

Outlook

AUTUMN 2024

**No one can
*beat cancer alone.***



WashU Medicine

Outlook

WASHU MEDICINE

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FEATURES

2 Letter from the Dean
Doing more to move medicine forward

8 The Siteman difference
A patient-first approach to
cancer treatment

18 It takes all of us
Working together to create
better patient outcomes

42 The path forward
Today's research changes the
care of tomorrow

**56 Caring for our
communities**
Changing the world starts
in St. Louis

64 Alumni & Advancement

66 Match Day

69 Classnotes

73 Obituaries

**But we can
*beat it together.***

Together, we can do more.

In her book “Illness as Metaphor,” Susan Sontag writes, “Everyone who is born holds dual citizenship, in the kingdom of the well and in the kingdom of the sick. Although we all prefer to use only the good passport, sooner or later each of us is obliged, at least for a spell, to identify ourselves as citizens of that other place.”

What does it mean to come home, so to speak, to that place of illness? And how can we, an institution charged with the sacred task of guiding people through that kingdom of the sick, make their time there better, calmer, and as brief as possible?

At WashU Medicine, we know that the answer begins with a patient-centered approach to treatment. Siteman Cancer Center – based at Barnes-Jewish Hospital and Washington University School of Medicine in St. Louis – has always understood that prioritizing the patient experience as they find their way in “that other place” is paramount. And the new, first-of-its-kind ambulatory cancer building was designed with significant patient input to make sure that our cutting-edge, research-informed and multidisciplinary care is delivered in a way that centers patients’ needs while prioritizing their comfort and convenience.

But we also know that the best patient care relies on the absolutely essential relationship between clinic and lab. At WashU Medicine, the most cutting-edge cancer research informs Siteman’s state-of-the-art clinical care, and that care deepens and expands our research to move the field forward. And Siteman – now celebrating its 25th anniversary – has in this brief time become one of the most impactful cancer centers in the world, one of a handful of places where cancer care is steeped in and deeply informed by

research. And we have incredible momentum, with WashU Medicine at No. 2 in National Institutes of Health (NIH) funding and Siteman in the top tier of National Cancer Institute-designated Comprehensive Cancer Centers, one of only a handful to receive an “exceptional” rating. We’re also among the top five U.S. cancer centers when it comes to the volume of patients we serve.

At the heart of this relationship between clinic and lab is our faculty, a group known for its doggedness, its insistence on never resting on laurels, and for always looking to push at the boundaries of what is said to be possible in disease prevention and treatment.

There’s Timothy J. Eberlein, MD, who has led Siteman from its very beginning and set the tone of excellence, along with the strong foundation of research and clinical care that has positively impacted so many lives. Graham A. Colditz, MD, DrPH, the world’s leading cancer epidemiologist, has advanced the use of population data, deep clinical and multi-omic phenotypes to identify the best approaches for cancer prevention and led the implementation of programs that are already successfully reducing cancer mortality in urban and

rural areas of Missouri with astounding efficacy. And then there’s the pioneering work of John F. DiPersio, MD, PhD, who helmed the Division of Oncology for 25 years and whose research has dramatically improved the success of bone marrow transplantation for patients with blood cancers. He has also developed innovative cell-based immunotherapies that now are in clinical trials. His successor, Daniel C. Link, MD, also an expert in understanding and treating blood cancers, is not only a great new leader for our oncology division but a key player in our efforts to more rapidly shepherd our promising discoveries through the drug development process so that they can save the lives of patients. I’m also thinking of Timothy J. Ley, MD, who was the first in the world to sequence a patient’s cancer genome, ushering in precision medicine approaches to leukemia and other cancers. And thanks to truly transformative research by Robert D. Schreiber, PhD, we understand how cancer cells evolve to escape detection by the immune system; his advances are the basis upon which today’s successful immunotherapies have been built. These are just a few examples of an absolutely incredible faculty that has accomplished things previously thought to be impossible – a faculty that is always striving to do more.

As you’ll read throughout this issue, we find ourselves in a moment of rapid progress in so many areas of cancer treatment. Our paradigm of precision medicine is allowing us to address one of its most pressing challenges: understanding which forms of cancer are aggressive and require intensive therapy, and which are not and require a different course of treatment. We are already leveraging genomic research, and new technologies in imaging and artificial intelligence are allowing us to customize treatment for each patient and promise for more effective and less arduous treatments. One of the most exciting projects currently underway uses new imaging technology together with artificial intelligence to be able to predict with extraordinary accuracy which forms of early breast and lung cancer are likely to progress and which might require minimal, or even no, therapy. We also are investing in a visionary initiative that will accelerate drug development across WashU Medicine to get more of the lifesaving therapeutics and diagnostics coming out of our labs to the people who need them. Projects that improve the effectiveness of cancer therapies are advancing more urgently, even as you read this magazine.

I like to talk about the virtuous cycle of academic medicine, in which we invest in education and

research to bring improvements to clinical care, better outcomes for patients and better health for the community, particularly in our commitment as a safety net provider for vulnerable patients. In turn, our clinicians care for the community and identify important areas for further scientific innovation.

Our WashU Medicine clinicians at Siteman are just a perfect exemplar of that cycle: taking care of patients, doing research to understand the different forms of cancer and develop better treatments for all of them, and going out into the community to engage in prevention work. That last one is a particular point of pride: Working together with Siteman, our efforts have led to a marked reduction in breast and colorectal mortality rates in our local and regional communities.

But we must do more. With the opening of the new ambulatory cancer building, we can and must take our community outreach to the next level. This means doubling down on our prevention efforts by



“We are on the precipice of incredible discovery and critical advancement of human health.”

increasing screenings and reducing mortality for all forms of cancer, and it also means increasing access to new, research-informed therapies and approaches. Most of the people who undergo cancer treatment do so without being a part of the most brilliant, cutting-edge ideas or the process by which we determine how to improve our care. It’s time to make sure anyone who has the potential to benefit from a clinical trial has access to one, and I want WashU Medicine – with Siteman and BJC – to lead the way.

We are on the precipice of incredible discovery and critical advancement of human health. I hope you’ll take the time to read this issue and learn more about what’s happening in cancer treatment and prevention at Siteman Cancer Center and WashU Medicine.

— DAVID H. PERLMUTTER, MD

Executive Vice Chancellor for Medical Affairs, the George and Carol Bauer Dean of the School of Medicine and the Spencer T. and Ann W. Olin Distinguished Professor

**More scientific breakthroughs.
More treatment options.**

More hope.



National leaders in cancer

Siteman Cancer Center is a leader in cancer care, built on the foundation of collaboration between WashU Medicine and Barnes-Jewish Hospital. This partnership has fostered ground-breaking research and life-changing care that has led to the prestigious recognition of Siteman as a Comprehensive Cancer Center by the National Cancer Institute (NCI).

75,000 unique patients served annually

600 WashU Medicine physicians and scientists

700 active therapeutic clinical trials per year

9,000 patients enrolled in clinical studies each year

\$250M in research grants and contracts in 2023

160 multi-investigator grants, including three SPORE grants

196 patent filings by investigators in 2023

13 new startup companies since 2019

200,000 preventive screenings performed in 2023

31% city and 33% county breast cancer mortality reduction in Black St. Louis patients over eight years

20 Missouri counties removed from list of colorectal cancer hot spots



Today. Tomorrow.

Together.

A patient-first approach to cancer treatment

The new Siteman Cancer Center makes care more convenient and manageable for more patients

BY ANDREA MARTIN

“Here, world-class experts will come to the patient. It’s really special, and I hope that all of our cancer patients will benefit from the hope they experience and our opportunity to provide better, more coordinated care.”

— Timothy J. Eberlein, MD, director of Siteman Cancer Center and the Spencer T. and Ann W. Olin Distinguished Professor and senior associate dean for cancer programs at WashU Medicine



657,270 square feet
Devoted exclusively to cancer

9 floors
Allow for future growth

88 private infusion rooms
Foster patient privacy

101 exam rooms
Improve patient comfort

433 indoor parking spaces
Easier in and out

2024
New Siteman Cancer Center opens

Patients are the inspiration

behind Siteman Cancer Center's newest outpatient facility

The new meticulously planned building offers a tangible example of what makes Siteman – the only National Cancer Institute-designated Comprehensive Cancer Center in Missouri and southern Illinois – so unique. It embodies the power of collaboration between BJC HealthCare and WashU Medicine in providing innovative cancer care based on the latest research, and an ongoing, deep commitment to the health of our region.

Cancer patients and survivors and their families – together with physicians, nurses, social workers and other caregivers – met with the building's architects and designers before construction began to share insights aimed at enhancing care and improving the overall experience for patients and their family members.

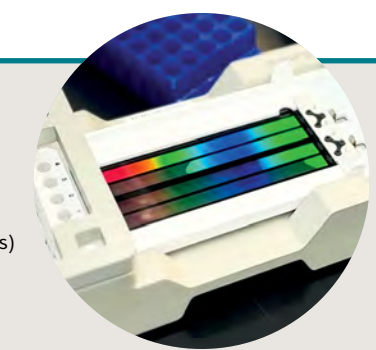
"In today's world when a patient has cancer, they visit multiple areas for treatment or care. They go to a place to get imaging done; they go to a place where they get their labs drawn; they go to a place where they receive chemotherapy; they go to a place where they see their providers. This location solves a lot of that – 80% of it: they can go to one building, one floor or two floors to get imaging, lab testing, get their treatments, see their provider. It's one single place where they can receive the unparalleled care and treatment Siteman is known for at all of its locations."

– Christina Longnecker, vice president of Oncology Services at Siteman Cancer Center

Siteman Cancer Center A quarter century of hope and healing

2023

- First Medicare- and Medicaid-approved whole genome sequencing test
- Route 66 Endometrial SPORE grant from National Cancer Institute (ongoing)
- Merit Extension for Cancer Center Support Grant from NCI (five to seven years)



2021

Cancer vaccines found effective in clinical trials

2020

Earns second consecutive Exceptional rating from NCI



Walls throughout the building feature work from local artists

Building more convenient care

When one purpose, to cure cancer, meets patients' needs directly, the level of expertise and number of emerging breakthroughs become limitless.

Houses Centers of Excellence

- Brain Cancer
- Head and Neck Cancer
- Blood Cancer
- Breast Cancer
- Pancreatic Cancer

Centralizes all diagnostic services

- Imaging, including mammography and breast ultrasound
- Laboratory
- Pulmonary function lab
- Bone density

Prioritizes convenience and well-being

- Cancer Information Center
- Business center equipped with computers, printers, fax, etc.
- On-site pharmacy and gift shop
- Therapeutic horticulture on treatment floors
- Pet therapy throughout patient floors

New Breast Health Center

- Breast imaging
- Consultations
- Pre-procedure care
- Surgical team care
- Post-procedure care
- Medical oncology an elevator ride away

“Our commitment to patient-centered care is reflected in every corner of this space, designed to offer the best possible environment for patient education, treatment and well-being. But truly, this is more than a building. It’s a promise to our patients that they deserve nothing but the best, and we are dedicated to delivering just that, every single day.”

— Paul J. Scheel Jr., MD, vice chancellor for clinical affairs at WashU Medicine and CEO of Washington University Physicians

“WashU Medicine oncologists at Siteman, known nationally for their expertise and leadership, offer personalized, targeted therapies designed specifically to block the abnormalities driving a patient’s cancer and increase the chances of a cure.”

— Ramaswamy Govindan, MD, the Anheuser-Busch Chair in Medical Oncology and associate chief of oncology, WashU Medicine



Private infusion rooms next to inviting waiting areas

“Our number one mission is to provide state-of-the-art, compassionate care. We’ve been fortunate to get physicians who are nationally recognized in their fields, but they also realize the importance of giving compassionate care.”

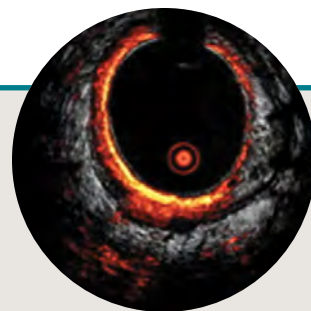
— Daniel C. Link, MD, the Alan A. and Edith L. Wolff Distinguished Professor of Medicine, director of the Division of Oncology at WashU Medicine and deputy director of Siteman Cancer Center



Scan the QR code for a closer look at the new Siteman Cancer Center or visit siteman.washu.edu/main-campus



Light-filled waiting rooms throughout the building



2019

- Whole genome sequencing is validated and introduced to the medical community
- Pioneers photoacoustic imaging for rectal cancer restaging

2018

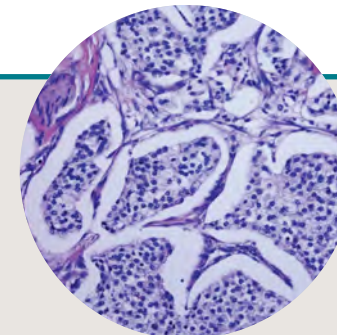
Parkview Tower opens, consolidating inpatient cancer services into one building

2017

- Offers CAR T-cell therapy
- First to use NK cell therapy for recurrent childhood leukemia
- 7,500th bone marrow transplant

2016

Pancreatic SPORE grant from NCI (ongoing)



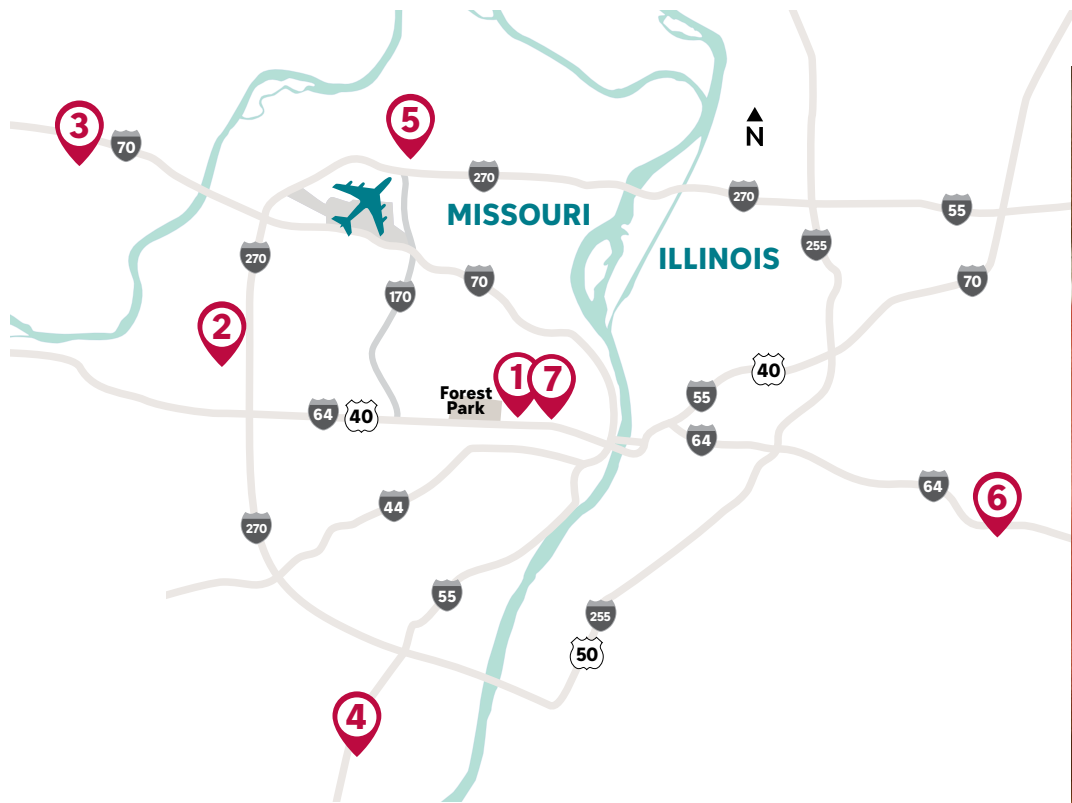
2015

Earns Exceptional rating from NCI, its highest rating

2014

World’s first MRI-guided radiation therapy





- 1** Washington University Medical Campus
- 2** Barnes-Jewish West County Hospital
- 3** Barnes-Jewish St. Peters Hospital
- 4** South St. Louis County
- 5** Northwest HealthCare
- 6** Memorial Hospital Shiloh
- 7** St. Louis Children's Hospital

Seven Siteman Cancer Center locations

at BJC HealthCare facilities throughout the region.

