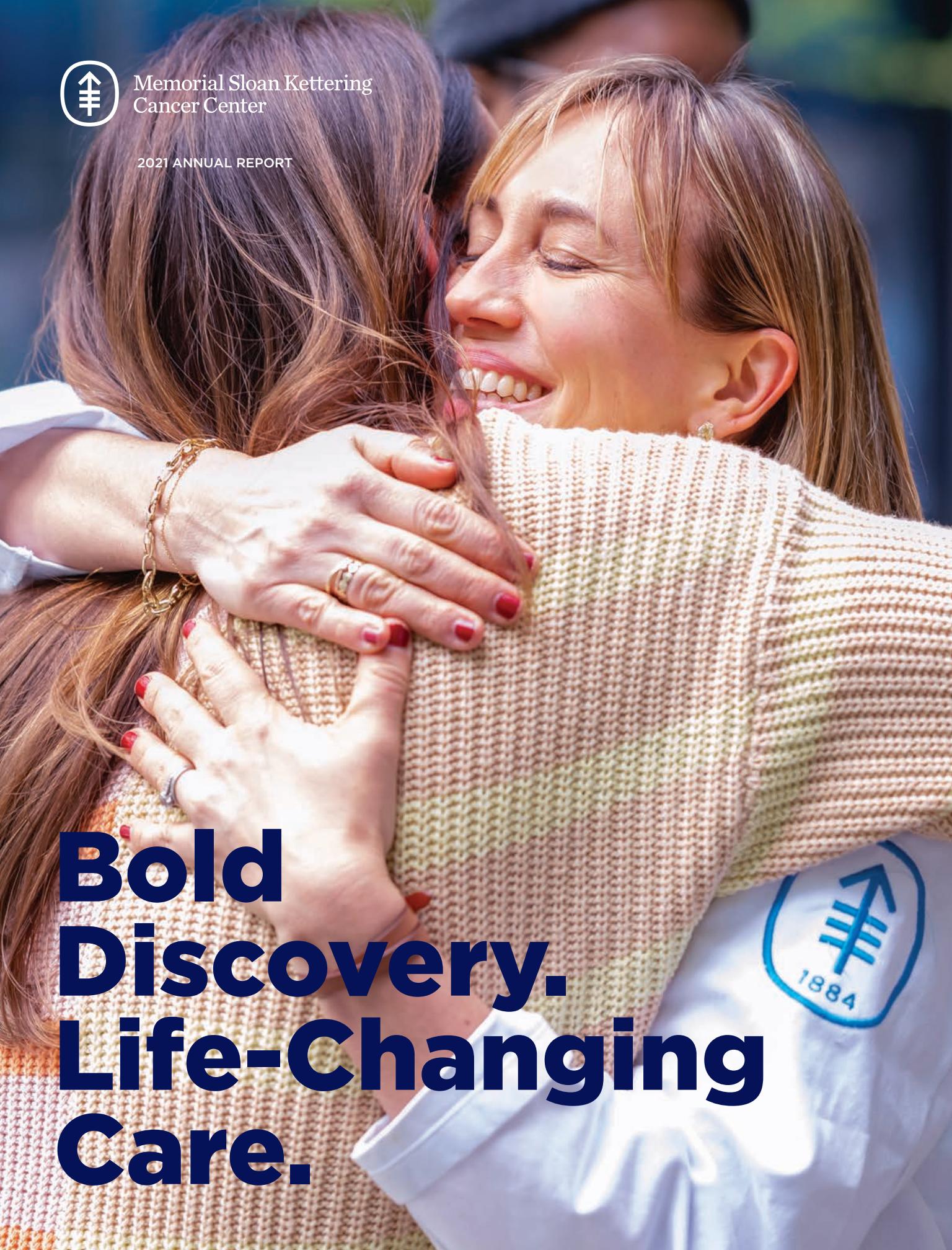




Memorial Sloan Kettering  
Cancer Center

2021 ANNUAL REPORT



**Bold  
Discovery.  
Life-Changing  
Care.**





**MSK is an ecosystem  
of discovery, where  
the seed of an idea  
can blossom into a  
breakthrough.**

(Cover) Medical oncologist Andrea Cerck, MD, embraces her patient, Sascha Roth.  
(This page) Radiopharmacist Scott Vietri and Cyclotron Engineer Sherron Hicks prepare  
a drug with a radioactive element that seeks out hidden cancer cells and destroys them.

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# messages

## from the Chairman and the President

### From the President

#### For 138 years, Memorial Sloan Kettering Cancer Center (MSK) has fulfilled its promise to people facing cancer.

The most recent evidence made international headlines in June 2022 at one of the country's premier cancer conferences. Physicians and journalists hailed two groundbreaking studies by MSK researchers, presented at the American Society of Clinical Oncology (ASCO).

In one historic trial led by **medical oncologists Andrea Cersek and Luis Diaz**, all 14 patients with rectal cancer saw it disappear completely, thanks to a form of immunotherapy that helps people whose tumors contain a specific genetic mutation. In this trial involving a subset of rectal cancer patients, the immune system was unleashed to attack the tumors, and no surgery, chemotherapy, or radiation was needed, sparing patients from debilitating side effects. It was a rare — if not first — study in which every person with cancer who was enrolled experienced 100% remission.

In the second trial, MSK **medical oncologist Shantu Modi** presented research that will change the practice of treatment for patients with metastatic breast cancer that is known as HER2-low, meaning a low level of a protein that fuels the growth of cancer cells. Using the targeted therapy trastuzumab deruxtecan,

the trial found that the drug held cancer in check nearly twice as long as standard chemotherapy. These are stunning results for patients with advanced breast cancer.

Both trial presentations received standing ovations at the conference. They are just the beginning. Our researchers will continue investigating whether these treatment approaches can help even more patients with other forms of cancer.

We are building momentum for the decade ahead — and beyond — to help people with cancer in every way we can.

### Foundation for the Future

MSK welcomed new leaders in key roles in 2021. **Deb Schrag** was named **Chair of the Department of Medicine**. This is a homecoming for Dr. Schrag, who began her career as a medical oncologist at MSK and is recognized as a pioneer for her work in improving the delivery, quality, and effectiveness of cancer care.

MSK's unparalleled nursing staff also received a new leader with the appointment of **Tracy Gosselin** as **Senior Vice President and Chief Nursing Executive**. She leads nearly 5,000 highly skilled nurses and support staff across 25 sites.

MSK also named **Rémy Evard** as **Chief Digital Officer and Head of Technology**. Among many achievements in 2021, MSK's technology and digital team, **DIGITs**, consolidated telemedicine systems onto a single platform, helping telemedicine visits expand from 300 per week in 2020 to more than 5,800 per week at the end of 2021.

### Clinical and Research Advances

MSK's legacy of excellence in research continued in 2021, with 49 faculty members ranked among the most Highly Cited Researchers in the world by the research firm Clarivate.

This Annual Report includes just some of the highlights:

The lab of **Andrea Schietinger, Associate Member of the Immunology Program at the Sloan Kettering Institute (SKI)**, found that autoimmunity can be caused by a never-before-seen population of stem-like T cells. This research could provide important insights into making T cells more effective cancer killers.

**Scott Lowe, Chair of the Cancer Biology and Genetics Program**, and his lab at SKI also discovered how genetic changes and environment — specifically, tissue damage — work together in the earliest stages of pancreatic cancer development, allowing the disease to grow. This discovery lays the groundwork for earlier diagnosis and better treatment of this particularly difficult cancer.

Similarly, clinical advances made at MSK in 2021 offer new hope to people facing some of the most difficult and complex cancers. Among many examples, **medical oncologist Bob Li** co-led trials that resulted in FDA approval of the first-ever KRAS inhibitor, targeting an oncogene that fuels cancer growth that had been considered "undruggable" for decades. This treatment, called sotorasib, provides a new option for some patients with non-small cell lung cancer.



**SCOTT M. STUART**

Chair, Board of Trustees

MSK **medical oncologist Michael Morris** has been a leading researcher of a therapy for advanced prostate cancer that can kill cancer cells that are resistant to other treatments.

Based on clinical trials he led, the FDA approved a treatment called 177Lu-PSMA-617, which uses a molecule that seeks out and attaches to a specific protein on the cancer cell. The technology then delivers radiation that destroys the cancer cell. This important advance offers new hope for people with prostate cancer, which kills 34,000 people in the U.S. each year.

### Diversity and Inclusion

At MSK, our continued efforts to build a more equitable culture are bearing fruit. In 2021, *Forbes* named MSK one of America's Best Employers for Diversity, ranking 17th out of 500 organizations and the second-highest-ranked hospital.

During 2021, MSK continued building an exceptional team at SKI and Memorial Hospital that better represents the diverse world we live in, which includes hiring nine new faculty members from underrepresented communities. The Nicholls-Biondi Diversity Clinical Scientist Fellowships for Academic Careers in Cancer Research were also created in 2021, thanks to the support of **Jamie C. Nicholls, MSK Board of Trustees, and her husband, O. Francis Biondi**.

We also established the MSK Bridge program, which brings 10 college graduates from backgrounds that are underrepresented in science and medicine to MSK labs for two years.

**CRAIG B. THOMPSON, MD**

President and Chief Executive Officer  
Douglas A. Warner III Chair

In addition, MSK continued working in 2021 to increase the racial and ethnic diversity of our patient population by making care more accessible.

These efforts include expanded community outreach programs to improve cancer health equity. Among them is the Endometrial Equity Cancer Program, led by **Carol Brown, gynecologic surgeon and Chief Health Equity Officer**, with colleagues including **nurse practitioner Latasha Anderson-Dunkley**. The program conducts educational outreach and screens women at high risk to reduce the disparity that makes Black women almost twice as likely to die of endometrial cancer as white women.

MSK also redoubled its efforts in 2021 to fight COVID-19. To ensure vaccines were accessible to as many of our patients as possible, we set up pop-up clinics, including at the MSK Ralph Lauren Center, located in Harlem, and the MSK Brooklyn Infusion Center. To reach populations outside MSK that have been disproportionately affected by the pandemic, MSK created partnerships. At MSK Nassau, more than 400 residents from nearby towns were vaccinated.

In New York City, MSK partnered with city government and the Abyssinian Baptist Church to establish a vaccine clinic at the historic church in Harlem. Approximately 350 MSK staff volunteered to help, administering 12,000 doses of vaccine to community members.



**KATHRYN MARTIN**  
Chief Operating Officer



**LISA M. DEANGELIS, MD**  
Physician-in-Chief  
Chief Medical Officer  
Scott M. and Lisa G. Stuart Chair



**JOAN MASSAGUÉ, PhD**  
Director, Sloan Kettering Institute  
Marie-Josée and Henry R. Kravis Foundation Chair

## Recognition and Honors

MSK's excellence has remained constant throughout the pandemic. In 2021, *U.S. News & World Report* again ranked MSK as one of the top 2 cancer hospitals in the country, as it has every year since the ratings began more than three decades ago. Among all hospitals — not just cancer hospitals — MSK was ranked No. 1 in the nation for the treatment of ear, nose, and throat diseases; No. 2 in gynecology; and No. 3 in urology.

Many individual members of the MSK community also received prestigious recognitions. **Dr. Diaz, Head of the Division of Solid Tumor Oncology**, was appointed to the National Cancer Advisory Board; **Dana Pe'er, Chair of the Computational and Systems Biology Program, SKI**, was named a Howard Hughes Medical Institute Investigator; **Justin Perry, cell biologist and immunologist at SKI**, was named a recipient of the National Institutes of Health Director's New Innovator Award; **Larry Norton, Medical Director at the Evelyn H. Lauder Breast Center**, was elected to the American Academy of Arts and Sciences; **Esther Babady, Chief of the Clinical Microbiology Service**, was named to the *Crain's New York Business* 2021 Empire Whole Health Heroes List; **Dr. Brown** was named one of *Crain's New York Business*' Notable Black Leaders and Executives; **Richard O'Reilly, former Chair of the Department of Pediatrics**, was inducted into the 2021 Giants of Cancer Care®; and

**Direna Alonso-Curbelo, postdoctoral fellow at SKI**, was named a winner of the 2021 Blavatnik Regional Awards for Young Scientists, among many other recognitions of MSK faculty, staff, and trainees.

## Continued Support

Looking ahead, MSK is deeply grateful for support that will save lives for decades to come. 2021 was a record-breaking year for donor support of MSK, more than doubling the previous record set in 2018.

Over 800,000 donors support MSK, including individuals who participate in **Kids Walk for MSK Kids, Fred's Team, and Cycle for Survival**®, as well as visionary gifts from generous benefactors.

