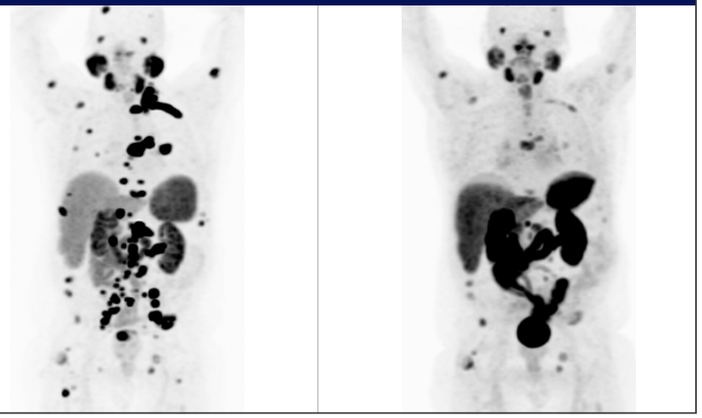
A New Era

To help the growing number of people with cancer, MSK is planning to expand the treatment space in the Manhattan campus and offer theranostics therapy at regional sites in New Jersey and New York state.

It will be a lifeline for more people like Dr. Shieh, who is so deeply grateful for the extra years he has been given with his wife and family, they’ve made a generous donation to support Dr. Chen’s continued research. Dr. Shieh enjoys playing piano, which relaxes and soothes his mind, as well as golf and pickleball, which he recently took up. He and his wife enjoy visiting their four daughters — two of whom are doctors — and seven grandchildren.

“It’s wonderful that I’m able to be there for moments like my oldest grandson graduating from college this year,” he says. “As my wife says, I just need to keep this up until I’m 100 years old.” •

PSMA PET Scans Before and After Theranostic Therapy



At left, prostate cancer metastases are highlighted by a theranostic agent and appear as small dark spots in the arms, legs, hips, and elsewhere in the body. After targeted treatment (at right), the metastases have receded or are undetectable.

Dr. Lewis’ research is supported by the MSK donor community, including The Tow Foundation and the Prostate Cancer Foundation.

Dr. Lewis holds the Emily Tow Chair in Oncology.

Dr. Rudin’s research is supported by the MSK donor community, including the Ge Li & Ning Zhao Family Foundation and Sharon Levine Corzine.

Dr. Rudin holds the Sylvia Hassenfeld Chair in Lung Cancer Research.

MSK orthopedic surgeon Dr. Jonathan Forsberg examines Michelle Smith-Levitin's leg during a follow-up appointment. **Inset:** Michelle holds a model of the first-of-its-kind implant that saved her leg.

Revolutionary Bone Implant

The tennis court was Michelle Smith-Levitin's happy place. The 14-year-old from Westchester, New York, could play for hours — until one day, she fell and couldn't put weight on her leg when she stood up.

Tests showed a noncancerous but aggressive tumor on her shin bone. Little did she know this would become a decades-long problem that would end up threatening her leg and even her life. By age 60, this physician and mom of two faced a serious bone infection and the very real and devastating possibility of amputation.

She sought a second opinion at Memorial Sloan Kettering Cancer Center (MSK) and when she did, something extraordinary became possible: Dr. Smith-Levitin was offered the chance to become the first person in the world to receive a one-of-a-kind bone implant that could save her leg and her mobility.

Fighting Bone Infection With Groundbreaking Technology

"I believed it was possible to save Michelle's leg," says **orthopedic surgeon Jonathan Forsberg, MD, PhD**, a veteran who served in the Navy for more than 30 years. "We could use state-of-the-art technology and materials to design an implant for her that would also help fight her infection. This could be revolutionary, and I was excited about working with Michelle to solve this difficult problem."

At first, it sounded too good to be true. But by the end of their conversation, Dr. Smith-Levitin was convinced. "He's experienced, innovative, and technically amazing. I said, 'This is no longer a consultation. You're definitely the guy who's taking care of me,' " she recalls.

Michelle Smith-Levitin regained function and mobility in her leg and is getting stronger every day.

Dr. Forsberg replaced part of Dr. Smith-Levitin's thigh bone and shin bone with a temporary spacer, custom-built with 3D printing technology. She was among the first patients to receive the spacer, made of a new, strong material called polyetherketoneketone (PEKK), which has antibacterial properties. Its design allowed her some movement while the infection was treated with antibiotics for six weeks.

Then she became the first patient to receive an implant with an antibacterial coating recently approved by the U.S. Food and Drug Administration (FDA). Dr. Forsberg worked with Onkos Surgical to create a permanent implant that would prevent infection long-term and that was based on the unique anatomy of Dr. Smith-Levitin's leg.

Two weeks after surgery, her infection was gone, and she "felt a thousand times better," she says. Two months later, she was able to walk with just a brace on her leg. Her goal is to walk unrestricted, swim, ride a stationary bike, and do Pilates.

"He literally saved my leg!" says Dr. Smith-Levitin. "I went back to work with some accommodations. I have no more pain, and with physical therapy, I'm getting stronger every day." •

Memorial Sloan Kettering Cancer Center