The new Siteman Cancer Center joins Siteman's legacy of excellence in the St. Louis region, including in Illinois. At each of Siteman's seven locations, WashU Medicine physicians provide innovative care and cancer screenings, address disparities and provide opportunities for eligible patients to access clinical trials.



Al Siteman, the man behind Siteman Cancer Center, along with his wife, Ruth, who died in June, pledged an enduring gift. Today, the center is an international leader in cancer treatment, research, prevention, education and community outreach.

Foresight

Investing in innovation that has changed the world

BY KRISTI RUGGLES

2013

- First single-vault proton center opens
- Leukemia SPORE grant from NCI (ongoing)



2012

BJC Collaborative launched, with Siteman as a founding member, laying the foundation for Siteman Cancer Network

2011

5,000th bone marrow transplant



2009

First SPORE grant from NCI – Endometrial (ongoing)

2008

- Sequences first human cancer genome
- Establishes Division of Public Health Sciences to propel prevention, education and community outreach efforts



In 1999, Al Siteman posed a question that would advance human health worldwide and shape the future of St. Louis. Why, he asked, do patients in our region travel hundreds of miles to well-known cancer centers far from home to receive the highest quality cancer care?

Then he invested in the answer. Al and his wife, Ruth, who died in June, pledged \$35 million to bring together cancer programs housed throughout WashU Medicine and create the Alvin J. Siteman Cancer Center. It was a monumental gift and the first of many that would help establish St. Louis as a destination for world-class cancer care.

Though the Sitemans preferred privacy, they agreed to give their name to the cancer center to catalyze fundraising. Within six months, other donors committed an additional \$75 million to cover the initial costs of creating Siteman, based at Barnes-Jewish Hospital and WashU Medicine, and its numerous programs.

“That was a seminal moment,” said Timothy J. Eberlein, MD, director of Siteman Cancer Center and the Spencer T. and Ann W. Olin Distinguished Professor and senior associate dean for cancer programs at WashU Medicine. “The name instantly gave the center credibility.”

In the 25 years since the couple made that founding gift, the cancer center has become one of the elite centers leading the world in efforts to

defeat cancer. And it is a relative newcomer – many peer institutions were established before 1950.

The center’s dramatic growth includes an increase in research funding since the center’s inception from \$10 million to \$70 million from the National Cancer Institute (NCI) to support innovative projects led by WashU Medicine scientists, and the expansion of its roster of WashU Medicine physicians and scientists to more than 600. And through Siteman’s seven locations, the center has treated more than 1 million patients.

Clinical trial participation has grown by 145%, from 3,921 participants in 1999 to 9,611 in 2023. The trials, led by WashU Medicine physicians, include those evaluating innovative investigational therapies for virtually every kind of cancer. This inspires hope among the patients who seek care at Siteman and is especially meaningful in economically disadvantaged communities, where myriad factors drive higher rates of cancer mortality.

EMBRACING THE BOLD

Among the attributes that have characterized the Sitemans’ philanthropy over the years is their willingness to fund promising but untested hypotheses. In 2010, the couple endowed the Siteman Cancer Research Fund at WashU Medicine, which is part of a constellation of funds known collectively as the Siteman Investment Program. The competitive program provides seed grants to scientists with novel ideas, often early in their careers, to help them produce preliminary data needed to secure larger federal grants.

The program’s success is indisputable. From 2018 through 2022, the \$31.1 million awarded through the program generated an additional \$405 million in external funding from agencies such as the NCI. Grants have supported work to develop cancer vaccines, use light to safely kill cancer cells, and precisely target tumors with radiation, among other areas.



Al and Ruth Siteman

In addition, the couple’s generosity has spurred major scientific breakthroughs. In 2007, a team of WashU Medicine scientists led by Timothy J. Ley, MD, the Lewis T. and Rosalind B. Apple Professor of Medicine and a professor of genetics, were pursuing what had been described as a “bodacious experiment that could blow things wide open.” They aimed to be the first to sequence a patient’s cancer genome.

Their project lacked both certainty – this was uncharted science – and resources. A federal agency had denied the scientists’ request for funding to get the project over the finish line. Then Al Siteman stepped in and committed \$1 million. The gift powered completion of the study that fundamentally changed cancer care. The scientists developed a blueprint for discovering the unique genetic mutations that drive cancer growth in individual patients’ tumors, which ignited the meteoric rise of cancer genomics to guide treatment decisions.

“That gift is just one example of Al and Ruth’s vast impact,” said David H. Perlmutter, MD, executive vice chancellor for medical affairs, the George and Carol Bauer Dean of the School of Medicine and the Spencer T. and Ann W. Olin Distinguished Professor. “It is impossible to calculate the number of patients who experience

better outcomes as a result of their willingness to take a risk on this research.”

Added Eberlein: “Al believed in a novel idea that led to fundamental advances in cancer care. This gift illustrates how philanthropy plays a key role in allowing us to carefully invest in new ideas – ideas that may become the treatments of tomorrow.”

IMPROVING OUTCOMES FOR ST. LOUIS AND BEYOND

Al Siteman’s giving priorities today sustain a passion he shared with his wife to improve access to top-notch cancer care for underserved populations. He continues to support the Siteman Program for the Elimination of Cancer Disparities, or PECaD, which strives to ensure that all cancer patients and communities in the cancer center’s 82-county catchment area in eastern Missouri and southern Illinois benefit from the scientific and clinical expertise of WashU Medicine faculty members.

“Al’s commitment to bring equity to outcomes for cancer patients reflects his devotion to the St. Louis region and his depth of understanding of our work,” said Graham A. Colditz, MD, DrPH, the Niess-Gain Professor of Surgery; director of the Public Health Sciences Division in the Department of Surgery; and associate director of prevention and control at Siteman. “He gives thoughtfully, strategically and with profound generosity.”

That profound generosity is shaped by his scientific curiosity, zeal for innovation, keen eye for risks worth taking, and unwavering trust in WashU Medicine physicians and scientists. Tucked quietly beneath those attributes is his compassion.

“When I see Al at the Medical Campus, invariably someone will stop him and say, ‘Hey, aren’t you Mr. Siteman?’” Eberlein said. “When he tells them he is, they thank him and say, ‘If not for you, my husband, son, aunt or other relative would not be alive.’ He gets tears in his eyes every time.”

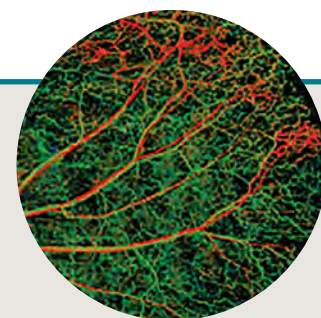
Join the Sitemans in furthering this legacy of hope and healing.



Scan and give to support cancer research or visit siteman.washu.edu/donate

“Al’s commitment to bring equity to outcomes for cancer patients reflects his devotion to the St. Louis region and his depth of understanding of our work.”

—Graham A. Colditz, MD, DrPH



2006

Develops photoacoustic imaging for cancer detection

2005

Joins National Comprehensive Cancer Network

2004

Receives Comprehensive Cancer Center status designation from NCI



2001

- Receives Cancer Center designation from the National Cancer Institute (NCI)
- Landmark study reveals immune system’s pivotal role in tumor prevention

1999

The new cancer center is named the Alvin J. Siteman Cancer Center

Research & care that push medicine forward

“Twenty-five years ago, we had two aspirational goals: One, we wanted to be experts in every kind of cancer; and two, we wanted every patient’s experience to be unique and have the maximum amount of support, providing them more hope and cures.”








— Timothy J. Eberlein, MD, director of Siteman Cancer Center and the Spencer T. and Ann W. Olin Distinguished Professor and senior associate dean for cancer programs at WashU Medicine

Big problems are solved by teams of people who have big ambitions and who won’t stop until they find a way through. The compassionate care happening every day at Siteman Cancer Center is powered by the innovative research and care of WashU Medicine physicians and scientists along with the technology and infrastructure of BJC HealthCare, bringing together the brightest minds — from bench to bedside — to collaborate with the purpose of understanding, treating and curing **all** cancers — from the most common to the most rare and complex.

At Siteman, patients are partners in their care, empowered and engaged in their own treatment plans and recoveries. And many can play a critical part in the advancement of treatments for all by courageously participating in clinical trials.

As a top national cancer center, Siteman provides innovative approaches and effective treatment options, committed to bringing cancer patients the extraordinary gift of an ordinary day, and giving those previously thought to be out of options new ones to consider.

Explore the extensive scope of cancer research at WashU Medicine and patient care at Siteman Cancer Center. These examples provide a glimpse into the ongoing innovations and services that impact all of us in some way.

-  BLOOD CANCER
-  BRAIN CANCER
-  COLORECTAL CANCER
-  ENDOMETRIAL CANCER
-  PANCREATIC CANCER
-  BREAST CANCER
-  PEDIATRIC CANCERS

A device transforms a patient's white blood cells into a CAR T-cell therapy in several days in the Siteman Cancer Center Biologic Therapy Core Facility. This supports translational medicine efforts — from bench to bedside — in the fields of cellular therapy and gene therapy for treating blood cancers.

World leaders in ending blood cancer

The Siteman Blood Cancer Center delivers tomorrow's treatments today

BY JULIA EVANGELOU STRAIT

The Siteman Blood Cancer Center, recognized internationally as a leader in innovative care, draws patients from across the U.S. and overseas. The center brings together the multidisciplinary expertise of WashU Medicine physicians who have a singular focus on treating blood cancers, including leukemia, lymphoma, multiple myeloma and myelodysplastic syndromes. They have long been at the forefront of transforming care and pushing the boundaries of what's possible in managing these complex cancers.

Such progress stems from a solid foundation of research-informed care championed by leukemia expert John F. DiPersio, MD, PhD, the Virginia E. and Sam J. Golman Endowed Professor of Medicine, who led WashU Medicine's Division of Oncology for more than 25 years. He was instrumental in establishing Siteman's bone marrow transplant program for patients with blood cancers as one of the world's best, and his ongoing research at WashU Medicine continues to move the field forward. In addition to developing novel cell-based immunotherapies, he is focused on alleviating graft-versus-host disease, a potentially deadly complication of bone marrow transplantation. His research has been fundamental to the FDA approval of medications to mobilize stem cells for transplant and the first drug approved to treat graft-versus-host disease.

WashU Medicine's expertise in blood cancers runs deep. Physician-scientist Daniel C. Link, MD, also specializes in leukemia and conducts innovative research aimed at developing better treatments for blood cancer. He is deputy director of Siteman and director of the Division of Oncology. Link is a world leader in understanding hematopoiesis, the process by which different types of blood cells are formed and has helped develop WashU Medicine's hematopoietic malignancy research program into one of the top such programs in the country. He also leads efforts aimed at boosting translational research and moving promising investigational treatments — developed at WashU Medicine — into clinical trials.

In addition to Link, the Alan A. and Edith L. Wolff Distinguished Professor of Medicine, the Siteman Blood Cancer Center is led by Amanda F. Cashen, MD, a professor of medicine and associate chief of the Hematologic Malignancies Program, and Brad S. Kahl, MD, a professor of medicine and director of the Lymphoma Program.

Patients with blood cancers who seek care at Siteman have access to the most advanced diagnostic techniques, the latest, most advanced



Danielle Albea, research lab supervisor (left) and Julie Ritchey, research lab manager for John DiPersio, MD, PhD, work in the Siteman Cancer Center Biologic Therapy Core Facility to produce CAR T cells, a type of cell-based immunotherapy for treating blood cancers.

treatments, including immunotherapies, and an array of clinical trials aimed at developing new, more effective treatments options.

“Our patients benefit from decades of outstanding clinical care and research led by WashU Medicine physicians and researchers at Siteman,” Cashen said. “This level of expertise also helps us recruit the brightest talents in blood cancer research and train a new generation of physicians and physician-scientists dedicated to further improving outcomes for patients.”

Patients receive expert care guided by the most advanced genetic tests available, including whole cancer genome sequencing for acute myeloid leukemia (AML) through the ChromoSeq test, developed by WashU Medicine physician-scientists and the first to be approved for reimbursement by the Centers for Medicare & Medicaid Services.

The Siteman Blood Cancer Center also has received a prestigious Specialized Program of Research Excellence (SPORE) in Leukemia grant from the National Cancer Institute — one of only two active Leukemia SPOREs in the country. The award funds research to develop the next generation of blood cancer therapeutics.

Stem cell transplants provide the possibility of a cure for some blood cell cancers and can only be performed at specialized centers. WashU Medicine physicians have performed more than 10,000 stem cell transplants at Siteman, making the cancer center one of the largest and most experienced bone marrow transplant programs in the country. “Very few institutions in the U.S. have the expertise and resources that WashU Medicine and BJC HealthCare bring together to care for patients at Siteman,” Cashen said. “For patients with blood cancers, we draw on our wealth of experience so they receive the very best care possible from a team that is absolutely committed to their care and supports patients every step of the way.”

Time, the ultimate gift

A New York doctor turns to WashU Medicine specialists at Siteman Cancer Center to treat the untreatable

BY KRISTINA SAUERWEIN

Three years ago, a routine blood test showed that David B. Duggan, MD, had a high white-blood-cell count, suggesting an infection or illness of some sort.

“But I felt great,” recalled Duggan, a hematologist in New York.

In his late 60s at the time, Duggan was active – he cycled, swam and worked on his 185-year-old farmhouse. He also taught medical students, conducted research and treated patients with leukemia, lymphoma and other blood cancers at the State University of New York Upstate Medical University in Syracuse, N.Y.