Among many highlights are the Tow Center for Development Oncology, made possible by support from the **Tow Foundation and other donors**; the Lisa and Scott Stuart Center for Adolescent and Young Adult Cancers,

supported by **Scott Stuart and his wife, Lisa**; The Louis V. Gerstner, Jr. Physician Scholars Program, made possible by **Lou Gerstner**; the Fiona and Stanley Druckenmiller Presidential Innovation Fund, supported by the **Fiona and Stanley Druckenmiller Foundation**; and The Marie-Josée Kravis and Henry R. Kravis Cancer Ecosystems Project, funded by **Marie-Josée Kravis and Henry R. Kravis**.

As always, our three pillars — patient care, scientific research, and education — set us apart and set standards in the field. With your continued support, we will carry on our mission of bold discovery and life-changing care.

### CRAIG B. THOMPSON

President and Chief Executive Officer  
Douglas A. Warner III Chair

## From the Chairman

As we went to press with this Annual Report for 2021, we welcomed **Selwyn M. Vickers, MD, FACS**, as our next President and Chief Executive Officer. Dr. Vickers joins MSK in September 2022. An extraordinary surgeon-scientist with a proven track record in leading complex medical centers, Dr. Vickers has built innovative academic and research programs, strengthened clinical care, and has been dedicated to addressing health disparities.

Dr. Vickers joins MSK from the University of Alabama at Birmingham (UAB), where he led one of the largest public academic medical centers in the country and was CEO of the UAB Health Systems and UAB/Ascension St. Vincent's Alliance.

On behalf of the MSK Board of Trustees, I would like to offer our enormous gratitude to **Craig Thompson** for his incomparable leadership over the past 12 years. He has overseen one of the most remarkable periods for cancer science and care in history, with standouts including the fields of cancer genomics and immunotherapy.

He has also helped lead the growth of MSK's pioneering Regional Care Network, transforming cancer care to an outpatient basis that allows people to stay closer to home.

At the same time, Dr. Thompson helped steer MSK through some of the greatest challenges in its long history, including Hurricanes Irene and Sandy, which devastated the New York metropolitan area, and of course COVID-19, the greatest public health threat of our lifetime.

I know I speak for all of us when I say it's a great comfort to know we can rely on Dr. Thompson's insights for years to come as he returns to his first love, as a renowned cell biologist and faculty member, leading research in his lab at MSK. His imprint on MSK and his contribution to biomedical science are enduring.

He and Dr. Vickers will work together to ensure a smooth transition. In Dr. Vickers, MSK has found a charismatic and compassionate leader who is uniquely qualified to shepherd this great organization into the future.

### SCOTT M. STUART

Chair, Board of Trustees

A close-up photograph of a male scientist with dark hair and a beard, wearing a white lab coat and purple gloves. He is holding a test tube with a blue liquid. The background is a blurred laboratory setting with shelves of equipment.

# Innovation with lasting impact

**Our discoveries make history.  
Our results help patients  
around the world.**

**10**

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MSK Annual Report 2021

Abderezak Zebboudj, PhD, is a research fellow in the Balachandran Lab, focused on discovering new ways to stimulate the immune system to treat cancer.

# A triumph against prostate cancer

Things were looking bleak for Michael Rosenblum in 2019. His prostate cancer had become resistant to chemotherapy and other treatments, and PET scans showed dark clusters of cancer cells in bones throughout his body. His prostate-specific antigen (PSA) level — a marker that should normally be in the single-digit range — had soared to more than 100. Most people in his condition would be out of options.

But his doctor, Memorial Sloan Kettering Cancer Center (MSK) **medical oncologist Michael Morris**, offered a lifeline: a new therapy that zeroes in on hidden prostate cancer cells to destroy them. The treatment, called 177Lu-PSMA-617, uses a molecule that selectively seeks out and attaches to a specific protein on the cancer cell surface called PSMA (prostate-specific membrane antigen). The technology delivers radiation that damages DNA and destroys the cancer cell.

Michael began treatment in July 2019 and finished in February 2020. After six doses of the therapy, the pictures spoke a thousand words: The dark clusters had vanished. His scans showed no visible signs of cancer. Michael celebrated his 50th wedding anniversary in 2021. The 76-year-old remains free of active disease, with a PSA that is undetectable.

“From how I feel today, you would never think I had cancer a few years ago,” he says.

“This type of precision medicine is a game changer for people whose prostate cancer has spread despite receiving multiple prior treatments,” Dr. Morris says.

“This type of precision medicine is a game changer for people whose prostate cancer has spread despite receiving multiple prior treatments.”

—Michael Morris, MD



## An MSK Triumph

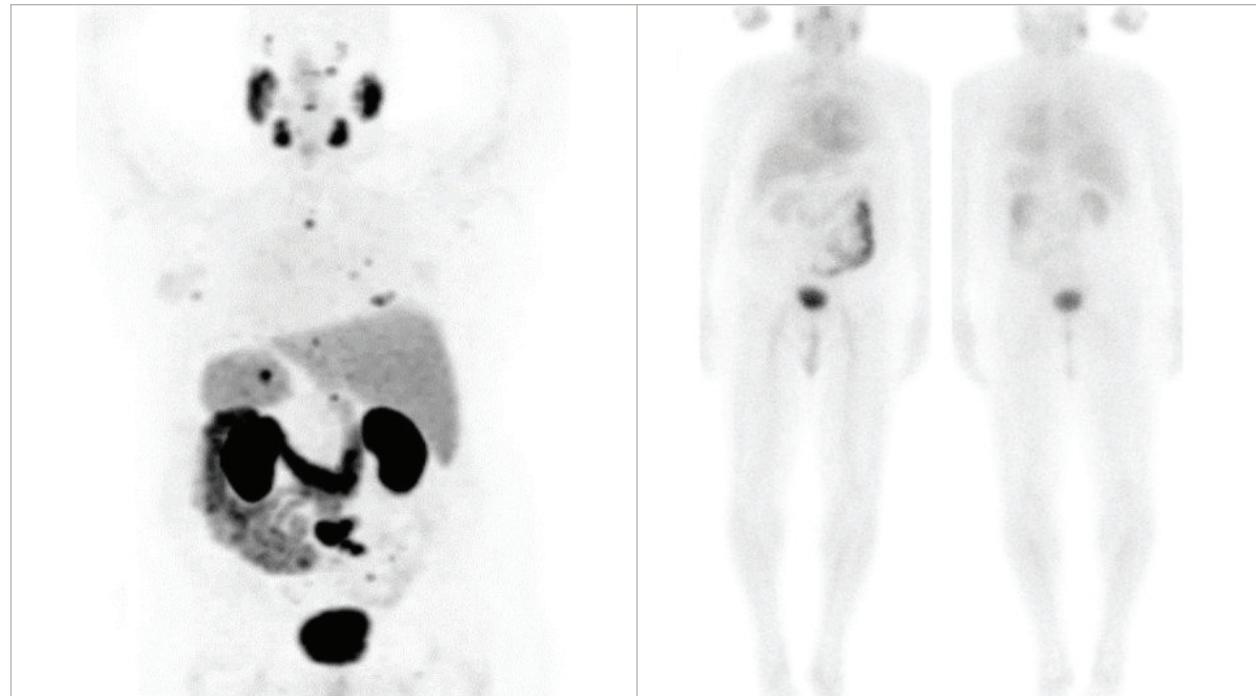
The PSMA-based technology could transform care for prostate cancer, the second leading cause of cancer death in American males. The PSMA molecule was first identified at MSK in the early 1990s. Since then, MSK has continued to play a critical role in developing and testing this technology to track and treat spreading prostate cancer cells, which would otherwise be hidden.

The initial breakthrough involved using a radioactive substance, or tracer, to find metastatic prostate cancer cells. Dr. Morris played a leading role in clinical trials testing a particular tracer that gained FDA approval in 2021.

"This is the biggest diagnostic advance for prostate cancer since the 1980s, when the PSA test was introduced," he says. "Imaging has been the Achilles' heel of prostate cancer, forcing many treatment choices to be based on estimation and probabilities. Now, we can be much more confident that we are correctly identifying the location of the disease to make an accurate treatment plan."

Creating the technology that pinpoints these elusive cells was a total team effort: The **MSK Molecular Imaging and Therapy Service, led by Heiko Schöder**, was key in testing the tracer, as were **MSK radiologist Hebert Alberto Vargas** and **interventional radiologist Jeremy Durack**.

Jason Lewis, PhD, is a radiochemist who develops radiopharmaceuticals to treat cancer.



(Left) PSMA PET scans of Michael Rosenblum before treatment show prostate cancer metastases (small dark spots) throughout his body. (Right) After treatment, metastatic cancer is no longer visible.



"This advance is the result of years of work by the community of physicians promoting the use of PSMA agents," Dr. Schöder says. "It's gratifying to see a collaborative effort result in a breakthrough that has the potential to make a difference for so many patients with advanced prostate cancer."

## The Promise of Theranostics

The technology has exciting potential for other cancers, too. It represents the latest bold advance in the emerging field of theranostics, which uses radioactive substances to visualize cancer cells and destroy them without harming normal cells.

"We have a theranostic motto, which is 'We see what we treat, and we treat what we see,'" says **nuclear medicine physician Lisa Bodei, Director of Targeted Radionuclide Therapy** at MSK. She specializes in using radioactive materials to diagnose and treat cancer and played a key role in the MSK clinical trial for prostate cancer.

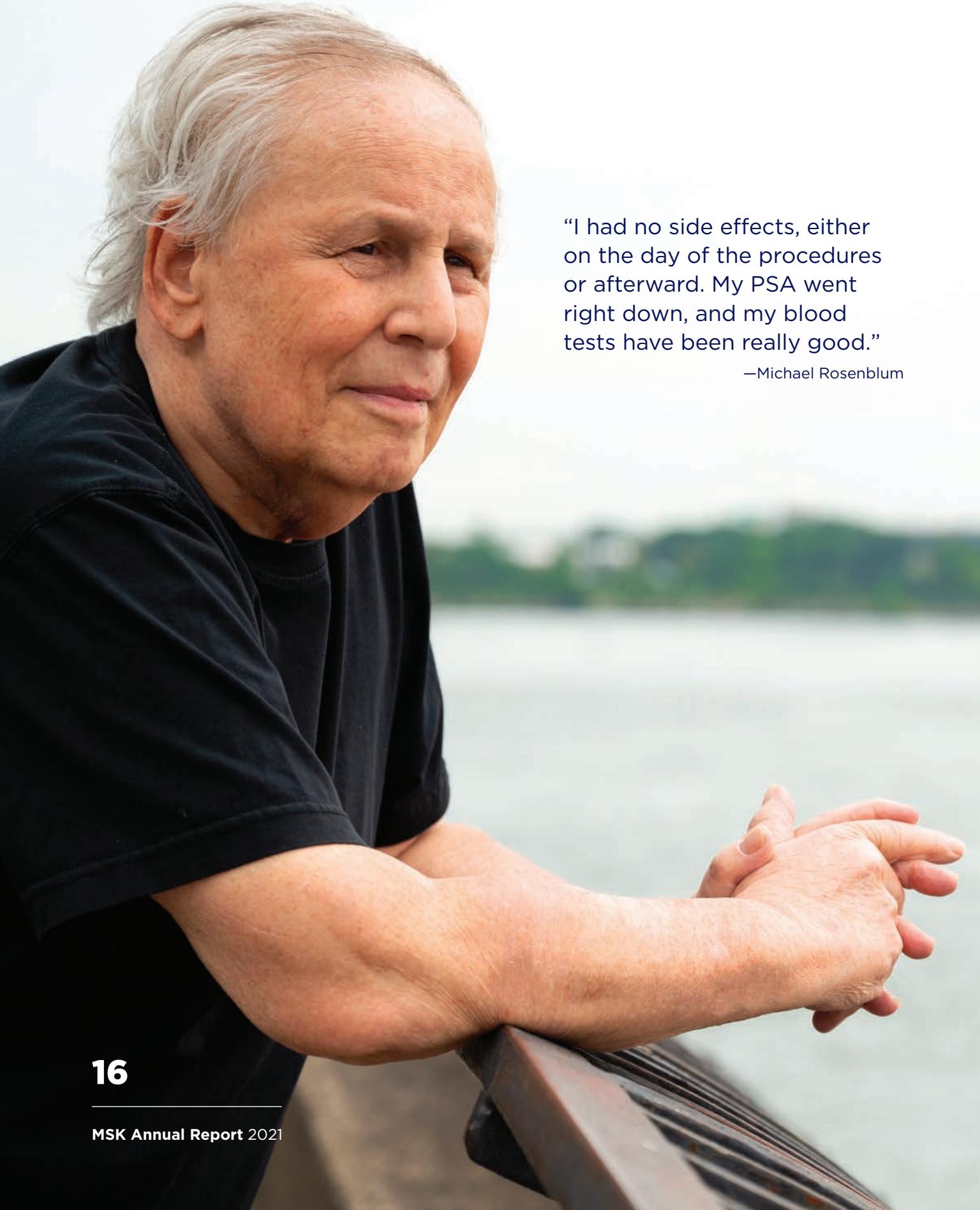
Here's how it works: First, patients are scanned to make sure there is enough PSMA present in the cells to make them likely to respond to the treatment. Then, patients receive the radioactive drug by injection over four to six sessions, spaced six weeks apart.