But within days of the blood test, Duggan received grim news. He had leukemia – specifically, T-cell prolymphocytic leukemia, or T-PLL, a rare, aggressive and often fatal cancer.

“Ironically, as a hematologist, I was quite familiar with T-PLL,” Duggan said. “I’ve treated patients with it, and it can progress quickly. Standard treatments aren’t terribly satisfying.”

So, he started getting his affairs in order. He and his wife of 39 years, Lynn, took a two-week bucket-list trip to Ireland with family. He looked forward to being a part of major family events, including the birth of his first grandson, Colin, and the marriage of his youngest child. He stopped accepting new patients.

“My job was to be there for my patients,” he said. “I wasn’t sure if I’d be around.”

But then, Duggan discovered a phase 1 clinical trial 885 miles from home at Siteman Cancer Center. The international, multicenter trial is evaluating an innovative cellular immunotherapy that was developed by WashU Medicine’s John F. DiPersio, MD, PhD, the Virginia E. and Sam J. Golman Professor of Medicine, and his colleagues, fellow physician-scientists Geoffrey L. Uy, MD, co-leader of the Hematopoietic Development and Malignancy Program at Siteman and a professor of medicine in the oncology division; Michael Kramer, MD, PhD, WashU Medicine instructor in medicine; and Armin Ghobadi, MD, clinical director of the Center for Gene and Cellular Therapy and a professor of medicine in the oncology division at WashU Medicine.

The clinical trial is partly funded by Wugen, a startup cofounded by DiPersio, who also directs WashU Medicine’s Center for Gene and Cellular Immunotherapy at Siteman. The company – which is developing several lines of cell-based

Now in remission, patient David Duggan, MD, travels from his home near Syracuse, N.Y., for a follow-up appointment with Armin Ghobadi, MD, for his investigational treatment of T-cell prolymphocytic leukemia (T-PLL). After his diagnosis, Duggan sought out clinical trials, which led him to an immunotherapy trial headed by John DiPersio, MD, PhD.

immunotherapies for various cancers – was cofounded by WashU Medicine physician-scientist Todd Fehniger, MD, PhD, co-leader of the Hematopoietic Development and Malignancy Program at Siteman and a professor of medicine in the division of oncology; Matthew Cooper, PhD, a former faculty member and Wugen’s chief scientific officer; and Melissa Berrien-Elliott, PhD, a former postdoc in Fehniger’s lab.

The trial involves CAR T-cell therapy, a type of cellular immunotherapy that uses genetically modified T cells to attack cancer cells. This particular CAR T-cell therapy is unique in that it is genetically engineered to attack T cell cancers, such as Duggan’s, rather than B cell cancers, the typical target of CAR T-cell therapies. But using genetically modified T cells to kill and eliminate the cancerous T cells is tricky, because the modified T cells risk mistaking themselves for the cancer and succumbing to friendly fire rather than eliminating the leukemia.

A second genetic modification helps overcome this challenge by eliminating the T cells’ ability to target one another, which also stops the cells from attacking the body’s healthy tissues, preventing a life-threatening side effect of treatment called graft-versus-host disease. These modifications further allow the therapeutic T cells to be collected from any healthy donor without concern about finding someone with an immune system match, which can take time and delay treatment against an aggressive disease.

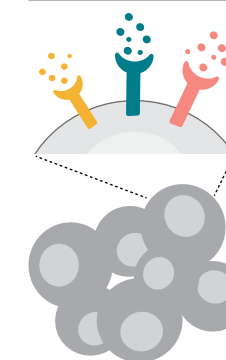
Using the novel CAR T-cell therapy, Ghobadi administered the infusion to Duggan in early 2024. “He had a beautiful expansion of CAR T cells circulating throughout his body,” Ghobadi said. “It eventually led to the elimination of his malignant T cells, basically ridding the body of leukemia.”

In addition to Duggan, other patients who have received the CAR T-cell therapy have gone into remission, Ghobadi said. “The trial has introduced a new and exciting opportunity for treating patients who otherwise lacked other options.”

“As a doctor, I understand death,” Duggan said. “After my diagnosis, I was afraid I had little time left. But Siteman has given me access to WashU Medicine oncologists who are international leaders in their fields as well as this innovative clinical trial that’s granted me time. I am grateful because, boy, I sure enjoy living.”

“BOOT CAMP” FOR CANCER FIGHTERS

A donor’s or patient’s natural killer cells are “trained” using chemical signals to make them even better cancer fighters for the patient.



Natural Killer (NK) Cells

NK cells have an innate capacity to avoid “friendly fire” that allows them to attack only cancer cells and not harm the patient’s healthy cells. For some cancers, NK cells are engineered to express a new type of recognition that is specific for the targeted diseased cells.

The differentiated NK cells now “remember” their basic training, and once transplanted they will:

- Kill cancer cells
- Activate other immune cells
- Persist after transfer into a patient



Memory-like NK Cells

TESTING IN CLINICAL TRIALS FOR:

- Leukemia
- Lymphoma
- Melanoma



Innovation by collaboration

The brightest minds solving
brain cancer's toughest challenges

BY MARK REYNOLDS

SITEMAN CANCER CENTER

Brain tumors are among the most challenging cancers to effectively treat. Depending on the tumor's location, surgery can interfere with cognitive function, movement or language, and surgery often is not the solution because the tumor cells are invasive and intertwined with normal brain cells. Additionally, the brain's natural protective barrier prevents chemotherapy drugs from reaching the brain.

Leading WashU Medicine physicians and researchers at Siteman Cancer Center meet these challenges head-on through a collaborative team effort that includes medical oncology, neurosurgery, radiation oncology, neurology, cancer biology, immunology, pathology, engineering, genetics, and imaging sciences. These powerful partnerships have come together at the Siteman Brain Tumor Center, which launched in 2021, and has emerged as a nationally recognized program focused on developing and evaluating new therapeutics to help improve patient survival.

"We bring together clinicians and researchers from varying disciplines to work toward the best possible outcomes for our patients, starting from high-level research that leads directly to clinical innovations that improve patient care," said Albert H. Kim, MD, PhD, the August A. Busch Jr. Professor of Neurological Surgery at WashU Medicine and director of the Siteman Brain Tumor Center. "Our unique infrastructure breaks through barriers, drives innovation through collaboration, and positions us to revolutionize our understanding of brain tumor biology and treatment."

WashU Medicine investigators are actively participating in dozens of clinical trials, including efforts led by Milan G. Chheda, MD, an associate professor of medicine at WashU Medicine and director of neuro-oncology at WashU Medicine and Siteman, to evaluate immunotherapies and targeted therapies for brain tumors, and by Jiayi Huang, MD, an associate professor of radiation oncology and co-director of the Siteman Brain Tumor Center, to optimize radiation therapy for glioblastoma, one of the most aggressive brain tumors. These groundbreaking innovations are made possible by the unique clinical expertise of WashU Medicine physicians at the Siteman Brain Tumor Center,

Milan G. Chheda, MD, and colleagues at the Siteman Brain Tumor Center use their unique clinical expertise to target radiation therapy for glioblastoma. Siteman is the only cancer center offering this high level of treatment in the region.

the only center regionally offering a full spectrum of surgical, systemic and radiation therapy options, helping lead to more effective therapies and better outcomes for patients.

"Because of the center's integration of research and patient care, discoveries can more rapidly move into the clinic," said Alexander H. Stegh, PhD, a professor of neurosurgery and the center's director of research. For instance, Stegh's research within the center's brain tumor technology program has led to a first-in-human clinical trial of investigational nanotherapeutics for glioblastoma. His technology uses nanoparticles that are designed to cross the blood-brain barrier and activate the immune system to fight tumors or deliver precision medicine intended to stop tumor growth.

"The focus on neuroscience research and on defeating cancer here at WashU Medicine is truly sparking change," Kim said. "The expertise and drive that our team and our many collaborators have to conquer brain tumors are making a significant difference in the field for current and future patients."



The Siteman Brain Tumor Center launched in 2021, and is led by Albert H. Kim, MD, PhD, shown here during a craniotomy to treat a brain tumor. The center has emerged as a nationally recognized program focused on developing and evaluating new therapeutics to help improve patient survival.

Mobilizing the best to start the fight earlier

Getting a head start on detection and treatment in adults under 50

BY KRISTINA SAUERWEIN



Michael Rall-Brown plays with his daughters at the Dennis & Judith Jones Variety Wonderland Playground in Forest Park this fall. Colorectal surgeon William C. Chapman Jr., MD, removed Rall-Brown's large intestine and created a new stool pouch from his existing small intestine.

For more than a decade, Michael Rall-Brown would skip meals to avoid digestive havoc. Other times, he'd eat and, within the hour, stop whatever he was doing to sit or lie down until waves of pain passed. Diarrhea was a frequent occurrence.

Rall-Brown delayed seeking medical care because he lacked finances and time off work. And for as long as the 39-year-old father of two daughters could remember, his family had not trusted doctors, due to long-standing discrimination against Black people, including in health care.

But in April, agony forced Rall-Brown to seek help at two hospitals near his home in north St. Louis County. At the second hospital, doctors found multiple masses in his colon that were causing obstruction and dangerously low blood counts. Given the complexity of the situation, he was transferred to Barnes-Jewish Hospital. Additional imaging and diagnostics revealed hundreds of polyps in his large intestine, landing him in the operating room with William C. Chapman Jr., MD, a WashU Medicine colorectal surgeon at Siteman Cancer Center.

During surgery, Chapman discovered two golf-ball-sized tumors hiding among the hundreds of polyps riddling Rall-Brown's large intestine, which includes the colon and rectum. The surgeon removed his entire large intestine and reconstructed a new stool pouch from Rall-Brown's small intestine.

"On the spectrum of polyp numbers we see, Michael was at the absolute top," Chapman said. "Over the years, polyps had carpeted his large intestine and continued to grow. Two of them had even turned into cancers, all without Michael knowing of his underlying disease or the threat looming within his bowels. Taking care of patients like him is extremely complicated, often requiring specialists from multiple disciplines. That's the advantage of Siteman, with the expertise of WashU Medicine specialists. We can provide the very best care to patients with aggressive cancers. And that was true with Michael. By the time I saw him, he was in bad shape."

Today, Rall-Brown said he feels much better and has resumed many of his regular activities, such as spending time with his daughters.

As part of his care at Siteman, Rall-Brown learned he has an inherited genetic mutation predisposing him to early-onset colorectal cancer. His maternal grandmother had died from colon cancer in her early 70s, but Rall-Brown saw her cancer as a disease that afflicts older people, not someone young like him.

"Having cancer hadn't even entered my mind," Rall-Brown said. "I just thought I had a weak stomach. I didn't realize how close I was to dying."

Many adults under 50 years old are like Rall-Brown, attributing digestive problems to having a delicate system, nerves and stress, eating poorly, or a run-of-the-mill stomach virus. They also may think blood in their stools means hemorrhoids. "Colon cancer is not usually what they think of," Chapman said.

Rall-Brown is part of a consistently increasing number of adults under age 50 being diagnosed with colorectal cancer.

COLORECTAL CANCER



COMMON SIGNS IN PEOPLE WHO DEVELOP early-onset colorectal cancer

- ABDOMINAL PAIN
- RECTAL BLEEDING
- DIARRHEA
- IRON DEFICIENCY



Hyun Kim, MD, led multiple studies in which patients with rectal cancer had healthier outcomes without surgery and with shorter than usual courses of radiation and chemotherapy. “There’s a stigma associated with being diagnosed with colorectal cancer at a young age,” Kim said. “The center wants to raise awareness while also conducting early screenings and genetic testing for high-risk populations.”

The American Cancer Society cautions that colorectal cancer has become the leading cause of death in men younger than 50 and the second-highest cause of death in women in the same age group.

Many young people delay medical care because they are unaware of the symptoms or risks, and they do not typically undergo screenings such as colonoscopies. By the time they’re diagnosed, the cancer is often in advanced stages.

Meanwhile, routine screenings and increased awareness in people over age 50 have helped to decrease deaths from colorectal cancer. If caught early enough, the cancer is highly treatable.

Recognizing the urgency to reach younger people, Siteman established the Young-Onset Colorectal Cancer Program in 2021, becoming one of the first cancer centers in the U.S. dedicated to diagnosing and treating colorectal patients younger than 50.

Each year, about 100 new patients from Missouri, Illinois and surrounding states are seen in a multidisciplinary clinic at Siteman that brings together WashU Medicine surgeons, medical oncologists and radiation oncologists who have expertise in treating younger patients with colorectal cancer. Along with the clinicians, the program offers diagnostics such as precision radiology and resources such as access to clinical trials, some of which have led to innovative treatments that have changed industry standards and practices.

“Cases continue to increase in adults at a younger age, and some of this can be explained by family history or inherited cancer syndromes, but the medical community doesn’t fully understand most of the reasons why cases are on the rise,” said Chapman, an assistant professor of surgery and one of the program’s lead physicians. “The program

leans into WashU Medicine’s vast expertise in clinical care, research and technology to tackle this problem from all angles.”

Hyun Kim, MD, is a WashU Medicine associate professor of radiation oncology and head of the gastrointestinal oncology and adaptive radiation therapy services. He has led multiple studies in which patients with rectal cancer had healthier outcomes without surgery and with shorter than usual courses of radiation and chemotherapy. “Not having to undergo surgery is such an important treatment option for young patients,” Kim said. “These patients with young families and jobs can continue to live their lives during treatment.”

The program also has helped Rall-Brown by offering financial counseling and other services aimed at helping patients navigate medical bills and the health insurance system.

Further, he talked with a genetic counselor who recommended his family members get testing. He learned that Black people are 20% more likely to get colorectal cancer and 40% more likely to die from it than people of other races. “I don’t believe most people in my community are aware of this,” he said. “Just knowing the risks helps prevent people from getting colorectal cancer.”

The Young-Onset Colorectal Cancer Program also is dedicated to advancing research that improves prevention, early detection and treatment. For example, Yin Cao, ScD, a program leader and an associate professor of surgery and of medicine in the Public Health Sciences Division at WashU Medicine, is leading global efforts to identify risk factors for young-onset colorectal cancer.

Earlier this year, Cao was awarded a prestigious grant for \$25 million from Cancer Grand Challenges, a global research initiative co-founded by the National Cancer Institute of the National Institutes of Health (NIH), and Cancer Research UK. It is dedicated to tackling the toughest challenges in cancer research. Cao is co-leading an interdisciplinary research team involving nine co-investigators across the globe, including Gary Patti, PhD, the Michael and Tana Powell Professor of Chemistry at WashU. Working with more than 70 collaborators and a panel of patient advocates, the team is committed to identifying risk factors, with the goal of swiftly reversing the rising trend of early-onset colorectal cancer.