"I had no side effects, either on the day of the procedures or afterward," Michael says. "My PSA went right down, and my blood tests have been really good."

The trial also showed that adding the drug to standard treatment slowed progression of prostate cancer. Dr. Morris presented the results in June 2021 at the annual meeting of the American Society of Clinical Oncology. They also were



Lisa Bodei, MD, PhD,  
Director of Targeted  
Radionuclide Therapy



**"I had no side effects, either on the day of the procedures or afterward. My PSA went right down, and my blood tests have been really good."**

—Michael Rosenblum

reported in *The New England Journal of Medicine*. The FDA approved 177Lu-PSMA-617 for therapeutic use in March 2022.

"This enables even more people who had essentially been given death sentences to survive and live well," Dr. Morris says. As a next step, he and colleagues are looking into using the PSMA-directed therapy earlier — rather than only after the prostate cancer has spread.

For Dr. Morris, the recent inroads against this stubborn disease are especially gratifying. "I have been involved in the PSMA research since the end of my fellowship at MSK in the late 1990s," he says. "It's amazing to see it all come to fruition. The benefits these advances will bring to men with this common disease cannot be overstated."

#### **What Lies Ahead: Leading the Way With Alpha Therapies**

The theranostics advances will continue with even more powerful forms of radioactive therapy. The MSK laboratory of **radiochemist Jason Lewis (Emily Tow Jackson Chair in Oncology)** and other researchers are investigating the use of alpha particles, which are hundreds of times more potent than the photons used in conventional radiation. Not only do alpha particles cause more damage when they slam into cancer cells but their path of destruction is also more tightly focused, sparing normal cells.

MSK is building one of the nation's first dedicated alpha particle labs at a U.S. academic institution that meet the standards set by the U.S. Food and Drug Administration (FDA) for clinical application.

"These radiopharmaceuticals that we are creating translate very well from bench to bedside," says Dr. Lewis, Chief of the Radiochemistry and Imaging Sciences Service and Director of the Radiochemistry and Molecular Imaging Probe Core Facility. "When you see these striking responses to treatment, it brings real hope for the future and our patients."

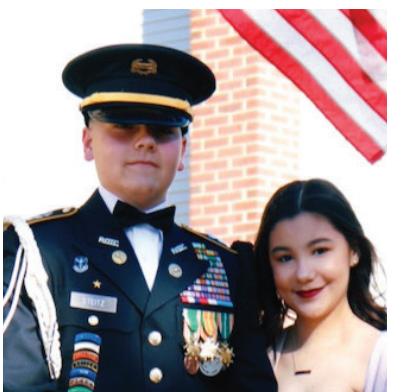
Michael Rosenblum couldn't agree more. •

**"This enables even more people who had essentially been given death sentences to survive and live well."**

—Michael Morris, MD

The **Magnier family** and the **Scannell family** have provided vital support for prostate cancer research at MSK.

# Pairing patients with the right drug



(Above, top) Giovanna at MSK in 2016. Before enrolling in a clinical trial, she was running out of treatment options. (Above, bottom) Giovanna in 2019 at a military ball with Anthony Steitz, her best friend from childhood. "Without him, I wouldn't be where I am today," she says.

**Their first meeting was unforgettable.** Giovanna Whitting was 16 years old but looked much younger, says Memorial Sloan Kettering Cancer Center (MSK) medical oncologist Alexander Drilon. "She was severely underweight," he remembers. "There was talk about giving her a feeding tube." Giovanna had metastatic thyroid cancer. Standard treatments were not working.

"I was literally dying in my hospital bed," Giovanna says of that day in 2018. "Then Dr. Drilon comes in out of nowhere with a treatment for me. I don't know where I'd be if it weren't for him."

Today, Giovanna is a 20-year-old college student studying writing and digital media at Pennsylvania State University. She has a boyfriend and a tightknit group of friends. "When people look at me, they can't tell that I was ever sick," she says.

Giovanna's amazing turnaround is due in part to an innovative database developed at MSK, called **OncoKB™**. It matches patients whose cancer is driven by rare mutations with the targeted therapy that may work based on the patient's tumor molecular profile.

In October 2021, OncoKB became the first such database to be partially recognized by the U.S. Food and Drug Administration (FDA). This distinction means that OncoKB is considered a scientifically valid reference tool that documents the tumor-type specific therapeutic implications of cancer mutations.

OncoKB is the result of years of collaboration overseen by MSK **molecular geneticist Debyani Chakravarty**, the lead scientist for OncoKB; **Nikolaus Schultz (Geoffrey Beene Junior Faculty Chair)**, head of Knowledge Systems in MSK's Marie-Josée and Henry R. Kravis Center for Molecular Oncology (CMO); and MSK **computational oncologist JianJiong "JJ" Gao**.

## A Tsunami of Genetic Information To Interpret

Nearly two decades ago, when doctors began performing the first tests to analyze genetic patterns for a few types of cancer, interpreting the results was straightforward. A handful of familiar mutations indicated that people with certain cancers may respond to drugs targeting those mutations.

With the advent of more advanced DNA sequencing technologies analyzing hundreds of cancer-associated genes or even the whole genome, there's been exponential growth in the number of potentially targetable mutations that can be detected.

Thanks to an experimental drug, Giovanna Whitting's aggressive thyroid cancer has disappeared.



**"Dr. Drilon comes in out of nowhere with a treatment for me. I don't know where I'd be if it weren't for him."**

—Giovanna Whitting



Alexander Drilon, MD,  
Chief, Early Drug  
Development Service

There also has been an explosion in the number of targeted drugs available to treat cancers of all types.

Confronting mind-boggling amounts of data, doctors and scientists at MSK understood that they needed a better way to keep track of the mutations and possible drugs for different kinds of cancer. They developed this searchable database and named it OncoKB. (The “KB” stands for “knowledge base.”)

“There are so many cancer-causing mutations that no one can memorize all of them,” says **physician-scientist David Solit (Geoffrey Beene Chair), Director of the CMO**, which maintains the database. “We created OncoKB as a tool to help doctors understand which mutations in a particular gene are important and may predict for sensitivity or resistance to a particular drug.”

### Matching Patients With Targeted Drugs

Giovanna was first diagnosed with medullary thyroid cancer, an aggressive disease, when she was 8 years old. MSK **pediatric surgeon Michael La Quaglia (Joseph H. Burchenal Chair in Pediatrics)** removed part of her tumor, which relieved the pressure on her windpipe that was making it difficult to swallow. For years, her cancer remained under control, but it eventually returned. In May 2018, a scan revealed that it had spread to one of her lungs.

Giovanna’s cancer was analyzed with **MSK-IMPACT**, a test that looks for mutations in more than 500 cancer-associated genes in tumor samples. The test detected a mutation in a gene called *RET*.

“Based on results that OncoKB revealed about the *RET* mutation, she was then referred to us,” says Dr. Drilon, who is Chief of the **Early Drug Development Service** at MSK. “Because she had the *RET* mutation associated with response to *RET* inhibition, we were able to enroll her in a clinical trial of a selective *RET* inhibitor, selpercatinib, a drug that was investigational at the time.” (In May 2020, selpercatinib, now also known as *Retevmo*™, received FDA approval for treating lung and thyroid cancers caused by *RET* mutations.)

After Giovanna started taking the drug, she felt better almost immediately. “When I was really sick, I had a routine every morning that broke my mom’s heart. I would wake up and cough until I threw up,” Giovanna says. “I still remember waking up in a hotel room near MSK just a day or two after I started taking the pills. I was getting ready to start my cough, and then I realized it was gone.” Since those early days in the trial, Giovanna’s scans continue to show no signs of cancer. She still takes selpercatinib every day.

“Giovanna looks like a completely different person from when I met her,” Dr. Drilon says. “None of this would have been possible without OncoKB.”

### Finding the ‘Driver’ Mutations

One reason it’s so hard to match mutations with drugs is that most tumors contain dozens of mutations. The challenge is determining which mutations are the “drivers” — that is, which mutations control the cancer’s development or spread. Most mutations are “passengers” that play no significant role in tumor growth.

“Once the drivers are identified, the next step is to determine which of them are clinically actionable — which means they can be potentially targeted with drugs,” Dr. Chakravarty explains. “OncoKB



(From left) David Solit, MD; Debyani Chakravarty, PhD; and Nikolaus Schultz, PhD, collaborated on the development of OncoKB.

was designed to make these tasks significantly easier.”

The goal now is to disseminate the knowledge from this massive and constantly updated database across the country, far beyond MSK. Since December 2019, other hospitals have been able to license OncoKB to help their patients, even if their diagnostic genetic test was not MSK-IMPACT. “We hope that the FDA’s recognition of OncoKB will help raise awareness of this valuable resource not only at referral cancer centers but also among doctors caring for patients in the community,” Dr. Chakravarty says. “The goal is that many more clinicians will have access to the knowledge stored within OncoKB so that many more patients can ultimately benefit from precision oncology approaches.”

Giovanna wants to spread her story too. After college, she plans to become a magazine writer. “I want to use my writing to inspire other people,” she says. “When it comes to pediatric cancer, we don’t talk about our stories nearly enough. I think by showing my perspective and how I’ve coped, I can help other teens going through this to know they’re not alone.” •

# After four decades, a breakthrough for lung cancer



Bob Li, MD, PhD, MPH,  
Co-Director, Thoracic  
Liquid Biopsy Program

**Karen Milich got the surprise call at 7:30 on a Saturday night. It was Bob Li, her medical oncologist at Memorial Sloan Kettering Cancer Center (MSK), telling her that he had obtained a slot for her on a clinical trial of a brand-new experimental drug called AMG 510. Karen, who had been living with advanced lung cancer for nearly a year, got up the next day and drove 20 hours from her home in Florida to New York City. About a week later, she started taking the drug.**

That was August 2019. Since that time, Karen's cancer has been wiped out. "I always tell Dr. Li I want to take my AMG to prevent my cancer like someone else takes an aspirin to prevent a heart attack," Karen says. "I don't feel any side effects from it at all."

In May 2021, the U.S. Food and Drug Administration (FDA) approved AMG 510, now called sotorasib (Lumakras™), for a subset of people with lung cancer. The approval was based on the international clinical trial co-led by Dr. Li, which was published in *The New England Journal of Medicine* in June 2021.

Sotorasib looks like any other pill, but it represents an astounding breakthrough in cancer science. It blocks a cancer-causing protein that results from a mutation in a gene called KRAS (pronounced "kay-rass"). KRAS, discovered in 1982, was one of the first cancer genes ever found. Yet despite decades of research, scientists kept hitting roadblocks. That's because the protein's smooth, round shape lacked notches or grooves where drugs could attach. Scientists eventually gave this tenacious protein a label: undruggable.

When she didn't respond to other treatments, Karen Milich received an experimental drug, which wiped out her lung cancer.



**Sotorasib looks like any other pill, but it represents an astounding breakthrough in cancer science.**

When Karen was first diagnosed in the fall of 2018, sotorasib was not available. She received chemotherapy, radiation, and immunotherapy, but her cancer continued to grow. Then she learned she had been accepted into the MSK trial.

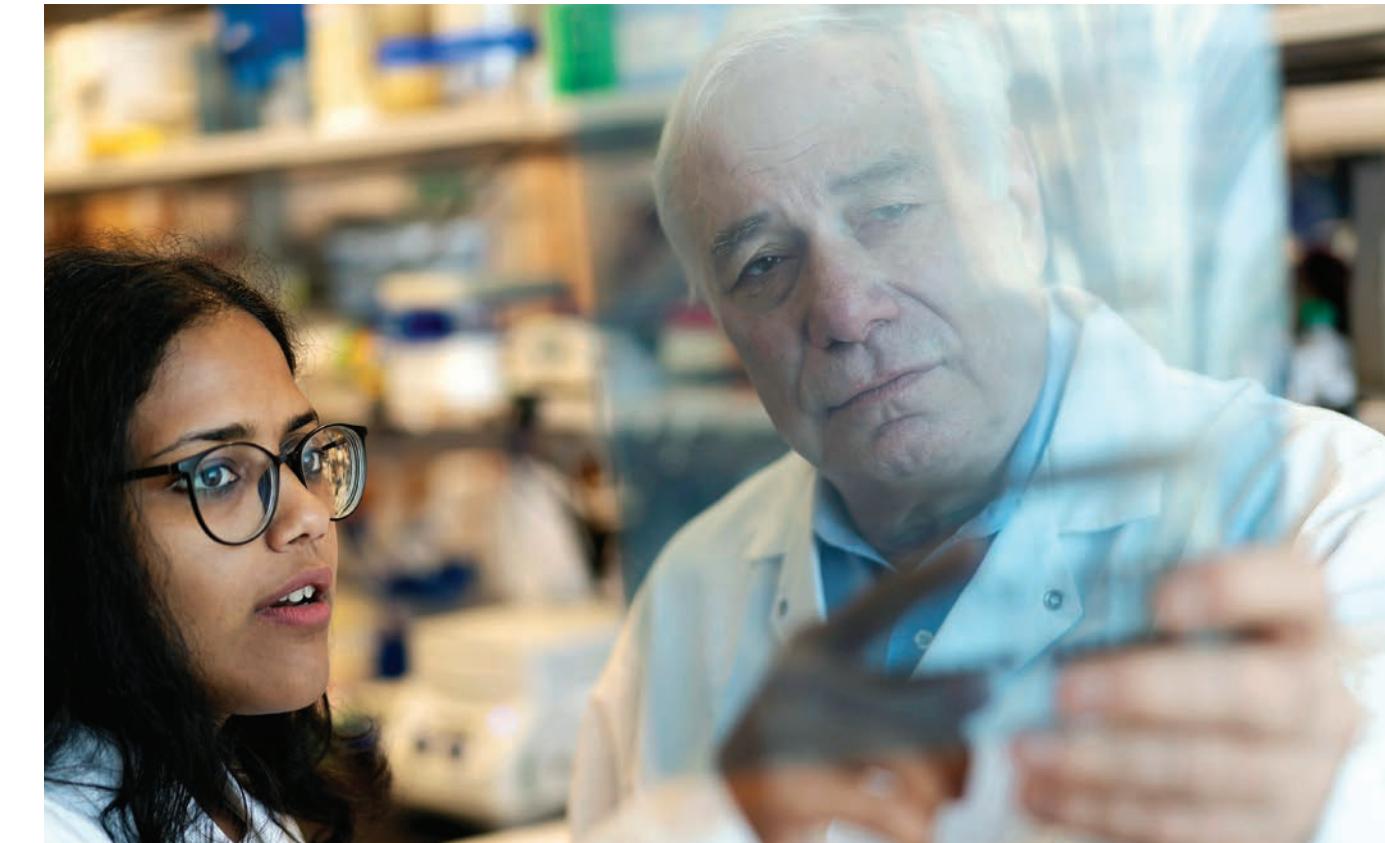
Sotorasib was developed thanks to years of hard work, much of it done at MSK, including in **physician-scientist Neal Rosen's lab in the Sloan Kettering Institute**. In a paper published in *Science* in 2016, MSK **physician-scientist Piro Lito** and Dr. Rosen (Enid A. Haupt Chair in Medical Oncology) showed how it was possible to block the most common form of mutated *KRAS* in lung cancer, called *KRAS*-G12C. The FDA approved sotorasib for treating lung cancers with this specific *KRAS* mutation.

At the American Association for Cancer Research annual meeting in April 2022, researchers presented longer-term follow-up data for the clinical trial that led to sotorasib's approval. Notably, nearly one-third of patients continued to survive after two years — a significant share for patients with advanced disease who had exhausted other treatment options.

"Karen's got a remarkable story, but she's not the only one who benefited," Dr. Li says. "It's a testament to what a milestone this is, to be able to target this protein that was previously considered to be really bad news."

**"What really sets MSK apart in this area is the combination of lab and clinical research focused on understanding how these drugs work and the best way to administer them."**

—Piro Lito, MD, PhD



Physician-scientist Neal Rosen, MD, PhD, pictured here with research fellow Radha Mukherjee, studies *KRAS* and other cancer genes.

For patients who develop resistance to sotorasib, Drs. Lito and Li have recently published in *Nature* potential strategies to overcome these mechanisms. They also have launched clinical trials of combination therapies to continue to keep in check cancers driven by *KRAS*-G12C. "What really sets MSK apart in this area is the combination of lab and clinical research focused on understanding how these drugs work and the best way to administer them," Dr. Lito says.

In October 2021, MSK **surgeon Vivian Strong (Iris Cantor Chair)** used minimally invasive surgery to remove a small tumor in Karen's abdominal cavity that was not responding to treatment. Karen's latest tests show no evidence of active cancer. "I'm thankful to God every day for Dr. Li, MSK, and the trial," Karen says. "They're all incredible." •

Neal Rosen's research has been supported by MSK Board Member **Bruce C. Ratner**.

Piro Lito is an alumnus of the Josie Robertson Investigators program at MSK, created and sustained by the **Robertson Foundation**.

# Bridging gaps in patient care

**Everyone deserves the best medicine. We reach the patients others may overlook, leading the way for more equitable care.**

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Linda Collins was successfully treated at MSK for endometrial cancer. Black women are nearly twice as likely to die of endometrial cancer as white women, even though the disease is slightly more common in white women than in Black women.



# Improving outcomes for everyone

**Theresa Langley set three goals when she was diagnosed with aggressive triple-negative breast cancer at just 36 years old.**

She wanted to beat her illness.

She wanted to complete a career change and become a teacher.

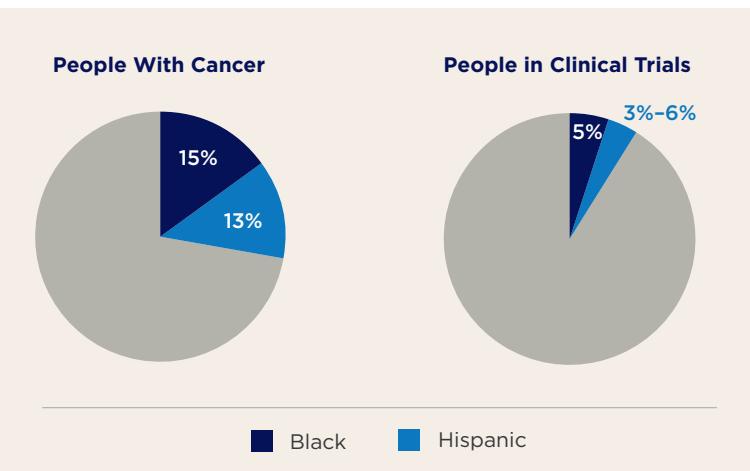
And she wanted to help solve a glaring problem she found while researching her diagnosis: "I was saddened to see there isn't a lot of research surrounding Black women like me or Hispanic women who are diagnosed with breast cancer."

She continues, "If I was able to participate in research to give voice to this group of women — and all people facing breast cancer — I wanted to do it."

## The Research Blind Spot

The problem that Theresa discovered could not be more urgent. Cancer research and clinical trials that investigate treatments for cancer are associated with better outcomes for patients.

But people of color are badly underrepresented in cancer research and have been for decades.



Research shows that Black individuals account for 15% of people with cancer, and Hispanics represent 13%. But only around 5% of participants in clinical trials for cancer are Black, and only 3% to 6% are Hispanic.

**"I hope this helps another person of color who is facing breast cancer — that would be wonderful."**

—Theresa Langley



This lack of representation in research is one factor contributing to the shocking disparities that people of color face with cancer.

The American Cancer Society puts it bluntly: "For most types of cancers, Black people have the highest death rate and shortest survival rate of any racial or ethnic group [in America]."

### A Hunch, Confirmed

One consequence of the low representation of people of color in cancer research is that side effects affecting specific populations may go unnoticed.

That could have been the outcome for Debra Edwards after she was diagnosed with breast cancer at age 55.

At MSK, Debra began a treatment known as AC-THP, which combines three chemotherapy drugs with two medications that target the protein HER2. At first, her side effects were manageable. But suddenly, Debra developed shortness of breath. "I couldn't walk more than half a block," she recalls.

Her **medical oncologist, Gabriella D'Andrea**, immediately recognized the symptoms of heart failure and referred Debra to MSK **cardiologist Anthony Yu**. His work focuses on rare but harmful side effects on the heart that certain breast cancer treatments can induce, including the drugs that Debra was taking.

Dr. Yu had noticed that a disproportionate number of patients at MSK who suffered these side effects were Black women like Debra. "At first, we thought maybe these were chance events," he recalls. "But as I treated more and more women for heart-related side effects during breast cancer, it became clear there could be an underlying difference between Black patients and patients of other racial groups."

Dr. Yu, alongside MSK **cardiologist Michelle Johnson — the MSK Vice Chair for Health Equity** — and their colleagues, undertook a review of the therapies and side effects in about 1,400

MSK cardiologist Michelle Johnson, MD, MPH, is Vice Chair of Health Equity.



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Black men are  
**73%**  
more likely to be  
diagnosed with  
prostate cancer  
than white men.

Black women have a  
**40%**  
higher death rate than  
white women after  
being diagnosed  
with breast cancer.



Cardiologist Anthony Yu, MD, MS, is focused on helping the disproportionate number of Black women who suffer side effects from certain breast cancer drugs.

women who had been treated at MSK for HER2-positive breast cancer between 2004 and 2013. In February 2021, they published the findings online in *The American Journal of Cardiology*.

Their study found that Black women were nearly two times more likely to have cardiac side effects than white women, even when adjusting for risk factors like high blood pressure, diabetes, and obesity, as well as for socioeconomic differences.

Dr. Johnson says: "There hasn't yet been a lot of work to look at racial disparities in terms of cardio-oncology. But this research is an exciting move forward to fulfill an important goal of mine and MSK's."

Thanks to the insights of her team at MSK, Debra recovered and returned to the life she loves.

### Research Plus Outreach

Another MSK research effort is underway to understand one of the most frightening disparities in cancer, involving endometrial cancer.

The disease, which is sometimes called uterine cancer, is slightly more common in white women than in Black women. But Black women are twice as likely to die of it. The number of cases is also on the rise among all women, with the greatest risk among Black women.

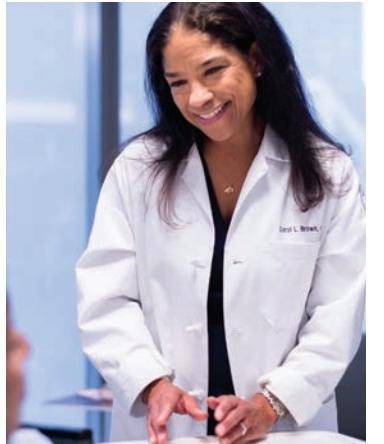
To learn what is happening, **surgeon Carol Brown — who is Nicholls-Biondi Chair for Health Equity** — is working alongside **medical oncologist Ying Liu**.

Dr. Brown explains that "at MSK, we probably have one of the largest groups of Black female patients in the country where we can analyze the genetics of their endometrial cancer tumors as well as their personal genetics."

One target coming into focus is that Black women are more often diagnosed with rare but aggressive forms of endometrial cancer. "The kinds of endometrial cancer more often found in Black

**"For most types of cancers, Black people have the highest death rate and shortest survival rate of any racial or ethnic group [in America]."**

—The American Cancer Society



Carol Brown, MD,  
FACOG, FACS,  
Nicolls-Biondi Chair  
for Health Equity

women are not as well targeted by current treatments," explains Dr. Liu. "We want to understand what's happening on the molecular level so we can find better therapies to treat them."

As that research progresses, Dr. Brown is also helping women right now.

In 2021, she launched the **Endometrial Cancer Equity Program** to educate Black women about this cancer, help those who are diagnosed find appropriate care, and ultimately find treatments to improve outcomes for all women.

Dr. Brown is also a champion of **CHERP, the MSK Cancer Health Equity Research Program**. She explains that the program "partners with community oncologists to bring MSK clinical trials to patients in Queens and Brooklyn who may not have access to cutting-edge therapy."

#### Theresa's Goals

As for Theresa Langley, she accomplished her goal of joining cancer research focused on women of color. She participated in a study led by MSK **breast surgeon Andrea Barrio** to investigate whether race or ethnicity plays a role in lymphedema.

Lymphedema affects 1 in 4 female patients and "is a chronic swelling of the arm that can occur after surgical removal of lymph nodes in the armpit," explains Dr. Barrio.

After following 276 MSK patients of different races with breast cancer, including Theresa, the first-of-its-kind study found that Black and Hispanic women were at highest risk of developing lymphedema after lymph node removal. Dr. Barrio says, "We can now better identify who is at highest risk and find treatments to minimize that risk."

Says Theresa, "I hope this helps another person of color who is facing breast cancer — that would be wonderful." That is precisely what Theresa set out to do. She's accomplished her other goals, too. Now cancer-free, she's back to her hardcore workout routine and has become an English teacher in Brooklyn.

She says her decision to join a clinical trial is "helping to push medicine forward — which helps all of us." •



Andrea Barrio, MD, FACS, is a breast cancer surgeon.



# Caring for young people with cancer

**When teens and young adults are diagnosed with cancer, they can feel lost — too old for pediatric care but decades younger than most cancer patients. And their numbers are growing: A staggering 90,000 cases are projected in 2022.**

The unfortunate reality is that recent advances in treatment have not benefited this age group as much as they have others. A key reason: Teens and young adults often don't have the right kind of support, beyond their families, to get them through the gauntlet of chemotherapy, surgery, and radiation. Cancer is grueling for anyone — especially for people just learning how to live on their own.