“As colorectal cancer and many other cancers are coming to a younger population, we must

expedite the discovery of causal risk factors for cancer, with the goal to identify effective and equitable interventions,” Cao said. “This requires a disruptive framework by uniting population science, mechanistic research, and implementation science in an accelerated fashion. We are pioneering this, building upon our years of dedicated work in early-onset colorectal cancer.”

With the support of Cancer Grand Challenges and Siteman, Cao’s team will continue to lead groundbreaking work in early-onset colorectal cancer. Among her team’s efforts, she is collaborating with WashU Medicine physicians at Siteman to gather clinical samples spanning the entire cancer continuum. Through precisely mapping the molecular changes triggered by risk factors, such efforts will unlock the potential to develop powerful, targeted interventions.

“Our overarching goal is to prevent and detect cancer earlier among younger generations,” Cao said. “This mission is bold and ambitious yet achievable. This drive comes from our unwavering commitment to patients like Mr. Rall-Brown, our community and our children.”

Rall-Brown said he found purpose during his illness: “It may sound odd, but having cancer has helped my self-esteem,” he said. “It shows I survived for a purpose. Maybe more people will get genetic testing. Maybe my daughters won’t get cancer. There’s a reason I’m here.”

Michael Rall-Brown enjoys an ice cream toast with his daughters Londyn Rall-Brown (left) and Arika Cooper.





Inventive and inclusive

Advancing endometrial cancer care
that works for everyone

BY JULIA EVANGELOU STRAIT

Maggie M. Mullen, MD, (left) reviews data with senior scientist Elena Lomonsova, PhD, and Angela Schab, PhD, postdoctoral research associate.

It's a troubling trend: Cases of uterine cancer are increasing rapidly across the U.S., as is the mortality rate. Further, an unsettling racial component exists, with Black women having a higher likelihood of aggressive disease and death than white women. In fact, Black women are nearly twice as likely to die from uterine cancer – also referred to as endometrial cancer – than any other racial or ethnic group.

This reality has pushed WashU Medicine physicians and researchers at Siteman Cancer Center to carry out groundbreaking research to address this racial disparity and identify new treatments that can benefit all women.

“In the past five years, we’ve witnessed a startling surge in endometrial cancer cases,” noted gynecologic surgeon Dineo Khabele, MD, the Mitchell and Elaine Yanow Professor of Obstetrics & Gynecology and head of the Department of Obstetrics & Gynecology at WashU Medicine. “It’s affecting more women in the U.S. than ever before, and alarmingly at much younger ages.”

WashU Medicine is a longtime leader in the study and treatment of endometrial cancer, first receiving a prestigious National Cancer Institute Specialized Program of Research Excellence (SPORE) grant for endometrial cancer in 2009. A new SPORE grant in 2023 – the only one awarded in the U.S. – is allowing WashU Medicine researchers to investigate what is driving recent increases in endometrial cancer cases and deaths as well as the racial disparities seen in this cancer type.

Collaborating with the University of New Mexico and the University of Oklahoma Health Sciences Center, the three WashU Medicine endometrial SPORE locations – and the diverse patient populations they serve – are providing an opportunity to better address endometrial cancer in patients who have been historically underrepresented in cancer research and clinical trials and are disproportionately affected by endometrial cancer, including Black, American Indian and Hispanic patients.

“We hope our studies will shed light on racial disparities we see in endometrial cancer,” said David G. Mutch, MD, the Ira C. and Judith Gall Professor of Obstetrics & Gynecology and principal investigator of the endometrial cancer SPORE. “We’re reaching out to diverse groups of patients to be sure our participants accurately reflect the individuals who develop this cancer and to be sure any research findings apply to and have the potential to benefit all patients. If we have a better understanding of racial disparities in endometrial cancer, we can take steps to reduce them.”



Dineo Khabele, MD, (left) works closely in her lab with senior research technician Wendy Zhang.

As part of the endometrial SPORE, one team of WashU Medicine researchers is evaluating investigational drugs that inhibit important molecules called heat shock proteins, which have roles in tumor cell growth and metastasis. A second team of researchers is testing inhibitors that target an aggressive uterine cancer by blocking a key protein called a receptor tyrosine kinase. And a third is focused on the possibility of early detection and prevention of endometrial cancer through weight-loss strategies.

“The SPORE in endometrial cancer gives patients opportunities to participate in innovative clinical trials that have potential to improve outcomes for those affected by this cancer,” Khabele added. “It also will help build a strong foundation for training early-career investigators, so they will have the support they need to advance work in this important area.”

Beyond the SPORE grant, Matthew A. Powell, MD, the Ira C. and Judith Gall Professor of Obstetrics & Gynecology, recently co-led national studies showing that adding immune checkpoint inhibitors to standard therapy for endometrial cancer improves outcomes for many patients. Checkpoint inhibitors help unleash T cells, giving these vital immune cells a better shot at eradicating a tumor.

The immunotherapies worked particularly well against endometrial tumors with certain genetic characteristics called mismatch repair deficiency and high microsatellite instability. Powell was a co-senior author on two studies showing these results. The findings were published in 2023 in *The New England Journal of Medicine* and are changing the standard of care for advanced endometrial cancer.

“With these recent advancements in immunotherapy and our ongoing clinical trials through the SPORE,” Mutch said, “we are able to offer more options for our patients now than we ever have, and we will continue working to move the field forward.”

Specialized Program of Research Excellence (SPORE)

grants are awarded by the National Cancer Institute to leading cancer centers conducting the most cutting-edge translational research in various cancer types. WashU Medicine has been awarded SPORES in blood, endometrial and pancreatic cancer, placing the research institute among a tiny vanguard of universities that have been awarded a trio of SPORES. Major components of these prestigious grants include innovative research projects with an emphasis on early-stage clinical trials.



Ending endometrial cancer isn't something doctors do alone.

Download and follow Siteman Cancer Center's "This is Cancer" podcast on your favorite podcast platform for inspiring examples of how doctors and patients work together and inspire each other.



Roheena Panni, MD, believes that clinical trials at Siteman Cancer Center help her work to develop immunotherapies for pancreatic cancer.

Making the impossible possible

Deep expertise drives advances in pancreatic cancer

BY MARK REYNOLDS

Cancer of the pancreas is uniquely lethal. Despite being one of the rarer forms of cancer, it is the third leading cause of cancer deaths in the United States, and cases are on the rise. Clinical advances, many made possible by WashU Medicine researchers at Siteman Cancer Center, have improved survivorship rates from 5% 20 years ago to about 12% today, meaning an additional 4,000 lives are saved each year. Still, according to WashU Medicine physicians and scientists who specialize in pancreatic cancer, there is much more work to do.

Most patients with pancreatic cancer don't experience symptoms until the disease is advanced, making this cancer particularly difficult to treat. Identifying the origins of the disease is crucial and may lead to more effective treatments.

"For patients with a rare, difficult-to-treat cancer like pancreatic cancer, it benefits them to be at Siteman Cancer Center, where we have a team with special expertise and offer the most advanced treatments and also the opportunity to enroll in clinical trials that have the potential to significantly improve outcomes," said Roheena Panni, MD, a WashU Medicine assistant professor of surgery.

Panni is working to develop immunotherapies targeted to pancreatic cancer. Much of what is needed to get ahead of this aggressive tumor would not be possible without the wide range of expertise available at WashU Medicine, she said.

Some of the pancreatic cancer clinical trials at Siteman are part of WashU Medicine's prestigious Specialized Programs of Research Excellence (SPORE) grant in pancreatic cancer from the National Cancer Institute – one of only three such grants in the U.S. Co-led by WashU Medicine's David G. DeNardo, PhD, a professor of medicine and co-leader of the pancreatic SPORE at WashU Medicine and co-leader of the Tumor Immunology Program at Siteman, and Ryan C. Fields, MD, the Kim and Tim Eberlein Distinguished Professor, chief of the surgical oncology section in the Department of Surgery and co-leader of the Solid Tumor Therapeutics Program at Siteman, the grant funds three major research projects: One is aimed at a strategy to make pancreatic cancer more sensitive to immunotherapy; a second investigates ways to make the cancer respond to innovative patient-specific vaccines tailored to individual patients based on unique characteristics of their tumors; and a third explores an anti-inflammatory compound that has the potential to make pancreatic cancer more vulnerable to chemotherapy.

"We are excited about these clinical trials and the opportunities they provide to patients to try new and innovative therapies backed by strong science," DeNardo said. "We have made some progress in recent years, and we hope the new treatments we are investigating will further improve outcomes for our patients with pancreatic cancer."



Connecting the dots

From detection to treatment, mapping a new future for breast cancer

BY JULIA EVANGELOU STRAIT

Graduate student Jiayu Ye works in the lab of Sheila A. Stewart, PhD. Stewart's lab has identified a drug combination that makes T cells more effective in mice with metastatic breast cancer.

WashU Medicine physicians at Siteman Cancer Center are recognized nationally for their expertise in leading-edge breast cancer therapies. Nearly 50 specialists in surgery, breast reconstruction, medical oncology and radiation oncology, radiology and pathology are part of the Breast Cancer Program at Siteman, providing personalized treatment plans for patients. Advanced genetic testing, including tests developed by WashU Medicine researchers, help predict which treatments are likely to be most effective.

One major area of focus for WashU Medicine researchers is identifying women at high risk. While breast density tends to decrease with age, studies evaluating mammograms – led by cancer prevention pioneer Graham A. Colditz, MD, DrPH, the Niess-Gain Professor of Surgery; director of the Public Health Sciences Division in the Department of Surgery; and associate director of prevention and control at Siteman, and Shu “Joy” Jiang, PhD, a WashU Medicine associate professor of surgery in the Public Health Sciences Division – have found the decline is significantly slower in women who later developed breast cancer. The research opens the door to harnessing information captured by mammograms over time to predict who is at highest risk.

“Siteman Cancer Center is one of the nation’s leaders in breast cancer screening and treatment,” said Debbie L. Bennett, MD, chief of the breast imaging section and an associate professor of radiology at WashU Medicine’s Mallinckrodt Institute of Radiology. “The two go hand in hand, because the earlier you can find the cancer, the easier it is to treat and the better the outcomes for patients. Our care is informed by the latest research discoveries, and that’s one of the distinguishing features of Siteman.”

Colditz also is developing ways to predict which patients with an early form of breast cancer – ductal carcinoma in situ (DCIS) – are at highest risk of progressing to invasive breast cancer. Colditz and his collaborator at WashU Medicine, Richard J. Cote, MD, the Edward Mallinckrodt Professor and head of the department of Pathology & Immunology, are leading studies of the 3D environment of breast tumors. Using new technology called PhenoCycler (formerly CODEX), they can visualize the spatial relationships of many cell types in breast tissue and tumors, including immune cells, in the transition from DCIS to invasive breast cancer to enhance prediction. They also are studying changes the tumors undergo in response to therapies.

Robert D. Schreiber, PhD, the Andrew M. and Jane M. Bursky Distinguished Professor, is a pioneer in designing immunotherapies for many



Robert D. Schreiber, PhD, works with Samuel Ameh (left) who recently earned his PhD training in Schreiber’s lab.

different types of cancer. As a leader in the field of cancer immunotherapy and director of the WashU Medicine Bursky Center for Human Immunology and Immunotherapy Programs, he is using PhenoCycler technology to understand how tumors respond to immunotherapy.

“PhenoCycler technology gives us a way to map and analyze hundreds of cells in intact tissue in 3D all at once and to follow changes over time,” Schreiber said. “It gives us an unbelievable view of where cancer cells and different types of immune cells are, which helps us understand what immunotherapy is doing – or not doing – to a tumor, so we can improve these therapies and design new ones.”

Despite efforts in early detection and treatment, some breast cancers continue to present challenges, including triple-negative breast cancer, in which the tumor grows even without the hormonal fuel that drives the growth of most breast cancers. For unknown reasons, it is more common and deadly in Black populations, making research in this area critical in reducing racial disparities. Jason Weber, PhD, a WashU Medicine professor of medicine and co-leader of the Breast Cancer Research Program at Siteman, and his team have identified molecular pathways that drive growth of this tumor type and that appear to be more common in Black populations. By studying the genetic and molecular underpinnings of triple-negative breast cancer, they are identifying possible ways to shut down the pathways driving its growth.

WashU Medicine researchers also are invested in developing better treatments for metastatic breast cancer. Sheila A. Stewart, PhD, the Gerty T. Cori Professor of Cell Biology & Physiology and vice chair, department of Cell Biology & Physiology at WashU Medicine and co-leader of the Mechanisms of Cancer Biology Program at Siteman, and her team have identified a new drug combination that is effective in mice with metastatic breast cancer. One drug disrupts the protective environment that tumors build to shield themselves from attack, and a second drug activates immune cells called T cells that then have better access to the unprotected tumor and are more effective at killing cancer cells.

Artificial intelligence (AI) and 3D mapping are changing the way we look at cancer

WashU Medicine and Whiterabbit.ai researchers have developed an AI algorithm that enhances breast cancer screening by identifying and filtering out normal mammograms, thereby allowing radiologists to focus on more questionable scans. The approach has been shown to reduce false positives without missing any cancers. And technologies like PhenoCycler (formerly CODEX) are helping WashU Medicine doctors use spatial biology to predict which patients are at the highest risk of invasive breast cancer and whether the tumors will respond to certain therapies.

Unparalleled expertise & options

Families find life-changing treatments and care available through Siteman Kids

BY KRISTINA SAUERWEIN

In children and teenagers, all cancers are rare – underscoring why it’s critical to seek out physicians who specialize in treating pediatric cancers.

“All pediatric cancers require specialized expertise and individual treatment approaches,” explained Jorge Di Paola, MD, who leads WashU Medicine’s pediatric hematology and oncology division and treats patients at St. Louis Children’s Hospital through the Siteman Kids pediatric cancer program. “We are uniquely positioned to treat all types of pediatric tumors and are a major referral center for leading-edge pediatric cancer care.”

WashU Medicine pediatric cancer specialists offer the full breadth of treatment options for children and teens with cancer – from standard therapies and advanced treatments to clinical trials. Patients and their families also benefit from the vast number of pediatric subspecialists available through Siteman Kids, including WashU Medicine hematologists and oncologists, neurologists and neurosurgeons, orthopedists, diagnostic imaging specialists and pathologists.

As a top pediatric cancer center in the U.S., Siteman Kids treats about 750 patients each year, including about 150 who are newly diagnosed.

“We also have access to a growing roster of innovative clinical trials,” said Di Paola, an internationally recognized expert on pediatric blood disorders, and the Elizabeth Finney McDonnell Chair in Pediatric Hematology & Oncology. “And we

provide some of the most innovative targeted therapies for cancer treatment, including proton beam therapy and immunotherapies that have produced lifesaving outcomes.”

Siteman Kids offers more than 100 pediatric clinical studies evaluating the effectiveness of investigational chemotherapy drugs or new drug combinations; genomic testing and personalized vaccines for patients with recurrent brain tumors; short-course radiation therapy with the aim of reducing treatment time for patients; and ongoing novel immunotherapies for blood cancers such as acute myeloblastic leukemia.