Supporting these patients so that they not only survive cancer but also live a life beyond it is the reason that Memorial Sloan Kettering Cancer Center (MSK) established the **Lisa and Scott Stuart Center for Adolescent and Young Adult Cancers** in 2021. Experts from across the institution come together to identify best practices, clinical trial opportunities, and support services for patients ages 15 to 39. They collaborate with specialists at the world's first **Center for Young Onset Colorectal and Gastrointestinal Cancer**, right here at MSK, as well as experts treating young women with breast cancer.

**William Tap, Chief of MSK's Sarcoma Medical Oncology Service, and Julia Glade Bender, Vice Chair for Clinical Research in the Department of Pediatrics**, lead the Stuart Center.

"Our goal," says Dr. Tap, "is to provide well-rounded care that addresses what this group needs beyond medicine — physically, emotionally, and socially."

Philanthropic gifts from the Stuart family and **The Kristen Ann Carr Fund** have been instrumental to the program's inception and growth. At MSK, there are now clinical trials just for adolescents and young adults with sarcoma. These — and soon, hopefully, more — trials will help standardize care approaches for patients around the world.

The following five teens and young adults put their lives in the hands of MSK care teams, who not only healed their cancer but also made them feel welcome, safe, and understood.



## desiree

**Diagnosed with osteosarcoma in 2020 at age 31**

**I was having the time of my life. I was in school, working, and in a relationship. When I noticed a bump on my knee, my doctor said, "Maybe you're on your feet too much." But my gut knew that wasn't right. I asked for an MRI. The doctors were shocked when it was cancer. It was, like, a one in a million chance. I didn't want to be this kind of special.**

But MSK made me feel special and important. I call my surgeon, Daniel Prince, my Prince Charming, and my oncologist, Leonard Wexler, my godfather. My nurse practitioner, Emily, is my "unofficial-official" bestie. My social worker, Alexandra, is my "professional" bestie. They would literally call just to say, "How are you?" It was like when your best friend calls. MSK also connected me with other sarcoma patients around my age. Sometimes, you need that validation, to know that "you did it, and maybe I can, too."

Now I'm training to take care of people with cancer. I identify with all the stops along their journey. But I will not rest until I work at MSK! They're probably sick of my saying thank you. I'm not just alive; I'm living. •



# charisma

**Diagnosed with triple-negative breast cancer in 2020 at age 28**

**When I was diagnosed, I didn't fully digest it. Nobody in my family was familiar with cancer. My gynecologist recommended MSK. We had to start treatment quickly because the type of cancer I had was aggressive. But even before my first appointment, my MSK team brought up the option of freezing my eggs. I don't have kids, but I thought, "Better safe than sorry." Everyone at MSK explained the process so well.**

I was hesitant to open up about my illness because it invites everyone else into your issues. Being a young adult with cancer, you don't really fit in. I didn't want to be babied. I liked using the TYA@MSK app to meet other people who could relate.

Getting reacclimated with life is just as hard as treatment was. I wish I would have known that going in. Dating is hard — when do you tell someone about your experience, and how much do you say? But I'm back to doing things I love. I went to an amusement park the day after my surgeon said I could. •

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# mario

**Diagnosed with colorectal cancer in 2020 at age 31**

**I was misdiagnosed for nine months. When I learned it was cancer, I just had this inclination to call MSK. I finally felt taken care of after a year of feeling like I wasn't being listened to.**

What I love about MSK is that they realize so many different elements go into health. Not only was my cancer being treated by the best specialists in the world with precision and compassion, but MSK has a holistic approach that is just the best. For example, I saw a psychiatrist during treatment and wrote a song with a music therapist to help combat anxiety. To this day, I see a wonderful integrative therapist and social worker. My social worker, Hadley, was so in tune with my needs as a patient that she recommended I speak with someone with early-onset cancer like me. Through MSK's Patient and Caregiver Peer Support Program, Hadley introduced me to Michael, who knew exactly what I was going through. Because Hadley introduced us, I felt supported in so many ways. I am forever grateful.

When you're diagnosed at a young age, it's so isolating. No one can really relate to what you're going through. You're just taken out of your life. When you tell your peers, it's over their heads. Now, I want to be a volunteer who speaks with other early-onset patients. •

A close-up portrait of Tunav, a young man with dark, wavy hair and a beard, smiling warmly at the camera. He is wearing a dark blue zip-up hoodie. In the background, blurred city lights and traffic are visible.

## tunav

### Diagnosed with leukemia in 2013 at age 17

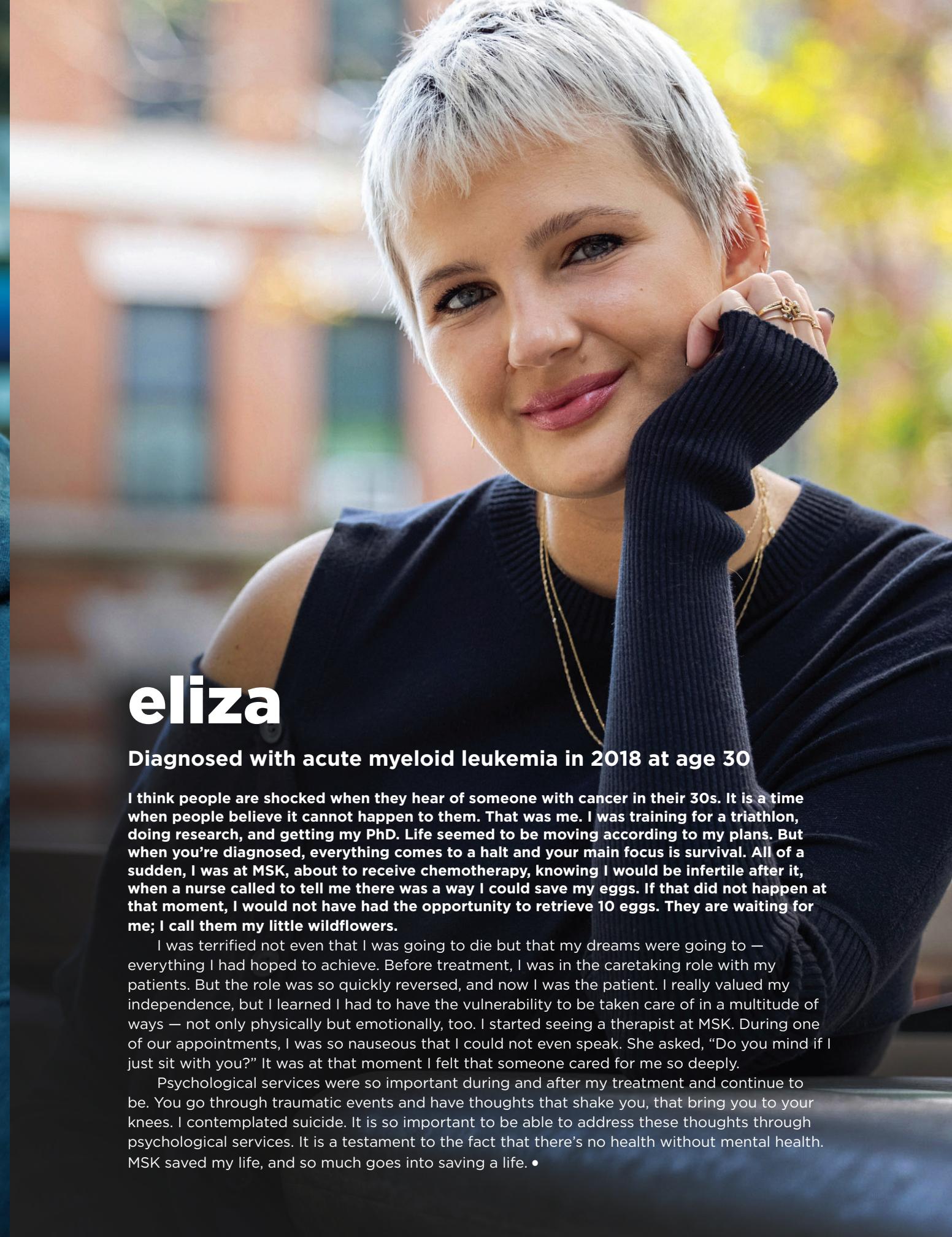
**My time at MSK was amazing. I was fortunate enough to be treated by some of the best doctors in the world. Dr. Peter Steinherz invented a protocol for leukemia treatment that's used in hospitals around the world, and I was able to sit in the same room with and be treated directly by him. What a blessing!**

After I was diagnosed, I realized that everyone around me would return to their lives and I had to go fight for mine — and that was OK. I spent time on my iPad learning about footwear and watching endless seasons of *MasterChef*, inspired by my roommate and friend, Fabio. My social worker, Kristie, was there for some of my loudest laughs and my deepest cries. She helped me step out of my stern mindset and build gratitude.

Through the Make-A-Wish Foundation, I was connected to Pensole Footwear Design Academy to design a sneaker for Adidas based on my story. I'm currently working on an apparel brand and using it to give back to terminally ill kids with cancer. I would tell another teen in my position: "Your voice and heart are strong; share them with those at MSK". •

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A close-up portrait of Eliza, a woman with short, light-colored hair, smiling and resting her chin on her hand. She is wearing a dark blue ribbed turtleneck sweater and a gold chain necklace. In the background, blurred autumn foliage is visible.

## eliza

### Diagnosed with acute myeloid leukemia in 2018 at age 30

**I think people are shocked when they hear of someone with cancer in their 30s. It is a time when people believe it cannot happen to them. That was me. I was training for a triathlon, doing research, and getting my PhD. Life seemed to be moving according to my plans. But when you're diagnosed, everything comes to a halt and your main focus is survival. All of a sudden, I was at MSK, about to receive chemotherapy, knowing I would be infertile after it, when a nurse called to tell me there was a way I could save my eggs. If that did not happen at that moment, I would not have had the opportunity to retrieve 10 eggs. They are waiting for me; I call them my little wildflowers.**

I was terrified not even that I was going to die but that my dreams were going to — everything I had hoped to achieve. Before treatment, I was in the caretaking role with my patients. But the role was so quickly reversed, and now I was the patient. I really valued my independence, but I learned I had to have the vulnerability to be taken care of in a multitude of ways — not only physically but emotionally, too. I started seeing a therapist at MSK. During one of our appointments, I was so nauseous that I could not even speak. She asked, "Do you mind if I just sit with you?" It was at that moment I felt that someone cared for me so deeply.

Psychological services were so important during and after my treatment and continue to be. You go through traumatic events and have thoughts that shake you, that bring you to your knees. I contemplated suicide. It is so important to be able to address these thoughts through psychological services. It is a testament to the fact that there's no health without mental health. MSK saved my life, and so much goes into saving a life. •

# The people of MSK

**There is heart and soul in  
every hallway. More than  
20,000 strong, we are united  
in our mission.**

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Pearlah Roberts, MSN, RN, is a clinical nurse in the  
radiology department at MSK Nassau.



# New leadership for a new era

Tracy Gosselin joined Memorial Sloan Kettering Cancer Center (MSK) in November 2021 as Senior Vice President and Chief Nursing Executive — leading the 5,000 nurses whose skills and compassion are the heartbeat of MSK. As a teenage volunteer at a hospital outside Boston, Dr. Gosselin says she learned the value of human connection. “It’s about helping people through those challenging moments,” she says. “How do you listen and figure out what they need, and help them through the next hurdle?”

Dr. Gosselin has been making the rounds to listen to patients and nurses, spending time in inpatient units and at each of MSK’s seven regional locations. “It’s really about building upon the excellence that’s already here,” she says, noting that MSK’s nursing staff has twice received Magnet® recognition, the nation’s highest honor for exceptional nursing care.

It’s an exciting new chapter, says Dr. Gosselin, and one she never imagined. “Growing up, I didn’t know much about cancer,” she says. “But oncology chose me, and I keep choosing it, over and over again.”



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## The nursing connection

Nurses want to help others — whether that means patients, families, or their own colleagues. That’s the basis of **Mentoring@MSK**, which pairs Memorial Sloan Kettering Cancer Center (MSK) nurses of all kinds and career stages so they can gain an inside look at a different facet of the field. It’s also open to advanced practice providers, including nurse practitioners, physician assistants, and certified registered nurse anesthetists. Since the six-month-long program began in 2016, more than 400 mentoring partnerships have blossomed.

“Mentoring@MSK is a testament to the power of human connections,” says program leader **Cortney Miller**. “Those connections facilitate professional development and deeper engagement at any career stage.”

Though the participants each have unique responsibilities, what they all have in common is a penchant for partnership and a desire to grow. The result is more than professional empowerment. It’s personal, too.