One of Siteman Kids’ strongest assets is the extensive collaboration among WashU Medicine pediatric physicians, researchers, nurses and research coordinators – it’s what attracted Di Paola to WashU Medicine in 2019.

“The overall collaboration here,” he explained, “is unparalleled. We work so well together because of our common goal to fight with and for our young patients and do everything possible to ensure the very best outcomes.”

Looking ahead, this shared goal will continue to drive the innovation that keeps Siteman Kids at the forefront of pediatric cancer care and research, with WashU Medicine physicians striving to set new standards of excellence.

Jorge Di Paola, MD, discusses patient care during rounds at St. Louis Children’s Hospital with the Siteman Kids care team, including fellow Courtney Vaughn, MD, PhD (background).



Fifteen-year-old Andrea “Drea” Palmer wears a personalized mask while receiving radiation treatment at the S. Lee Kling Proton Therapy Center this summer. Pencil-beam proton therapy is the most advanced technology used for precise treatment in cases like Drea’s medulloblastoma, which is a fast-growing malignant tumor near the base of her skull.

A chance to live life to the fullest

Last spring, severe pressure in the back of Andrea “Drea” Palmer’s head made it hard for the 15-year-old to play soccer, read or create the glittery art she loves. Sometimes she struggled to see straight.

MRI scans in April at St. Louis Children’s Hospital revealed a medulloblastoma, a fast-growing, malignant brain tumor near the base of her skull. Drea and her family were in the right place. Top WashU Medicine pediatric cancer specialists have extensive experience treating patients with pediatric brain tumors through the Siteman Kids program.

About 600 children in the U.S. receive a medulloblastoma diagnosis each year. Treatment typically involves surgery followed by radiation therapy. At Siteman Kids, children receive the most advanced radiation therapy: pencil-beam proton therapy delivered to the brain with a narrow beam that “paints” the radiation dose onto the tumor.

“With proton therapy, we have greater ability to control the dose and limit radiation exposure to nearby tissues,” said Stephanie M. Perkins, MD, director of the S. Lee Kling Proton Therapy Center at Siteman; the S. Lee Kling Endowed Chair in Radiation Oncology; and chief of the pediatric radiotherapy service at WashU Medicine and St. Louis Children’s Hospital. “This is especially important for young patients such as Drea. We want to achieve a cure for these children while limiting any side effects of treatment. We want to give them the best chance to live like they did before cancer.”

About 85% of children with medulloblastoma survive, and Drea’s prognosis is very good, Perkins said. “With such a good prognosis, it’s important to examine the long-term side effects of having and being treated for a brain tumor,” she said.

Before surgery to remove the tumor, Drea underwent additional brain imaging for a WashU Medicine study led by Perkins aimed at identifying biomarkers to determine whether a child is at risk for treatment-related cognitive issues.

Her research aims to detect changes in cognitive function by using resting-state functional MRI, a noninvasive technique pioneered by WashU Medicine physician-scientists including neuroscientist Marcus Raichle, MD, the Alan A. and Edith L. Wolff

Distinguished Professor of Medicine and a professor of radiology at WashU Medicine’s Mallinckrodt Institute

of Radiology. Resting state refers to brain activity that occurs when a person is unengaged – for example, daydreaming or sleeping. By determining which parts of the brain are in communication, researchers can define functional networks, including those impacting memory, attention and learning.

Early results have shown that some pediatric tumor patients experience changes in brain organization that can affect cognition, said Perkins, who collaborates with researchers in radiology and neuroscience. “Using imaging to identify important biomarkers could allow us to understand the basis of cognitive changes and may aid in identifying children who would benefit from additional resources to navigate challenges at school or elsewhere,” she said.

“We want Drea and all of our patients to pick up where they left off and live their lives to the fullest after treatment,” Perkins said.

For now, Drea focuses on life posttreatment: “I’m going to sleep in without worrying, play soccer and hang with my friends, like normal.”



Andrea “Drea” Palmer

Stephanie M. Perkins, MD, leads a study that uses brain images to identify biomarkers that may tell if a child is at risk for cognitive issues from their treatment.



“We needed a miracle”

Sharing breakthroughs across specialties leads physician-scientists to a first-of-its-kind therapy

Emily Robinett’s world stopped Jan. 4, 2018 – the moment doctors delivered her baby boy’s diagnosis. Leukemia, they said.

Specifically, 7-month-old Weston Robinett had acute myeloid leukemia (AML), a cancer of the blood and bone marrow.

Terrified, Robinett went into mom mode. “I read every medical journal I could find and followed every lead, no matter how small,” said the elementary school teacher from Kansas City, Mo. “I had to do everything I could for Weston.”

Standard therapy for AML entails chemotherapy and a stem cell transplant from a donor, with the aim of long-term remission. But a month after receiving a transplant, Weston’s cancer returned.

Doctors told Robinett what she already had gleaned from her research: More than 90% of patients with relapsed AML die within a few months to a year.

“We needed a miracle,” she said. Weston’s miracle arrived as a tip via Facebook from a parent who had heard about a phase 1 clinical trial

at Siteman Kids at St. Louis Children’s Hospital, co-led by pediatric oncologist Jeffrey J. Bednarski, MD, PhD, an associate professor of pediatrics at WashU Medicine.

The trial involved an innovative immunotherapy that harnesses “natural killer” cells, a type of immune cell that attacks cancer. The immunotherapy originated in the laboratory of WashU Medicine physician-scientist Todd Fehniger, MD, PhD, co-leader of the Hematopoietic Development and Malignancy Program at Siteman and a professor of medicine in the division of oncology, who had shown that memory-like natural killer (NK) cells were effective in treating adults with recurrent AML. Fehniger collaborated with Bednarski on the pediatric trials and generated the NK cellular therapy that patients receive at Siteman and Siteman Kids.

Within a week, Weston was enrolled in the trial.

Weston’s therapeutic NK cells were collected from his mother. Before administering the cells to Weston as therapy, his mother’s NK cells were exposed to proteins in the lab that supercharged them to attack his leukemia cells more effectively.

“And Weston experienced no major side effects from the treatment,” Bednarski said.

The first phase of the clinical trial enrolled seven other patients. Weston was among six of them to respond positively to the therapy.

Eighteen children and young adults to date have undergone treatment with NK cell immunotherapy at Siteman Kids.

There is always a risk that the cancer can return, so this past May, researchers began screening patients for a new trial that will give donor NK cells to patients as part of initial chemotherapy treatments to prevent relapse. “We want to cure patients up front,” Bednarski said. “We want them to return to the lives they had before cancer.”

Weston is now a 7-year-old, Spiderman-loving, Fortnite-playing first-grader with an aptitude for science. During his monthly checkup trips to St. Louis, he sometimes offers research suggestions.

“He wants Dr. Bednarski to find a way to eliminate the use of shots, because Weston doesn’t like them,” Robinett said, laughing. “Maybe he’ll grow up to be a scientist like Dr. Bednarski, who is like a member of our family. We love the people at Siteman Kids, and we’re so grateful to everyone for saving Weston’s life.”

Added Bednarski: “Weston is an energetic, playful, incredible kid. Our team is so happy that he is thriving. That is our goal for all children with acute myeloid leukemia.”



In this photo from summer 2019, Jeffrey J. Bednarski, MD, PhD, gives Weston a checkup.



Weston Robinett, 7, enjoys seeing Jeffrey J. Bednarski, MD, PhD, while getting an infusion treatment this fall. Robinett was part of an innovative phase 1 trial that involved immunotherapy – using “natural killer” cells to attack his acute myeloid leukemia.

Finding a better way

“There is this eternal parade of knowledge and discovery that links all scientists going backward and forward — that connection to the past and the future is what makes the work so special.”

— Timothy J. Ley, MD, the Lewis T. and Rosalind B. Apple Professor of Medicine and a professor of genetics

Driven by a common goal of finding better therapeutics and, ultimately, cures for cancer, WashU Medicine and Siteman Cancer Center are at the forefront of groundbreaking cancer research and best-in-class patient care.

From being the first to sequence an entire cancer genome, to developing unprecedented genomic tests, to creating new ways to bring more personalized treatments to patients, WashU Medicine continues to lead significant advancements in understanding cancer biology and treatment.

The research happening today at WashU Medicine is leading to the next evolution of care at Siteman. And the thoughtful and compassionate patient care that takes place every day at Siteman is influencing the next generation of cancer research at WashU Medicine. Together, we'll continue to push the boundaries of what's possible.

Birthplace of precision medicine

At the forefront of individualized cancer care

BY JULIA EVANGELOU STRAIT

Together, WashU Medicine and Siteman Cancer Center have long been a powerhouse in cancer research and a national leader in providing innovative, compassionate care to patients while pushing the boundaries of what's possible in treating this ancient and ever-evolving disease. Our researchers and clinicians are poised to shape future decades of cancer advances after having defined the previous decades of advances. And they'll do this work in partnership with the most powerful of collaborators – their patients.

"In my experience, patients receiving cancer treatment and their family members are among the most altruistic individuals," said Timothy J. Eberlein, MD, director of Siteman Cancer Center and the Spencer T. and Ann W. Olin Distinguished Professor and senior associate dean for cancer programs at WashU Medicine. "They often participate in research knowing it may or may not help them. But the knowledge gained from those trials will absolutely help patients in the future, which is a tremendous gift."

That is precisely the case with two genomic tests recently developed by WashU Medicine researchers. The tests advance precision medicine approaches for treating blood cancers and solid tumors by identifying genetic changes in a patient's cancer cells, which provides crucial information that physicians can use to help determine the optimal treatment strategy for individual patients. Both tests are approved by Medicare and Medicaid and are available to patients across the country, whether they're treated at Siteman or another cancer center.

The tests – dubbed ChromoSeq and GatewaySeq – were developed by a team led by Eric Duncavage, MD,

a professor of pathology & immunology and director of the Division of Genomic and Molecular Pathology, and David H. Spencer, MD, PhD, an associate professor of medicine and of pathology & immunology in the Division of Oncology at WashU Medicine. Both tests can identify mutations in a patient's cancer cells and help guide treatment decisions. ChromoSeq is a whole-genome sequencing test that guides therapies for patients with blood cancers called acute myeloid leukemia (AML) and myelodysplastic syndromes. GatewaySeq identifies mutations in any solid tumor that can be targeted with FDA-approved drugs.

The development of those tests is rooted in groundbreaking research conducted at WashU Medicine just over 15 years ago involving a cancer patient at Siteman Cancer Center – a woman in her 50s – with AML that progressed rapidly.

MAPPING THE WAY TO BETTER, MORE PERSONALIZED CARE

This brave patient was diagnosed in the early 2000s and spent the next few years receiving treatment at Siteman from her WashU Medicine oncologist, John F. DiPersio, MD, PhD, the Virginia E. and Sam J. Golman Endowed Professor of Medicine, director of the Center for Gene and Cellular Immunotherapy at WashU Medicine and a professor of pathology & immunology.

"She had a tremendous will to live – she fought her leukemia as hard as she could," said her husband, who wished to maintain the family's confidentiality. "Never said 'Why me?' or complained in any way. She was very interested in trying any therapy that might have a positive effect."



Lulu Sun, MD, PhD, an assistant professor, pathology & immunology, and Shelly O'Laughlin, director of clinical operations, Genome Technology Access Center, discuss the DNA sequencers and GatewaySeq. Medicare and Medicaid approved WashU Medicine's genetic tests for solid tumors and blood cancers, which can quickly identify treatable cancer mutations and guide precision therapy.

During her treatment, the patient chose to participate in research studies and provided blood and skin samples for analysis. After her death from AML, when the first next-generation genome sequencing technologies became available, the research team asked whether the family would give consent for genetic sequencing of the patient's whole cancer genome – not a collection of genes thought to be involved in cancer, but the entire DNA sequence of her cancer cells. The researchers suspected that errors in the patient's cancer cells would provide clues to which mutations had driven her cancer to develop. Coming relatively soon after completion of the Human Genome Project, of which WashU Medicine scientists played a significant role, the sequencing of an entire cancer genome had not yet been attempted.

"We said yes," her husband said. "Anything we could do to help the cause, we were for it."

At the time, many were skeptical of how useful it would be to sequence a whole cancer genome. They predicted that an overwhelming number of mutations would make it impossible to single out those driving the disease. It was a risky endeavor and difficult to fund. Timothy J. Ley, MD, the Lewis T. and Rosalind B. Apple Professor of Medicine and a professor of genetics, led the project and remembers finishing about one-third of the patient's genome and realizing they would need about \$1 million more to complete the full sequence. He asked for guidance from David M. Kipnis, MD, a former head of the Department of Medicine, who had some funding ideas and made



Timothy J. Ley, MD, served as project lead on sequencing the first whole cancer genome.

a few phone calls. One was to Alvin J. Siteman, the businessman whose generosity gave Siteman Cancer Center its name.

"That same day, we drove to Al Siteman's office in Clayton," Ley said. "He heard our pitch, asked probing questions, and said he'd think about it. By the time we got back to campus, his staff said we would have the funding the next day. That was the green light to go ahead. We pulled out all the stops and finished the sequencing very quickly. The analysis was difficult – we were in undiscovered territory – but we got there."

On Nov. 6, 2008, the WashU Medicine research team published the first whole genome sequence of a cancer patient's tumor cells in the journal *Nature*. The landmark study was the first to show that whole genome sequencing of a patient's cancer could reveal gene mutations driving the disease, presenting opportunities to develop genetic tests to refine cancer diagnoses and, potentially, new therapies.

'A WATERSHED MOMENT'

In November 2023, a 15-year retrospective article, also published in *Nature*, called that first whole cancer genome study "a watershed moment in ushering in the modern era of cancer biology and therapy." The sequencing and analysis took over a year to complete and cost \$1.6 million.

"My wife was a 'big impact' person in our everyday lives, so it seems fitting to me that her genome played this kind of role in cancer research," the patient's husband said. "We're grateful to the researchers and their big ideas."

The 2008 study triggered an explosion in the field of cancer genomics, leading to a revolution in the understanding of the biology of cancer. Among many critical contributions to the field, WashU Medicine investigators have led landmark studies in the genomics of breast, lung, brain, pancreatic, and endometrial cancers, and many others.

Among these efforts is the development of the many genetic tests that guide doctors as they form a patient's treatment plan, including ChromoSeq, GatewaySeq and others.

"Sequencing the first cancer genome was a phenomenal milestone in the field," Duncavage said. "Now that genome sequencing is fast and affordable, the goal is accessibility. We want to make these tests as widely available as possible so that every patient gets molecular testing to guide their treatment from the beginning."