Cortney Miller, MSN, MPA, RN



## jericho & elizabeth

**Jericho Garcia, MSN, RN-BC, Nursing Informatics Specialist (mentor), and Elizabeth Sieverding, BSN, RN, Clinical Nurse III at the David H. Koch Center for Cancer Care at Memorial Sloan Kettering Cancer Center (mentee)**

**Elizabeth:** Jericho and I met through a council task force at MSK. I really liked working with him — he got me interested in nursing informatics, a branch of nursing that combines nursing, information, computer, and other sciences to help us improve what we do. I didn't really know much about it. I wanted to learn more about the field and whether it's something I'm interested in pursuing.

**Jericho:** I wanted to give back to nurses here so they could grow and learn from my experience.

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**Elizabeth:** The mentoring program gave us dedicated time to seriously talk about my career path and create goals. One of my goals became to apply for a graduate program, and I got into three. I'll be starting a program in the fall. That's all thanks to Jericho.

**Jericho:** I'm not going to take all the credit!

**Elizabeth:** Jericho is more than just a mentor or colleague — he's a friend. He's a wonderful teacher, and I hope one day I can be that for others. The mentorship program was a set amount of time, but our relationship will continue.

**Jericho:** Right. If she ever needs help with something or needs advice, I'm always here. •

## coco & pearlah

**Coco Melendez, BSN, RN, Clinical Nurse IV at MSK Nassau (mentor), and Pearlah Roberts, MSN, RN, Clinical Nurse III at MSK Nassau (mentee)**

**Pearlah:** I wanted to advance the clinical ladder and learn what it took to become a clinical nurse IV. Coco recommended people I could shadow. I was also able to participate in a research project after bringing an idea to Coco. In my role as a radiology nurse, patients often tell me how anxious they are about getting their scans back. I'm now working with our Patient & Caregiver Education group to develop resources and tools to help people cope with that anxiety. And it all started during that conversation with Coco.

**Coco:** I was so excited when Pearlah picked me as her mentor. I knew that great things were going to happen because she's so motivated. I always feel inspired when I see other people grow, and I love to foster that in others.

I told her, "This is a great project to dive into." If she ever started second-guessing herself, I would say: "No way. You have to go for it."

**Pearlah:** She never doubted me, even when I doubted myself.

**Coco:** I leaned on her expertise, too. Radiology isn't a realm I know well, and Pearlah does. And beyond that, I would bounce ideas off her about what my next career steps should be. She's been a resource. The biggest piece of wisdom Pearlah gave me was to always chase that question, to keep going.

**Pearlah:** Coco helped me realize the value and importance of being a member of the nursing team here at MSK.

**Coco:** We are still very close. Anytime I see her, it lifts my day up. We were brought together for a reason. We are each other's sunshine. •





## cooking up comfort food

**A classically trained chef, Courtney Kennedy has worked in some of New York City's most exclusive kitchens, like Momofuku Ssäm Bar in the East Village and Flora Bar inside the Metropolitan Museum of Art. But two years ago, a job posting for a cook at Memorial Sloan Kettering Cancer Center (MSK) caught her eye.**

She thought of her dad, who had just undergone quadruple bypass surgery in Los Angeles. She remembers him raving about the hospital's food. "He still talks about it," says the Culinary Institute of America grad. "It made the experience so much better for him."

Chef Kennedy holds that memory close when preparing food for her new clientele. It's an even bigger challenge to make a restricted diet look and taste delicious. "You want to make something you would eat," she says. "I plate the food just like I did at Ssäm Bar."

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On her menu these days: vegan BLTs made with roasted portabella mushrooms, chopped pasta primavera for easy swallowing, and burgers with all the fixin's cooked for those who cannot have raw produce. The abundance of ingredients and equipment available in the MSK kitchen make it easy to whip up so many different dishes. "We're not working in the framework of a restaurant," she says.

Although Chef Kennedy and 30 other chefs in the MSK kitchen are cooking for hundreds of patients, they want each dish to be special, whether it be perfectly poached eggs Benedict or Caribbean fry bread. "It's somebody's mom or dad up there," she says. "You want to make sure they're treated well."

The shift from patrons to patients has reminded Chef Kennedy that cooking, at its core, is an act of love. "They're going through the hardest time in their life," she says. "So it's a big deal to make sure the food is exactly what they want."

For Chef Kennedy, "bon appétit" has never been more meaningful. •

# dancing into patients' hearts

**They call themselves the Three Musketeers because they're usually together and they always have each other's backs. Wendy Hernandez (left), Carsandra Mitchell (center), and Evelyn Bueno (right), Environmental Services (EVS) staff members who work in Pediatrics on the 9th floor of Memorial Hospital (M9), know to call each other when there's an overabundance of glitter or Legos in a room that needs straightening up. But these Musketeers are more than just comrades in cleaning — below their EVS uniforms beat the big hearts of seasoned entertainers with one mission: To bring smiles to the faces of the young patients on their floor.**

The three women have become famous on M9 for channeling Taylor Swift, Willow, Beyoncé — any artist whose songs they know — while also keeping M9 spick-and-span. In their hands, a mop handle can instantly morph into a microphone and a hospital room can become a stage, all for a very important audience of one.

"We do a little bit of everything," explains Evelyn. "When we go into a patient's room and they seem like they need cheering up, we start singing and dancing."

Although they aren't caring for patients, Evelyn, Wendy, and Carsandra certainly care about them. Cleaning their rooms every day, they say, is essential to safeguarding these vulnerable patients, a responsibility they take very seriously.

"We don't take shortcuts," says Wendy. "Everything we do is for the patients, who are fighting for their lives. They have low immune systems, and germs are very dangerous to them. By keeping their environment clean, we're helping to keep them safe."

Whenever they enter a patient's room, they go in with a smile and a positive attitude. "Sometimes the patients want to reach out to you, sometimes not — it depends on how they're feeling that day," says Carsandra. "Whatever it is, we want to help them through it. We're all mothers. If they're not feeling well, we all feel it."

Evelyn chimes in: "If I can make this a good day for someone, that's the best. When you hear one of these kids laugh, it's amazing." •



# The next generation

**Opportunities abound at MSK.  
Rising stars can innovate.  
Aspiring scientists from all  
backgrounds are educated.  
Our people dream big and  
give back.**

# Why we chose the Sloan Kettering Institute

## MSK: When did you first realize that the Sloan Kettering Institute (SKI) was a special place to do science?

**Justin Perry:** I came to SKI before I was even applying for a faculty position. My friend **Michael Overholtzer** is Dean of the graduate school here. I was visiting for a conference, and he invited me up to meet some colleagues of his, including **Lydia Finley** and **Philipp Niedhammer**.

The thing that kept coming up in our conversation was that SKI does science the right way. What I mean by that is: They make it so you don't have to worry about a lot of the day-to-day hassles of starting a lab, like how you are going to pay for new equipment or get supplies. I remember them saying, "You'll never have to worry about that." SKI makes it so we can just focus on our science.

**Agnel Sfeir:** I remember after visiting SKI and giving my vision talk, I was walking down 1st Avenue to my apartment. I was impressed by how deep but also diverse the science at SKI is. It's just incredible: Every person I met with was doing inspiring work.

One thing that I find to be special about SKI is that even though it is connected to a hospital, fundamental discovery science is at its core. This is unique. Not many institutes in the United States — or in the world — value basic science to this level.

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**Melinda Diver:** I was here as a graduate student, so I knew that I loved it at SKI. When I saw SKI was hiring, I decided to submit an application. Throughout the interview process, I remember feeling like there was all this new vibrant energy around the institute. There are few places you can go in this country or this world and have this concentration of scientists where you can just knock on their door and start up a great conversation. That was a huge driver for me to return.

**Tom Norman:** SKI is a really nice-size institution. It's got enough breadth that it covers all the major areas of biomedicine, but it's also small enough that it's easy to go meet your neighbor. I think it is a great way for interdisciplinary work to happen.

## What are some examples of the way SKI supports researchers to enable them to do their best work?

**Tom:** The resources available at SKI are a huge benefit. Especially when you run a small lab and you don't want to invest the time in developing a technique or something like that, they have all these wonderful core facilities that can fill those gaps for you.

**Melinda:** I completely agree. One of the main technologies that I use for my work is called cryo-electron microscopy. This requires multimillion-dollar equipment and someone very skilled to set up and maintain this equipment and computational infrastructure. SKI has a fabulous center to

support this work. That is a huge draw. As a young professor, that frees up so much time. You can devote your energy to science, as opposed to equipment support and troubleshooting.

## What do you want people to know about basic science and why it's so important to our understanding of cancer?

**Agnel:** I don't think people realize that 80% of the most transformative drugs approved by the FDA are the result of serendipitous basic science discoveries. Scientists were not looking for that particular drug; instead they were trying to find an answer to some fundamental question.

**Justin:** The commonly cited example of this is Jim Allison's work, which led to the development of immunotherapy. He didn't start out wanting to cure cancer; he wanted to understand T cell biology. But the basic science discovery about immune cell checkpoints led to this amazing therapeutic breakthrough for cancer. Jim was Chair of the Immunology Program from 2004 to 2010.



**Melinda Diver, PhD**

Assistant Member,  
Structural Biology  
Program

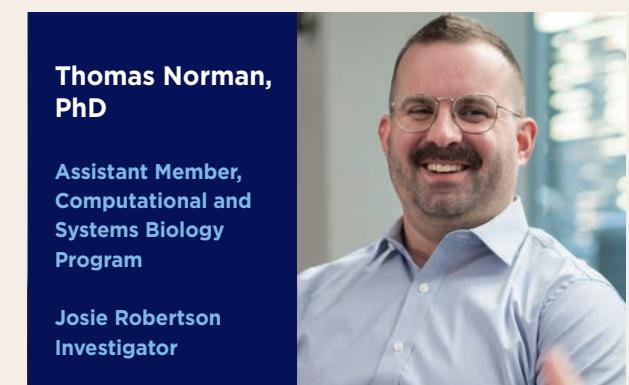
Josie Robertson  
Investigator

## How does having your lab across from the cancer hospital help you brainstorm and collaborate?

**Agnel:** I have several ongoing collaborations with people at the hospital. There are really no barriers. The radiation oncology department recently invited me to give a talk. The next thing I know, I am collaborating with three people from that department and two fellows joined my lab for their research years.

**Justin:** As a basic scientist at SKI, you have the ability to see findings from your lab move closer to the clinic — in some cases, even entering into the earliest phases of clinical trials with patients. That's very unusual for an academic institution.

**Tom:** I'll say SKI's close integration with a cancer hospital was actually a significant draw for me coming here. And this is coming from somebody who is a basic scientist to the core. For me, it's really exciting to try to take some of the tools that we have developed in experimental models and think about being able to apply them to patient samples. There just aren't that many places in the U.S. like that. •



**Thomas Norman, PhD**

Assistant Member,  
Computational and  
Systems Biology  
Program

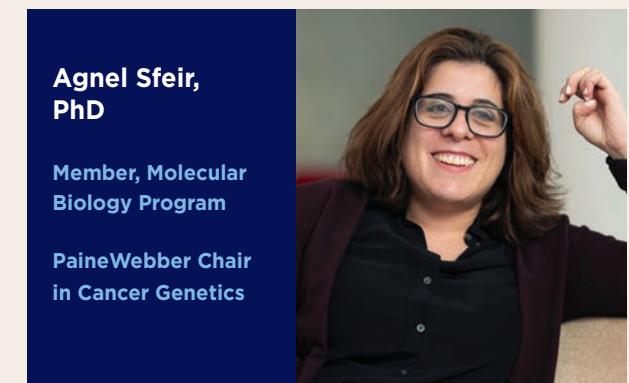
Josie Robertson  
Investigator



**Justin Perry, PhD**

Assistant Member,  
Immunology Program

Pew Biomedical  
Scholar



**Agnel Sfeir, PhD**

Member, Molecular  
Biology Program

PaineWebber Chair  
in Cancer Genetics



# True grit and the power of mentorship

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Aymar Borel Soh Fotso, MD (Dr. Soh), is an anesthesiologist at Memorial Sloan Kettering Cancer Center.

**It would be tough to find a more unconventional path to becoming a doctor at a renowned cancer center than the one taken by Borel Soh.**

And perhaps even harder to find a path that is more inspiring.

His journey starts in the Central African nation of Cameroon, winds through a car wash in the Bronx, picks up speed in community colleges, and takes flight in the basement of Memorial Sloan Kettering Cancer Center (MSK), where an immigrant who arrived in New York City speaking almost no English pursued an improbable dream.

As a child, says Dr. Soh, "I was fascinated with airplanes. Some of my earliest memories were of wanting to be a pilot." But he believes his life took an important turn when he was rushed to the hospital in Yaoundé, Cameroon, with a ruptured appendix at just 6 years old.

When he woke up after surgery, Dr. Soh recalls: "I was perplexed by the beeping machinery around me, which I now recognize as an EKG and a pulse oximeter. For a child obsessed with airplanes, it was very impressive."