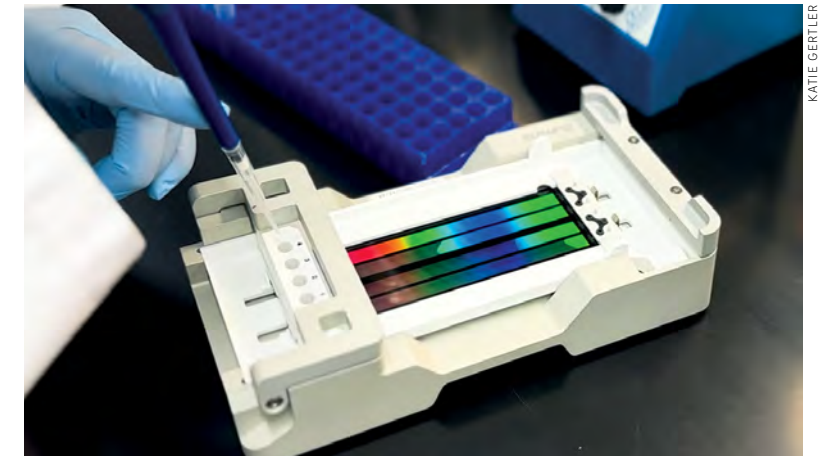
DEMOCRATIZING REVOLUTIONARY CARE

Today, with ever-improving technology – much of it developed here – WashU Medicine oncologists can order the ChromoSeq test to sequence the full cancer genomes of every AML patient at Siteman who agrees to it – in a few days for a few thousand dollars – far faster, and less than 1% of the cost of the original cancer genome sequence.

Beyond leukemia, nearly all patients at Siteman have some form of genetic sequencing of their cancers. GatewaySeq – specifically designed to identify mutations in solid tumors – was developed to help oncologists match genetic mutations in a particular patient's tumor to an ever-expanding list of FDA-approved drugs targeting those mutations.

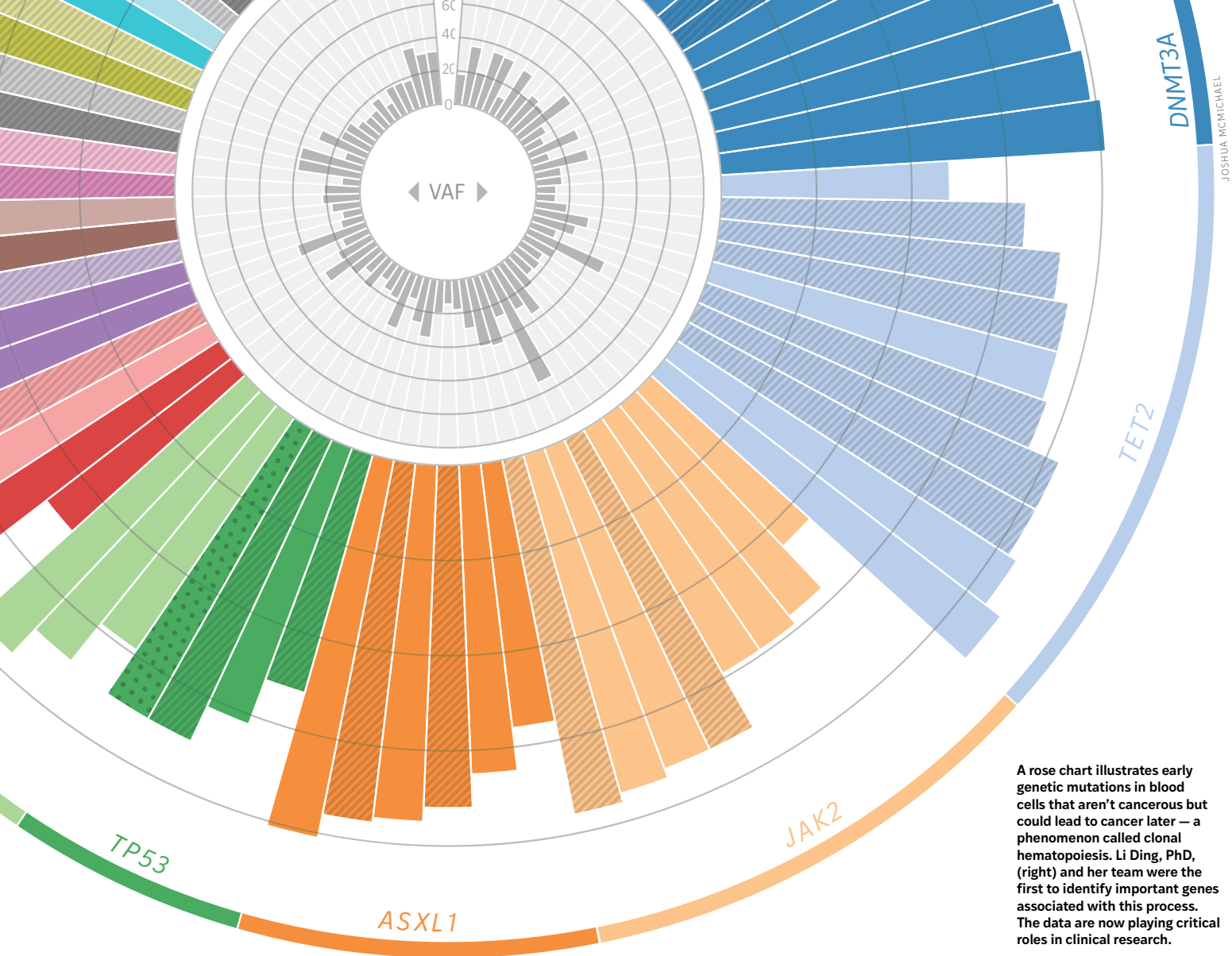
In some cases, even if a treatable mutation is not found, sequencing can reveal how aggressive a tumor is likely to be, allowing doctors to make better decisions about the use of standard therapies – including surgery, chemotherapy, radiation therapy and, increasingly, immunotherapy.

"These tests are so important because they tell us right away if there is a mutation doctors can act on," Duncavage said. "It has fundamentally changed the way we approach cancer therapy. We look forward to continuing this legacy, developing new methods to mine the cancer genome for future cancer therapies."



(Top) David H. Spencer, MD, PhD, discusses research findings with Heidi Struthers, lab manager, in his research laboratory in the Division of Oncology. "The research we do in our lab to understand the genetics of leukemia is so critical to advancing precision cancer medicine," said Spencer. "We know the genetic makeup of every cancer is unique, and the methods we develop and discoveries we make in the lab, often using samples donated from patients treated right here at WashU Medicine, are the starting points for better diagnostic tools and more precise cancer treatments."

(Bottom) A laboratory member loads a sample to run a ChromoSeq test, a new test for two blood cancers developed by a team at WashU Medicine. ChromoSeq is the first whole-genome sequencing test for cancer to be approved for reimbursement by the Centers for Medicare & Medicaid Services.



A rose chart illustrates early genetic mutations in blood cells that aren't cancerous but could lead to cancer later — a phenomenon called clonal hematopoiesis. Li Ding, PhD, (right) and her team were the first to identify important genes associated with this process. The data are now playing critical roles in clinical research.

JOSHUA MCMICHAEL

Revolution in cancer genome sequencing **defines clinical care**

BY JULIA EVANGELOU STRAIT

WashU Medicine researchers have led the field of cancer genomics since its inception. This work has led to a more personalized approach for individual patients, creating a standard of care at Siteman Cancer Center that has been adopted nationally and led to better patient outcomes.

WashU Medicine was the first in the world to sequence the complete genome of a cancer patient, an endeavor that enabled the team to identify a suite of mutations driving the patient's cancer. They also have held leadership roles in major national initiatives such as the National Cancer Institute's Cancer Genome Atlas, in which thousands of patients with varying types of tumors have had their whole cancer genomes sequenced across dozens of tumor types. As part of these efforts, the investigators have led seminal studies in the genomics of breast, lung, brain, pancreatic and endometrial cancers, among many others.



WashU Medicine's Li Ding, PhD, a co-author on the landmark 2008 paper that detailed the sequencing of the first cancer genome, is one of the country's leading cancer genomics researchers. "That study was so important," said Ding, the David English Smith Professor of Medicine and a professor of genetics. "Whole genome sequencing of tumors went from being a big unknown to a standard approach for the field of cancer research. Today, it is an increasingly important part of clinical care and helps influence decisions about the best treatment approach."

In the ensuing years, much of the national genomics work — which Ding and her team have helped lead — has expanded beyond the genetics of tumors to include analyses of all manner of molecular changes that tumors and their surrounding environments undergo.

Most recently, Ding's team and others have been able to use the most advanced techniques

in single-cell sequencing, and so-called "omics" analyses — including proteomics, metabolomics and epigenomics — to study the 3D structures of tumors and how they may change before, during and after treatment, plus what they look like when they spread to other organs.

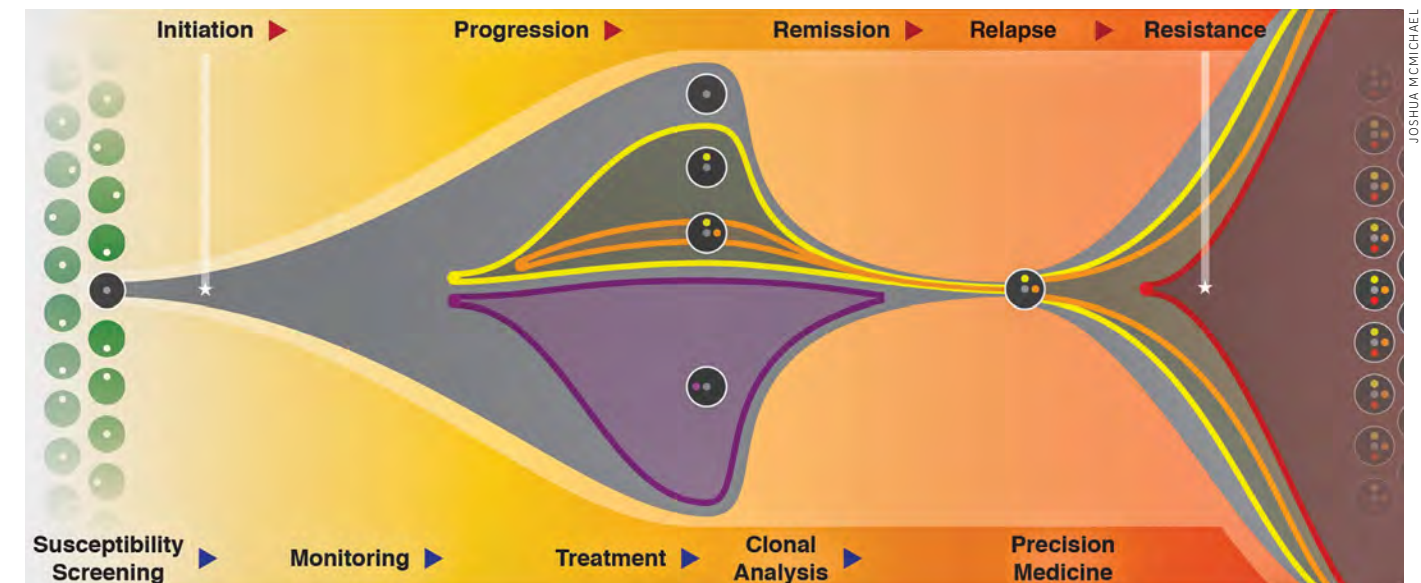
Such work continues to shape precision medicine strategies for treating cancer. As more mutations are added to genomic databases, more drugs that target specific mutations emerge. Several WashU Medicine scientists at Siteman have collaborated with pharmaceutical companies to develop these investigational therapeutics in clinical trials.

Targeted therapies for specific tumors were difficult before genetic testing. Maggie M. Mullen, MD, assistant professor of gynecologic oncology and director of the Gynecologic Oncology Tissue Bank, said today's genetic testing panels identify drug-targetable mutations about half the time in patients with gynecologic cancers. And that proportion is likely to keep increasing.

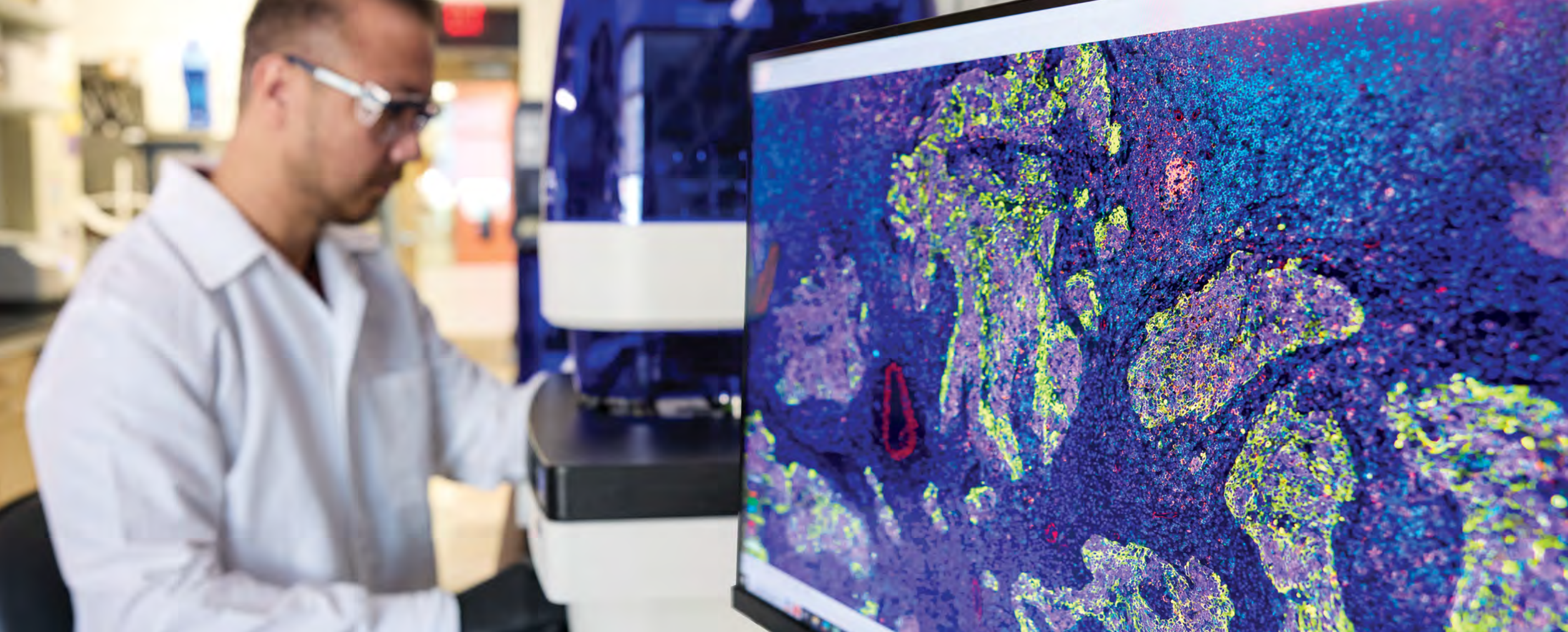
"More and more, we are able to offer our patients targeted therapies for their specific tumors," she said. "It's now based much more on the molecular profile of the tumor. For example, we have a study in ovarian cancer in which each patient is assigned to one of eight drug-treatment groups based on each tumor's specific genomic and molecular profile."