An even bigger impression was made as he recovered in the hospital. "My mom talked to the doctors each day as they visited me. As my health improved, my mom's smile became brighter and brighter. I remember thinking:

'I want to be one of these people who make people happy and bring healing.' That was when I decided I wanted to pursue medicine."

## Working Around the Clock

Dr. Soh finished high school in Cameroon and thought New York City was the perfect place to continue his education. But when he arrived, he realized: "There was a barrier — the first of many. I couldn't really hold a conversation in English. The reality was I just didn't speak English."

He enrolled in an English language education class, determined to get to college. Like so many immigrants, he made the most of the resources at hand. "When I saw captions on TV, it was like I'd found a goldmine. I could read along and learn how to pronounce words."

He was also enthralled by New York's public libraries. "I read three books a week, on every topic I thought could help me."

But he also badly needed to make money. "My first job was at a car wash in the Bronx. I lived in Brooklyn, so six days a week I would take the subway at 4:30 in the morning to work." Soon, he says, "I took jobs anywhere I could. I worked at a restaurant in Brooklyn. I stocked shoes." Often, he worked jobs nearly around the clock to make ends meet.



(From left) Dr. Soh at a gala with two of his MSK mentors, Louis Voigt, MD, who is a specialist in critical care medicine and Chair of the Ethics Committee, and Kathryn Martin, who is Chief Operating Officer at MSK.



Dr. Soh (second from right) celebrating his graduation from the MSK Anesthesiology Fellowship Program. Among those at the table are Dr. Voigt (far left) and Gregory Fischer, MD (second from left), who is Chair of the Department of Anesthesiology and Care.

He also enrolled in the City University of New York system. He started at Brooklyn's Medgar Evers College and eventually transferred to City College in Manhattan.

To further his dream of becoming a doctor, he applied for jobs at hospitals. But he didn't get any responses until a fellow student he tutored in physics told him she was working at MSK. Through his physics trainee, Dr. Soh met **John Meggs, a manager in MSK's Central Processing Department**. When Dr. Soh was offered a job, he began working in the basement of MSK's hospital in Manhattan.

### 'One of My Biggest Breaks'

While the Central Processing Department might be unfamiliar to most, the role they play at hospitals like MSK is absolutely vital. Dr. Soh explains that "my job was to clean and sterilize all the equipment like retractors and endoscopes that are used during surgery so they are ready to be used again. We delivered trays of sterilized surgical instruments each day to operating rooms."

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Dr. Soh calls the job "one of the biggest breaks of my life." But working while attending college required a prodigious work ethic. Dr. Soh worked the graveyard shift, beginning at MSK at 11 p.m. and stretching to 7 a.m. Immediately after his shift, he ran to catch a bus and then a subway to get to college for a full day of classes. Each evening, he caught a few hours of sleep before studying and returning to his overnight shift at MSK.

### Making Connections

He kept up this grueling pace for three years. He recalls: "When I delivered trays of surgical instruments to operating rooms, I could just imagine myself being a doctor, and thought how great it would be to practice medicine at MSK."

As he worked, he made connections among MSK care teams, including nurses and doctors. Eventually, he shared his dream of becoming a doctor. "People didn't just tell me, 'Good luck,'" he says. "People said, 'OK, here's what you need to do.' They were willing to invest their time and effort. And they gave me confidence that if I put in the work and was willing to make sacrifices, I could become a doctor."

### Mentors at MSK

Dr. Soh found mentors across MSK. Among them was **Kathryn Martin, MSK's Chief Operating Officer**. They met at a panel discussion for college students in 2011, during which she was impressed by his insightful questions. Looking back, Dr. Soh says, "I did not anticipate someone in her position would truly care for my success."

Kathryn Martin introduced Dr. Soh to MSK physicians, including **Louis Voigt**, who specializes in critical care. Dr. Soh calls Dr. Voigt "a phenomenal mentor" who "helped me get the information I needed. Aspirations aren't enough — you need information to create the bridge to actual achievement. Dr. Voigt really helped."

Dr. Soh was also encouraged by **Neil Halpern, the Director of MSK's Critical Care Center**. "He helped me put together my medical school application. They were all instrumental — along with so many others at MSK — in helping me take the next step in becoming a doctor."

### The 14-Year Plan

During medical school at SUNY Downstate College of Medicine in Brooklyn, Dr. Soh discovered a passion for anesthesiology. "I always knew I wanted to work in the operating room setting, based on my personal history. I found that with anesthesiology, I really appreciated seeing the immediate effect of your action in someone's health."

Dr. Soh returned to MSK during breaks from med school for research programs. In the final year of his residency, he returned to MSK for a six-week rotation. That segued into a one-year fellowship in perioperative medicine and onco-anesthesia.

In 2021, Dr. Soh had a conversation with **Gregory Fischer, Chair of the Department of Anesthesiology and Critical Care** and a "superb teacher": "He told me he was pleased with my work," says Dr. Soh. "And he asked me to come on board as junior faculty."

It was the culmination of a dream. "I started working at MSK in 2007," says Dr. Soh. "For me, this was a 14-year plan that came to fruition. I am very excited."

### Life Today

Today, life for Dr. Soh looks very different than when he first started working at MSK. He and his wife, Christine, have three young children. He is a passionate New York sports fan. Sometimes, he says, "I like to relax by watching anime," the Japanese cartoon and animation genre that he happily admits many adults find baffling, including his wife.

### 'A Transfer of Knowledge'

As Dr. Soh embarks on the newest phase of his medical career, he is characteristically thinking about his next goal. He says, "I would like to do medical missions in Cameroon and other developing countries, both as a doctor and as an educator."

Dr. Soh explains that "what I hope to achieve in my career is a transfer of knowledge. At MSK, so many people helped transfer knowledge to me. I want to keep doing that for other people."

In fact, as people around MSK have learned about his remarkable journey, they have reached out to ask for his advice. "I am now mentoring two people," he says. "One has applied to medical school and the other is working to improve their credentials to apply."

For Dr. Soh, his efforts are part of a virtuous circle. "I hope people think about how many more potential stories there are like mine," he says. "Providing a helping hand to people around you can change someone's trajectory in life. I know because it's happened to me." •



Dr. Soh (left) with two of his former co-workers in MSK's Central Processing Department, Gary Valentine (center), and Akua Awua Peasah (right)

# A path for aspiring scientists

**Navigating the arduous path to become a biomedical researcher requires lots of support — and Memorial Sloan Kettering Cancer Center (MSK) is deeply committed to help.**

A particular focus is training a diverse group of aspiring scientists, particularly those who come from backgrounds that are underrepresented in biomedical research. They bring new ideas to the table. And they help MSK better reflect the people for whom we care.

That's the philosophy of a new MSK effort launched in 2021 called the **MSK Bridge** program. **Carlos Ayala Santos** is its first student. A college graduate from Puerto Rico, he is spending two years as a postbaccalaureate scholar in the lab of **MSK physician-scientist Piro Lito**.

Leading this new program is **neuroscientist Yaihara Fortis Santiago, Associate Director, Office of Postdoctoral Affairs and Trainee Diversity Initiatives**.

**“The MSK Bridge program is like a trampoline that propels a person and allows you to show what you’re made of.”**

—Carlos Ayala Santos



## carlos ayala santos

### A Passion for Science

**My mother is a high school biology teacher in Toa Baja, Puerto Rico. As a kid, I would accompany her to class, and I found whatever she was teaching really interesting. When I got to high school, I competed in the school's science fair with a project focused on coral reefs and how they are being bleached by rising acidification of the ocean. To my surprise, I won the competition!**

This initial exposure to research motivated me to attend a summer program at the University of Puerto Rico Medical Science Campus. I became fascinated with the study of cancer because so many lifesaving questions need to be answered.

I was accepted at my college, the University of Puerto Rico, Mayagüez Campus, as a scholar to uncover novel compounds from medicinal plants that can hopefully be developed into chemotherapeutic drugs for cancer.

When the COVID-19 pandemic started, everything shut down. But not my ambition.

I had learned about an MD-PhD, a physician-scientist who both does research and cares for people. I knew pursuing this path was highly competitive and difficult. After the disruptions of COVID — and continuing challenges in Puerto Rico after Hurricane Maria a few years ago — I wanted to find a way to improve my credentials before applying for graduate school.

### The MSK Connection

Then I had one of the luckiest breaks that's ever happened to me.

I heard Dr. Yaihara Fortis Santiago speak at an online conference through my university about graduate school. Like me, she is also originally from Puerto Rico! I asked her if MSK had any opportunities for people who want

to gain experience before applying to graduate school.

She told me MSK was looking to get a postbaccalaureate program off the ground. Eventually, I was accepted to be the first student in a pilot project for a two-year program, now called the Bridge program.

### Lab Life

I am working in the lab of Piro Lito in the Human Oncology and Pathogenesis Program. Dr. Lito is an MD-PhD, doing exactly what I hope to do in the future. In his lab, we study different therapeutics and mechanisms against a famous oncoprotein involved with cancer called KRAS, which until recently was thought to be “undruggable.” My project is trying

to understand the functioning of specific chemotherapeutics aimed at KRAS.

I also help other lab members with their projects and make sure the lab is running properly. I’m very grateful that my mentor, **Dongsung Kim**, has been so supportive and patient as I master new techniques.

### Getting to the Next Step

The MSK Bridge program is like a trampoline that propels a person and allows you to show what you’re made of.

I think that the chance for a wider variety of students to engage with people here in MSK will set the stage to uncover very important things. •



MSK Bridge scholar Carlos Ayala Santos in the lab with a mentor for the program, Laura Menocal, who is a graduate student in the lab of SKI's Andrea Schietinger, PhD.



**yaihara  
fortis  
santiago**

### The MERIT Program

Of several initiatives to diversify the people we train, one of the most important is called **MERIT**, which stands for **M**aximizing **E**xcellence in **R**esearch **I**nnovation and **T**echnology.

At the undergraduate level, we begin with interns who take part in MSK summer programs. In the transition from college to graduate school, our new Bridge program that supports Carlos Ayala Santos will welcome eight scholars this summer.

On the graduate and postdoctoral level, MERIT fellowships support talent that is already in our labs. In 2021, the **MERIT Sawyers Fellowship** was created to fund the recruitment and career development of top scientists from groups that have historically been underrepresented in science.

Similarly, we recently launched the **Mandel Fellowships** for scientists at the graduate and postgraduate levels. The fellowships provide funding to cover two to three years of salary as well as money to travel to conferences to present their research, which is crucial.

### Why These Programs Are So Important

Some people might not have the social capital to penetrate the networks of their white colleagues or attend the top programs that are dedicated to science from very early in life. I’ve experienced some of those challenges myself, when I came to study biomedical science in the States and English was my second language.

Our colleagues in Development have done a phenomenal job of finding the funding support to help launch MERIT and deserve a lot of recognition. And so many people in the MSK community have raised their hands and said, “How can I help?” — including faculty and board members.

Individuals need to think in their day-to-day life how they can support and nurture talent, from everywhere. We want people to get excited, roll up their sleeves, and be part of the solution. •

# The MSK donor community

**Every year, hundreds of thousands of generous donors do their part to drive more innovation and save more lives. Our patients are grateful, and so are we.**

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Cycle for Survival brings together family, friends, and colleagues to raise money for rare cancer research; 100% of every donation goes directly to research led by MSK.





# 2021 MSK giving

**“Today, we see a clear path forward to dramatically improve the outcomes for people diagnosed with or at risk of cancer. The support of our donors ensures that MSK’s future will be even more remarkable than our past.”**

—Craig B. Thompson, MD  
President and Chief Executive Officer, Douglas A. Warner III Chair

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## Patient Care and Greatest Needs

Taking care of people with cancer and their families is central to our mission, and our donor community continues to elevate the standards of care for Memorial Sloan Kettering Cancer Center (MSK) patients and people worldwide. In 2021, philanthropy made these new initiatives possible:

- A fund to support MSK’s boldest and most promising translational research.
- A multidisciplinary center that focuses on the unique biological and social needs of young people with cancer.
- A program to help patients heal by putting into practice leading-edge discoveries on nutrition and the microbiome.

## Research

MSK has long led the field of cancer research, creating novel treatments and cures as well as entirely new ways of understanding the disease. Thanks to recent breakthroughs and innovative technology, we are on the cusp of a revolution in cancer science, with the potential to save even more lives. In 2021, philanthropy supported:

- **Drug discovery.** The FDA approved a diagnostic tool and multiple treatments developed or tested at MSK for prostate, non-small cell lung, endometrial, and kidney cancers. Philanthropy funds the laboratory research and clinical trials necessary to bring a drug to market.
- **Endowed chairs**, so MSK’s scientists have the resources they need to continue their research.