Ding added: "It is extraordinary how far we've come. We hope our ongoing studies can continue revealing new insights into tumors and lead us to improve therapies and options for patients even more."

Ding's team was the first to design a "fish plot" as a way to visualize the evolution of a tumor. From left, a tumor (gray) emerges from normal cells (green) then grows three "subclones" with different mutations profiles (yellow, orange and purple). Treatment eliminates the purple subclone and almost eliminates orange and yellow. But the right side shows evolution of treatment resistance as the surviving subclones grow again and add a new driver mutation (red). The goal is to develop precision medicine therapies that can eliminate every subclone.



JOSHUA MCMICHAEL



Research specialist Tianxiang “Roderick” Lin works in the Immunomonitoring Lab at the WashU Medicine Bursky Center for Human Immunology & Immunotherapy. The lab provides the structure, instrumentation and expertise to monitor the impact of cutting-edge immunotherapies.

What’s next?

Pioneering diagnostics and therapeutics changing cancer care

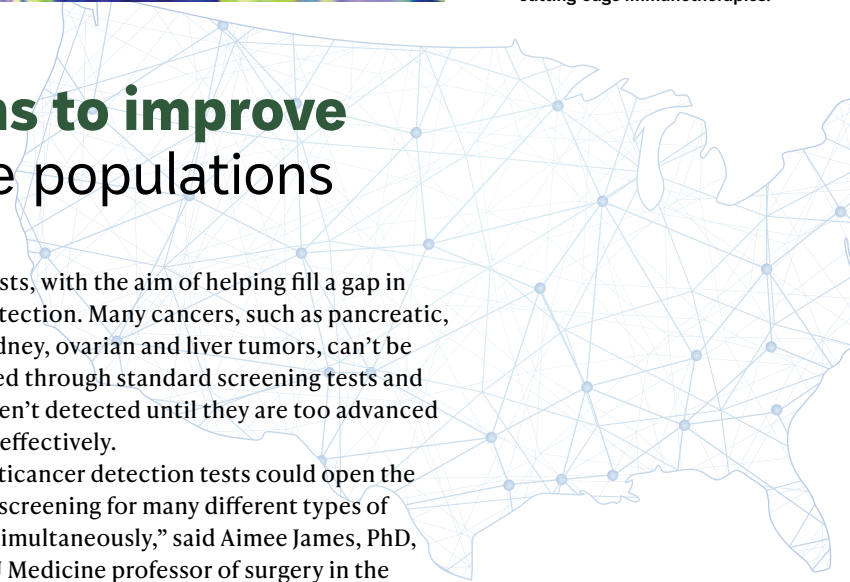
BY TAMARA SCHNEIDER

Advances in cancer diagnosis and treatment have raised five-year survival rates for all cancers nationwide from 49% in the mid-1970s to 69% in the 2010s. WashU Medicine scientists have been at the forefront of the national trend by continually expanding what physicians know about cancer and how to detect and treat it. Cutting-edge research at WashU Medicine has improved early detection of cancer, led to new, more potent therapies with fewer side effects, and personalized treatment for patients, with the aim of making therapies as effective as possible. Here are just five examples of emerging developments from WashU Medicine physicians and researchers, with potential for changing the lives of cancer patients.

Clinical trial network aims to improve cancer screening in diverse populations

WashU Medicine is one of seven academic centers in a new clinical trials network launched by the National Cancer Institute (NCI) in 2024 to investigate emerging technologies for cancer screening, with the goal of reducing cancer-related illnesses and deaths. WashU Medicine investigators work closely with Siteman Cancer Center to lead trials that take place in Missouri and southern Illinois. The network also aims to reach diverse populations, including people living in underserved areas. A major focus of the network is to evaluate the effectiveness of a screening technology designed to detect multiple cancers with a single blood test. Some such multicancer detection tests already are in use, but they lack full FDA approval and continue to be under evaluation. The network will evaluate

these tests, with the aim of helping fill a gap in early detection. Many cancers, such as pancreatic, lung, kidney, ovarian and liver tumors, can’t be identified through standard screening tests and often aren’t detected until they are too advanced to treat effectively. “Multicancer detection tests could open the door to screening for many different types of cancer simultaneously,” said Aimee James, PhD, a WashU Medicine professor of surgery in the surgery department’s Public Health Sciences Division and co-leader of the prevention and control program at Siteman. “But there’s a great deal we don’t know about the risks and benefits of these tests. Through the network, we can determine whether such tests can detect cancer early and save lives.”



These two scans show the location of cancer cells, represented by small black dots, in bone before (top) and after (bottom) theranostic-guided treatment.



VIKAS PRASAD, MD



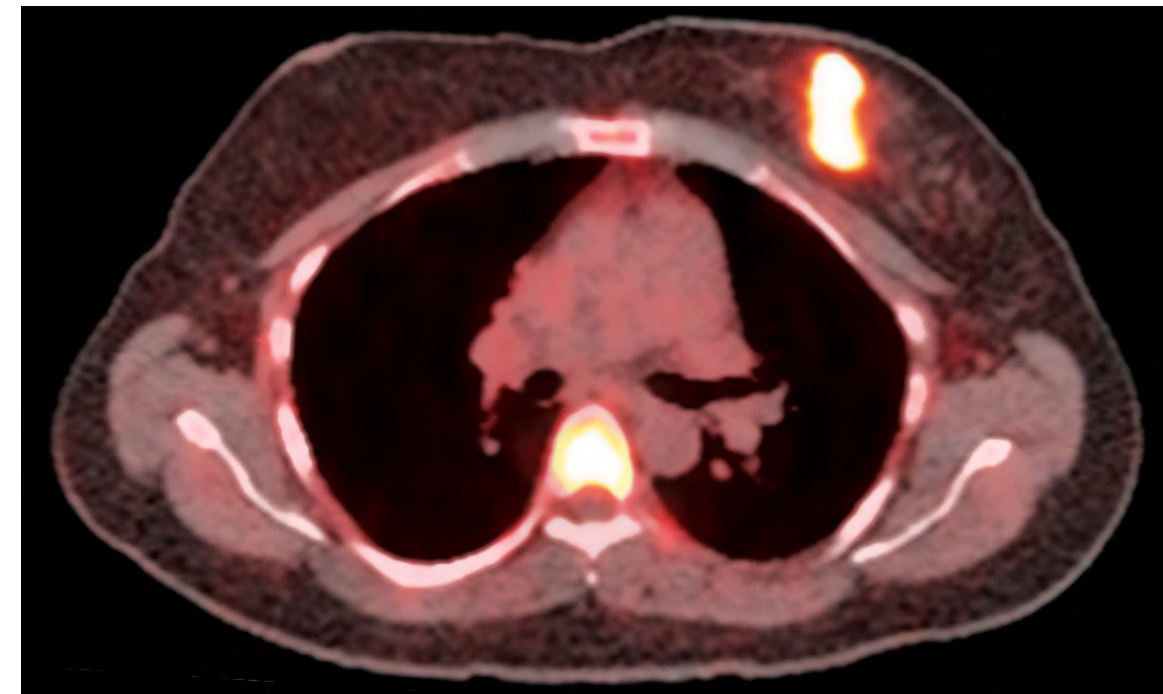
Theranostics treatment couples cancer detection and destruction

Like the Greek chimera that is formed from parts of a lion, a goat and a serpent, the emerging science of theranostics is a powerful hybrid. The name itself is a fusion of therapy and diagnostics, and theranostic molecules are fusions as well, comprised of one part that finds and visualizes the tumor and another that destroys it. With the aid of this molecular chimera, scientists can locate, characterize, treat and monitor cancer all at once.

“Theranostics allows for truly personalized medicine in a way that hasn’t really been possible using other techniques or technologies,” said Daniel L. J. Thorek, PhD, an associate professor of radiology at WashU Medicine’s Mallinckrodt Institute of Radiology and of biomedical engineering at WashU’s McKelvey School of Engineering and co-leader of the Siteman Oncologic Imaging Program. “Traditionally, everyone with the same disease receives the same drug regimen. With theranostics, because we have the ability to image where the drug is going and how much is being taken up and retained in the tumor, we have a way to tailor the dosing and the schedule to each patient in a way that’s really unique.”

Thorek works on theranostic drugs that use alpha particle emitters, a kind of radiotherapy in drug form. These drugs are composed of a radioactive heavy metal attached via chemical compounds called chelators to a targeting molecule that homes in on the cancer. Thorek is working on novel chelators that can carry a larger number of heavy ions, thereby increasing the dose of radiation to the cancer and, ideally, destroying it more effectively. Studies in animals bearing human prostate cancers have been promising, and Thorek is now working toward a trial to determine whether the experimental drug behaves as expected in the human body.

“One thing that’s exciting about these drugs is how well tolerated they are,” Thorek added. “The side effects don’t seem to be as severe or as prolonged as with conventional chemotherapeutics. I think we’re about to see a widening of the scope of this field. The potential of theranostics to make better drugs for patients is enormous.”



FARROKH DEHDASHTI

Bright spots indicate that cancer cells have responded to estrogen in this positron emission tomography (PET) scan of the torso of a woman with breast cancer. The spots are a sign that the patient is likely to benefit from hormone therapy. WashU Medicine researcher Farrokh Dehdashti, MD, is developing imaging-based ways to distinguish patients who are likely to benefit from a particular treatment from those who are not, so doctors can make the best care decisions for each patient.

Imaging reveals clues to tailored treatment decisions

Cancer imaging is more than just detecting the cancer, according to Farrokh Dehdashti, MD, the Drs. Barry A. and Marilyn J. Siegel Professor of Radiology at WashU Medicine’s Mallinckrodt Institute of Radiology and co-leader of the Siteman Oncologic Imaging Program. As national leaders in cancer imaging, Dehdashti and other WashU Medicine researchers are pioneering advanced techniques and technologies that drive innovations in cancer care.

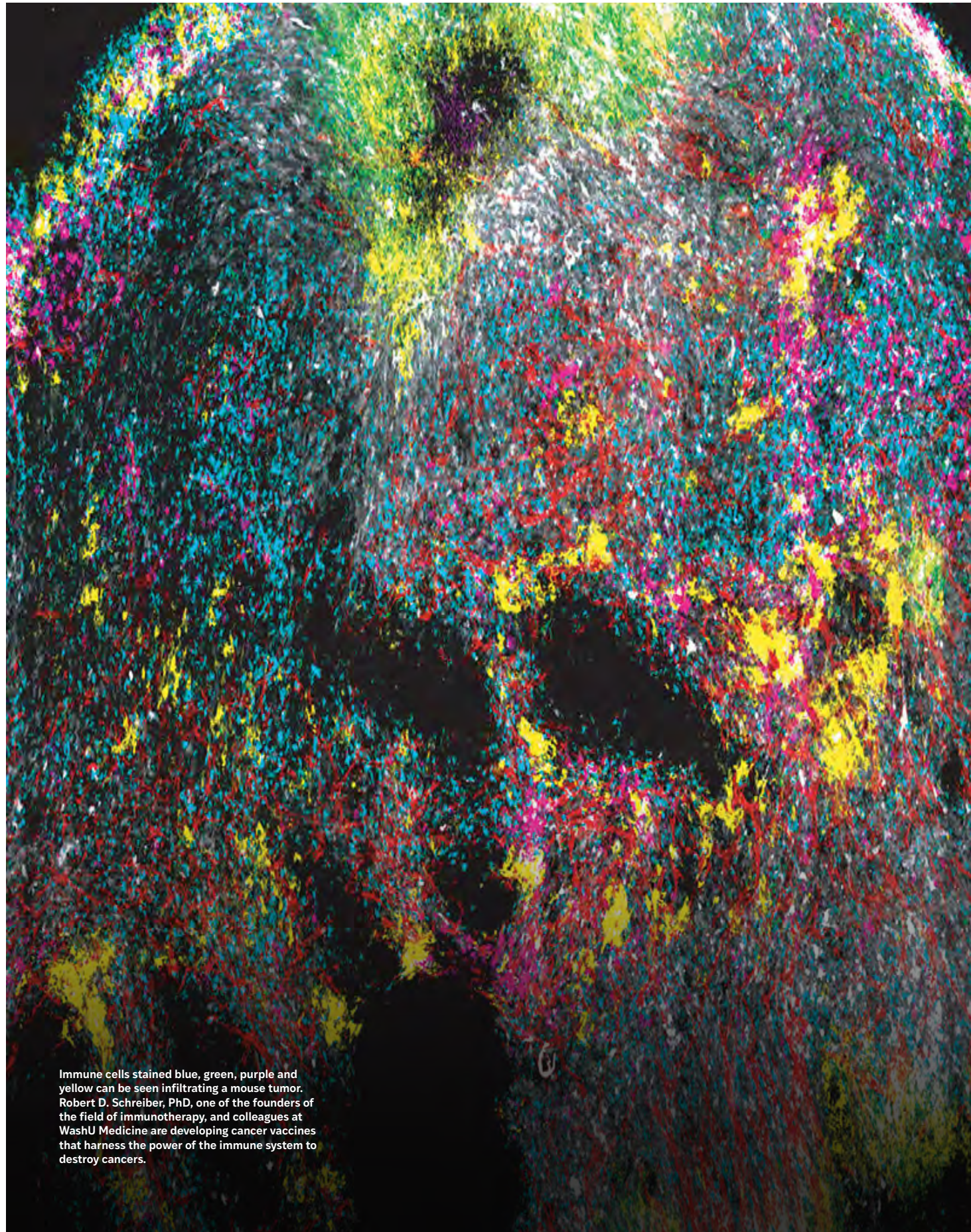
“These days, we can also characterize the cancer,” she explained. “We can see clues to how it is behaving, which is very important for knowing how to successfully manage and treat that cancer.”

For those who know how to see them, tumors carry molecular markings that reveal their strengths and weaknesses – which therapies they can resist and which they can’t. Dehdashti’s task is to make those markings visible so they can be read, interpreted and used to guide patient care.

For example, breast cancer is often treated with hormone therapy that targets estrogen receptors on cancer cells. Dehdashti and colleagues developed

an imaging test that measures whether estrogen receptors on cancer cells are working properly, and used the results of that test to distinguish breast cancer patients who were likely to benefit from hormone therapy from those who were not. In a small phase 2 clinical trial published in 2021, she and colleagues showed that the cancers of all patients with working estrogen receptors remained stable or improved on hormone therapy – and progressed in all women with nonfunctional estrogen receptors. Now she is leading a larger, multicenter, phase 2 clinical trial to verify and expand on the initial study.

“If breast cancer in a patient is estrogen receptor-positive, doctors usually will recommend hormone therapy even though they know it will only work for slightly more than half the patients,” Dehdashti said. “When hormone therapy works, it’s typically quite effective, and it has relatively mild side effects, and that’s why oncologists and patients want to try it first. But if doctors know that hormone therapy is likely to be ineffective for a particular patient, they can start with another therapy that may work better.”