## Education

MSK is committed to ensuring that all clinicians and scientists have the opportunities and resources they need to flourish so that tomorrow’s top cancer specialists are equipped to advance patient care and cancer science. In 2021, the MSK donor community made possible:

- Fellowships to train the next generation of cancer experts.
- Programs to enhance diversity in our labs and across the sciences, including a partnership with historically Black colleges and universities.

## Philanthropy by the Numbers

In 2021, more than 420,000 individuals, families, foundations, and companies contributed more than 600,000 donations — raising more than \$600 million for cancer care, research, and education.

Patient Care and Greatest Needs	\$307.2 million
Research	\$233.3 million
Education	\$68.5 million
<b>Total:</b>	<b>\$609 million</b>

## The MSK Giving Community in 2021: Together, Advancing MSK’s Mission

- Nearly 56,000 donors increased their giving.
- More than 82,000 donors made two or more donations.
- More than 320 donors told us MSK was in their estate plans.
- Donors live in 87 countries and all 50 states.
- Donors held 1,132 Facebook and Instagram fundraisers for MSK.



## paving the way for tomorrow's healthcare leaders

Roger W. Ferguson and  
Annette Nazareth

**As former President and CEO of TIAA, Roger W. Ferguson, Jr., knows how to calculate a high-return investment. For years, Ferguson and his wife, Annette Nazareth, have invested in education through philanthropy to help make universities more accessible for talented students. When the COVID-19 pandemic exposed gaps in the healthcare system, the couple increased their support for education by establishing the Ferguson Nazareth Family Endowed Initiative for Medical Students and Residents From Historically Underrepresented Groups and the Ferguson Nazareth Family Clinical Fellowship in Health Equity. Both programs are strategically designed to improve diversity in the field of cancer.**

"The pandemic has shone a bright light on healthcare inequity in this country," reflects Ferguson, an MSK Board of Trustees member since 2009. "We hope to create a more diverse population of cancer researchers and doctors, and better equip MSK with the tools to attack these societal challenges."

Funding from the Ferguson Nazareth family is fueling MSK's collaboration with historically Black colleges and universities to provide valuable mentorship and oncology experiences for promising medical students who may not otherwise be able to attend a top cancer research institution. These programs are also empowering future healthcare leaders from groups underrepresented in science to conduct new research at MSK focused on addressing disparities in healthcare. •



Mark McCooey at the 2021 Long Island Sound open water swim in Larchmont, New York. Mark has been participating in Swim Across America for more than 20 years and remains one of Larchmont's top fundraisers.

## 35 years of swim across america

**On August 1, 1987, a dozen ambitious swimmers participated in a 17-mile relay across Long Island Sound to support cancer research, giving birth to what is now known as Swim Across America (SAA).**

Over the past 35 years, SAA charity swims have raised more than \$100 million for research, clinical trials, and patient programs at the nation's top cancer institutions to "make waves to fight cancer." Since 1993, SAA has directed \$18 million to Memorial Sloan Kettering Cancer Center (MSK), thanks to two annual charity swims in New York, in both Larchmont and Glen Cove.

SAA funds young investigator grants at MSK, which are designed to spark innovation and launch up-and-coming scientists into their careers. SAA is also a longtime investor in MSK's immunotherapy research, including a clinical trial that made cancer history this past June, led by medical oncologists Andrea Cersek, Section Head of Colorectal Cancer and Co-Director of the Center for Young Onset Colorectal and Gastrointestinal Cancer, and Luis Alberto Diaz, Jr., Head of the Division of Solid Tumor Oncology (Grayer Family Chair). In the small study of 14 people with advanced rectal cancer that had a particular mutation, a single immunotherapy drug eliminated all evidence of cancer in every patient. These groundbreaking results mark the first time every participant has achieved complete cancer remission.

Today, the Swim Across America Laboratory at MSK is named in honor of the organization's enduring generosity. •

# the society of Memorial Sloan Kettering Cancer Center

**The Society of Memorial Sloan Kettering Cancer Center (MSK) is a dynamic volunteer organization dedicated to raising funds that advance progress in cancer diagnosis, patient care, research, training, and education programs at MSK. Funds raised through The Society help ensure that MSK continues to make a worldwide impact, from early detection to life-changing treatment for people with cancer.**

As part of its 2021-2022 annual campaign, The Society funded innovative research by Christine Iacobuzio-Donahue, David M. Rubenstein Chair and Director of the David M. Rubenstein Center for Pancreatic Cancer Research at MSK. Dr. Iacobuzio-Donahue leads a team of more than 50 MSK experts whose aims include transforming pancreatic cancer, which has a five-year survival rate of less than 10%, into a manageable chronic disease. Additional Society funds supported pancreatic cancer prevention and early-detection efforts as well as MSK's Last Wish Program, which empowers people with this disease to posthumously donate their tissues and contribute to research to help future patients.

The Society also awarded seed money to nine talented early-career researchers who are developing novel approaches to treat cancer. One recipient of these competitive grants, MSK nuclear medicine physician Simone Krebs, is studying how to improve the effectiveness of chimeric antigen receptor T cell therapy and monitor its side effects. In this tailored approach, T cells, a type of immune cell, are removed from a patient and modified individually in a laboratory. The reengineered cells are then injected back into the bloodstream to fight the cancer.

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Research conducted by physician-scientist Christine Iacobuzio-Donahue, MD, PhD, includes studying the genetics of metastatic pancreatic cancer.

The annual Society of Memorial Sloan Kettering Prize recognizes singular leadership in pediatric oncology around the world. Alfred Thomas Look, who joined Dana-Farber Cancer Institute in 1999 as Vice Chair for Research in the Department of Pediatric Oncology, was awarded the 2021 prize for extraordinary work that has helped improve the understanding, diagnosis, and treatment of childhood cancers. In particular, Dr. Look has made key contributions toward the development of targeted cancer therapies for children.

The year 2021 also marked The Society's 75th anniversary. A mainstay of support on behalf of MSK, The Society continues to help drive distinguished achievements in the field of cancer. •



Nuclear medicine physician Simone Krebs, MD, MS, specializes in targeted radiotherapy.

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# Statistical Profile

Memorial Sloan Kettering Cancer Center

	2017	2018	2019	2020	2021		2017	2018	2019	2020	2021
<b>PATIENT CARE</b>						<b>STAFF</b>					
Patient Admissions: Adults	21,953	22,792	24,175	21,517	<b>23,060</b>	Sloan Kettering Institute Members	133	130	133	137	<b>140</b>
Patient Admissions: Children	1,553	1,451	1,422	1,305	<b>1,082</b>	Hospital Attending Staff	1,148	1,228	1,358	1,417	<b>1,457</b>
Total Admissions	23,506	24,243	25,597	22,822	<b>24,142</b>	Advanced Practice Providers	623	702	836	885	<b>901</b>
Total Patient Days	161,661	171,798	173,702	160,922	<b>171,356</b>	Registered Nurses	3,098	3,398	3,874	3,993	<b>4,063</b>
Average Patient Stay (days)	6.9	7.1	6.8	7.1	<b>7.1</b>	Administrative and Support Staff	12,325	13,137	14,333	14,774	<b>14,937</b>
Bed Occupancy Rate <sup>(1)</sup>	94.3%	95.2%	96.2%	85.9%	<b>91.3%</b>	<b>Total Staff <sup>(1)</sup></b>	<b>17,301</b>	<b>18,569</b>	<b>20,559</b>	<b>21,105</b>	<b>21,461</b>
Outpatient MD Visits: Manhattan	526,006	541,146	562,224	505,224	<b>478,520</b>	Volunteers	1,019	960	770	432	<b>262</b>
Outpatient MD Visits: Regional Network	196,232	235,400	276,849	276,700	<b>254,208</b>						
Total Outpatient Visits	772,238	776,546	839,073	781,924	<b>732,728</b>	<b>EDUCATION</b>					
Screenings	31,683	38,738	45,263	45,549	<b>51,185</b>	Residents and Clinical Fellows: Positions	468	476	475	460	<b>568</b>
Surgical Cases	25,330	27,919	27,379	23,967	<b>26,764</b>	Residents and Clinical Fellows: Annual Total	1,749	1,714	1,690	1,619	<b>1,691</b>
New Radiation Oncology Patients						Research Fellows	346	325	346	277	<b>184</b>
Starting Treatment: Manhattan	5,283	4,434	5,538	4,173	<b>4,607</b>	Research Scholars	120	133	171	150	<b>105</b>
New Radiation Oncology Patients						Research Associates	115	117	132	153	<b>182</b>
Starting Treatment: Regional Network	4,510	5,203	6,616	6,666	<b>7,460</b>	Graduate Research Assistants	37	34	39	28	<b>34</b>
Diagnostic and Interventional						PhD Candidates	278	266	277	282	<b>300</b>
Radiology Procedures	543,322	575,383	631,174	591,450	<b>659,966</b>	MD/PhD Candidates	24	22	20	21	<b>26</b>
Clinical Investigation Protocols <sup>(2)</sup>	1,133	1,139	1,159	1,254	<b>1,898</b>	Registrants in CME Programs	6,098	7,246	7,921	6,582	<b>6,507</b>
(1) Based on adjusted bed count						Medical Observers	511	569	596	31	<b>12</b>
(2) Excludes studies closed to accrual						Medical Students	577	524	477	246	<b>350</b>
						Nursing Students	355	512	595	507	<b>475</b>
						Social Work Students	7	6	7	0	<b>8</b>
						Radiation Oncology Technology Students	12	15	19	19	<b>18</b>
						Physical Therapy Students	6	8	6	4	<b>9</b>
						Occupational Therapy Students	2	2	2	3	<b>4</b>
						Laboratory Medicine Students	13	15	12	20	<b>20</b>

(1) In 2021, 37 staff members held appointments in both Sloan Kettering Institute and the Hospital.

## Financial Summary

Memorial Sloan Kettering Cancer Center

### 2021 TOTAL OPERATING REVENUES (Dollars in Thousands)

**\$6,398,365**

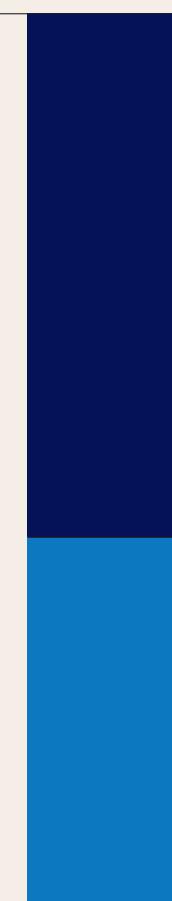
Patient Care Revenue  
**\$5,011,551**



### 2021 TOTAL OPERATING EXPENSES (Dollars in Thousands)

**\$6,163,263**

Compensation and Fringe Benefits  
**\$3,315,428**



Contributions and Pledge Payments  
**\$360,752**

## Combined Statements of Activities

Memorial Sloan Kettering Cancer Center

	2017	2018	2019	2020	2021
<b>OPERATING REVENUES (Dollars in Thousands)</b>					
Patient Care Revenue	\$ 3,536,976	\$ 3,973,778	\$ 4,560,174	\$ 4,261,296	<b>\$ 5,011,551</b>
Grants and Contracts	296,493	334,536	368,743	347,540	<b>411,772</b>
Contributions	191,843	168,226	172,525	175,641	<b>162,290</b>
Net Assets Released From Restrictions –					
Pledge Payments	86,800	122,701	96,000	105,975	<b>198,462</b>
Royalty and Other Income	159,458	159,140	123,489	357,654	<b>443,099</b>
Unrestricted Investment Return Allocated to Operations	137,750	151,473	162,445	159,090	<b>171,191</b>
<b>Total Operating Revenues</b>	4,409,320	4,909,854	5,483,376	5,407,196	<b>6,398,365</b>
<b>OPERATING EXPENSES</b>					
Compensation and Fringe Benefits	2,335,132	2,587,336	2,892,770	3,184,891	<b>3,315,428</b>
Purchased Supplies and Services	1,501,935	1,756,174	2,026,254	2,123,302	<b>2,312,863</b>
Depreciation and Amortization	287,145	300,239	329,774	412,493	<b>422,309</b>
Interest Expense	45,343	47,045	40,099	103,682	<b>112,663</b>
<b>Total Operating Expenses</b>	4,169,555	4,690,794	5,288,897	5,824,368	<b>6,163,263</b>
<b>(Loss) Income From Operations</b>	239,765	219,060	194,479	(417,172)	<b>235,102</b>
<b>Philanthropic Revenue</b>	318,386	383,341	254,401	263,572	<b>576,457</b>
<b>Capital Spending</b>	737,965	700,827	628,148	264,706	<b>218,168</b>
<b>BALANCE SHEET SUMMARY</b>					
Assets	10,636,012	10,623,567	11,621,453	13,315,250	<b>14,941,252</b>
Liabilities	4,530,909	4,196,154	4,646,113	5,246,709	<b>5,116,862</b>
Net Assets	6,105,103	6,427,413	6,975,340	8,068,541	<b>9,824,390</b>

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