R. MEDRANO/B. ZINSELMAYER/B. SAUNDERS

Immune cells stained blue, green, purple and yellow can be seen infiltrating a mouse tumor. Robert D. Schreiber, PhD, one of the founders of the field of immunotherapy, and colleagues at WashU Medicine are developing cancer vaccines that harness the power of the immune system to destroy cancers.

Bespoke cancer vaccines harness the power of the immune system

Cancer vaccines work by training the immune system to recognize cancerous cells and destroy them. The immune system has formidable weapons and can act with pinpoint precision, but it is also bewilderingly complex, and scientists at WashU Medicine are still learning how to harness its power.

Robert D. Schreiber, PhD, the Andrew M. and Jane M. Bursky Distinguished Professor, published a paper in 2001 demonstrating the immune system's pivotal role in controlling cancer and laying the groundwork for the field of cancer immunotherapy. As co-leaders of the Siteman Tumor Immunology Program, he and William E. Gillanders, MD, the Mary Culver Professor of Surgery, are among the WashU Medicine scientists working to turn the promise of cancer vaccines into reality. Gillanders led an early breast cancer vaccine study that confirmed the potential power of vaccination and demonstrated the critical importance of choosing the right target. Schreiber and Gillanders have become leaders using genomics to identify neoantigens – mutant proteins unique to a patient's tumor – and in using that information to develop personalized vaccines against various cancer types.

They're now working to develop personalized neoantigen vaccines for patients with triple negative breast cancer and pancreatic cancer – both are aggressive and difficult to treat with standard therapies. Studies are underway to identify the best neoantigens and to understand the impact of combining vaccination with immunotherapies such as checkpoint inhibitors and immune modulators that developed broadly from Schreiber's seminal studies.

"The immune system is immensely powerful, and we have never been able to control it as well as we can now," said Schreiber, the director of the WashU Medicine Bursky Center for Human Immunology & Immunotherapy Programs and a WashU Medicine professor of pathology & immunology and of molecular microbiology. "The exciting thing is it's just going to get better as we go along. So the big question is, how can we make cancer therapy more specific, more effective and safer? Vaccination used to be a pipe dream. Now we can determine the full genome of a tumor, so we have an opportunity for the first time of making a vaccine against the tumor cells specifically with no ill effects. We're pushing back the boundaries, and it's incredibly exciting."

A new model to predict breast cancer

Middle-aged and older women are recommended to get mammograms every one to two years to screen for breast cancer. The widespread use of mammography has vastly increased the number of cancers found in the early stages of disease, when they are much more treatable. By some accounts, mammography screening programs have reduced deaths from breast cancer by up to 30%.

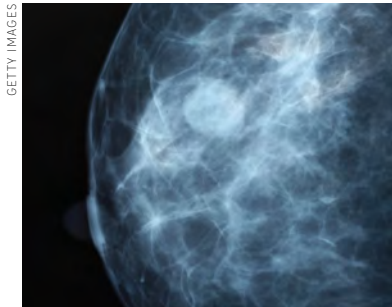
But if identifying breast cancer early is good, how much better would it be to identify people on track to develop cancer before tumors even form? This goal is what animates Shu "Joy" Jiang, PhD, a WashU Medicine associate professor of surgery in the Public Health Sciences Division.

Jiang saw in repeated mammograms an untapped source of data on how breasts change in the years leading up to cancer diagnoses. In a 2023 study with Graham A. Colditz, MD, DrPH, the Niess-Gain Professor of Surgery; director of the Public Health Sciences Division in the Department of Surgery; and associate director of prevention and control at Siteman, and Debbie L. Bennett, MD, chief of the breast imaging section and an associate professor of radiology at WashU Medicine's Mallinckrodt Institute of Radiology, Jiang used a mathematical model to monitor changes in breast density over the course of a decade in almost 1,000 women and found that the rate of change differed significantly between the nearly 300 women who were later diagnosed with cancer and those who were not.

In an ongoing study, she is using changes to breast texture over time to place women into one of five risk categories, ranging from very low to very high risk of developing cancer. Jiang and colleagues validated the model in three large datasets from the U.S., Canada and Sweden containing mammograms from more than 225,000 women. A diverse population including significant numbers of white, Black, Asian and Indigenous women in Canada was evaluated to ensure that the model works for women of all backgrounds.

Women who are at very high risk due to genetics are given the option of taking drugs such as tamoxifen to forestall disease. If Jiang's model proves reliable, more women could become eligible for preventive treatment.

"I want to empower women to make their own decisions by giving them information about their risk," Jiang said. "Many women already get regular mammograms, so the data is already being collected. We just need to use the data more effectively."



Access for all

“It takes multiple partners to actually get to a community that has historically been isolated and medically underserved to increase both the awareness and understanding of the value of screening, and then link that community to services if screening tests indicate further care is needed.”

— Graham A. Colditz, MD, DrPH, the Niess-Gain Professor of Surgery; director of the Public Health Sciences Division in the Department of Surgery; and associate director of prevention and control at Siteman Cancer Center

Changing the world starts right here in the place we call home. Siteman Cancer Center, with the support of WashU Medicine physicians and BJC HealthCare, is working to reduce the barriers to cancer screening, and improve prevention and access to care by listening to, visiting and serving underserved communities across the St. Louis region.

From inflatable colons to mobile mammograms, these efforts focus on outreach and screening in 82 counties with high cancer rates in eastern Missouri and southern Illinois. Combined with the research being done at WashU Medicine and the clinical trials being conducted at Siteman, the communities in and around St. Louis are often among the first to experience breakthrough experimental treatments aimed at saving lives around the world.

Our mission is simple: to improve access and health outcomes for all, making a lasting impact on the lives we touch here at home and beyond.

Meeting communities where they are

Mission-driven cancer prevention and outreach

BY CONNIE MITCHELL

Christopher Spencer, MD, a radiation oncologist and medical director of the Delbert Day Cancer Institute and radiation oncology at Phelps Health in Rolla, Mo., meets Phyllis Meagher during a visit in downtown Rolla. Meagher was treated for nasal cavity cancer in the Siteman Cancer Network both in Rolla and St. Louis. "The accessibility and cooperation between Siteman and Delbert Day was clear right away," said Meagher. "It's easier for patients like me to stay close to home when you have to have radiation treatment every day. It was important to me that I could get world-class treatment that started in Rolla and would seamlessly transition to specialists in St. Louis."



Jean Wang, MD, PhD, a WashU Medicine professor of medicine and of surgery, smiles as a small crowd gathers and she invites them to “step into the colon.” She is standing beside a huge, inflatable colon – a walk-through tunnel that gives people an inside look at colon cancers, polyps and healthy tissue. It’s hard to miss at the health fair, where Wang uses it to bring people in to answer questions and share information about the signs and symptoms of colon cancer.

Wang and many WashU Medicine physicians and researchers at Siteman Cancer Center spend a portion of their time outside the boundaries of their clinics and labs to bring cancer prevention and detection resources to the public, especially those in medically underserved communities.

Leading these efforts for Siteman Cancer Center is Bettina Drake, PhD, WashU Medicine professor of surgery and associate director of community outreach and engagement at Siteman. “This is a team effort that requires people from multiple backgrounds across WashU Medicine and Siteman in order to conduct outreach and engagement that truly creates change and promotes health equity – to collaborate in a way where we’re working with the community and hearing their needs so we can implement sustained efforts that have a meaningful

impact,” she said. “It’s not something that anyone can do alone.”

Through Drake’s passionate leadership, Siteman, together with WashU Medicine and BJC HealthCare, recognizes that it’s not enough to only offer patients the most advanced therapies and conduct innovative research aimed at developing tomorrow’s treatments today. Caring for the community as a whole and preventing cancer from developing in the first place is also a critical part of their efforts. Much of this work is led by Siteman, with a particular focus on community outreach and screening efforts in 82 counties in eastern Missouri and southern Illinois that have some of the highest incidences of cancer, including breast, colon, prostate and lung.

And they’re seeing promising results.

For instance, colorectal cancer rates have decreased by 30% in rural Missouri, and late-stage breast cancer diagnoses have decreased by 33% among Black women in north St. Louis County and

COMMUNITY IMPACT

200,000 preventive screenings performed in 2023

by 31% in St. Louis following the advent of outreach programs targeted to those areas, including churches, The Breakfast Club, The Empowerment Network and the Urban League. A closer look at such programs reveals how they benefit the public and physicians alike.

PECAD FOCUSES ON THOSE MOST IN NEED

Community outreach and cancer prevention efforts such as Wang’s are part of the Program for the Elimination of Cancer Disparities (PECaD). The program embodies the power of collaboration between WashU Medicine, BJC HealthCare and Siteman in providing innovative cancer care based on the latest research, and an ongoing, deep commitment to the health of our region.

As associate director of prevention and control at Siteman, Graham A. Colditz, MD, DrPH, the Niess-Gain Professor of Surgery and director of the Public Health Sciences Division in the Department of Surgery, applies the experience that has garnered him an international reputation as a pre-eminent cancer prevention researcher, to the center’s outreach and prevention efforts. “It takes multiple partners to actually get to a community that has historically been isolated and medically underserved and increase both the awareness and understanding of the value of screening, and then link community members to services if screening tests indicate further care is needed,” said Colditz. “That’s been a fairly big part of our response. Rather than saying, ‘Well, we’ll just do some outreach and education and hope it works,’ we’re trying to fill in gaps wherever they arise and make a real difference in these communities we serve.”

WashU Medicine physicians working with PECaD are educating and screening individuals for colorectal, lung, prostate and breast cancers, often collaborating with community and government organizations and research programs. For instance, PECaD’s lung cancer screening initiative receives funding from the Veterans Administration. “Not everyone can get to a rural VA clinic, and veterans’ partners may not qualify for VA coverage. So how do we actually capitalize on the opportunity to get them to show up for a screening?” Colditz asked.

“Wouldn’t it be cool if we could suggest veterans and their dependents could get screened, and show them the places that we can help them get access?” he continued. “This kind of effort really underlines the value of partnering and finding those opportunities, and there’s a concerted effort to do that across our programs.”



Bettina Drake, PhD, addresses a crowd gathered to celebrate the opening of the new Siteman Cancer Center.

In another example, Michelle Silver, PhD, an assistant professor of surgery, is working to increase awareness of HPV vaccines among rural populations to help prevent cervical cancer. Her work evaluates access and informs people of vaccine availability through rural pharmacies in order to increase vaccination rates in these often medically underserved areas.

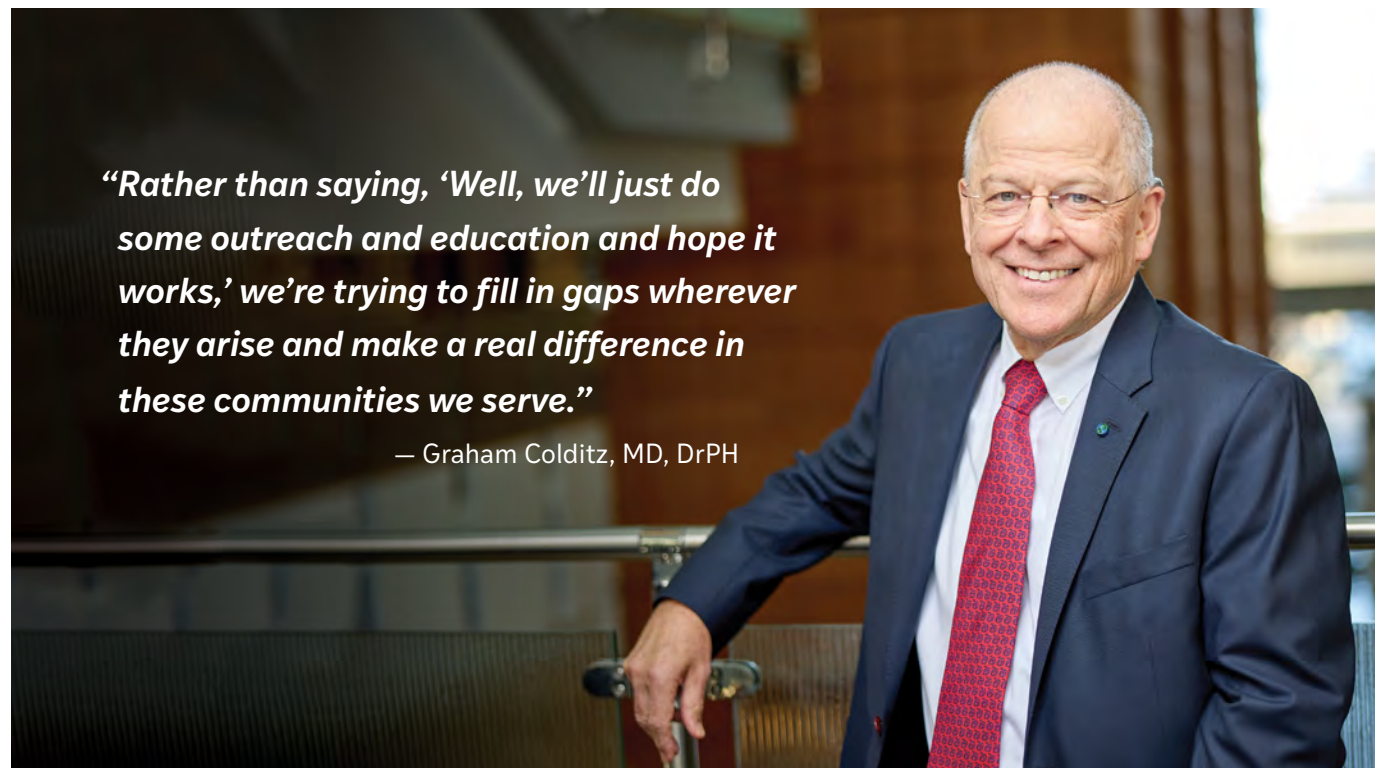
“It’s almost embarrassing that we – as a country – are at the end of the first quarter of the 21st century, and challenges of access exist to cancer screening services that half the population takes for granted,” Colditz noted. Through the various programs under the PECaD umbrella, WashU Medicine researchers and physicians are learning more about barriers that keep people from seeking out cancer screenings, such as distance from cancer screening services and a lack of transportation, job insecurity, cost and lack of health insurance and cultural influences.

“From the patient to the community health worker to the provider to the health system, our leaders collaborate in a way where we’re hearing the needs and we’re implementing sustainable efforts to promote change,” said Drake.

This commitment to learning and understanding is echoed by Aimee James, PhD, a WashU Medicine professor of surgery in the surgery department’s Public Health Sciences Division and co-leader of the prevention and control program at Siteman. “We can go to the literature to know how screening works in theory, but it is critical to go and learn from the people, how it works for them, what the patient and provider challenges are.”

COMMUNITY IMPACT

20 Missouri counties removed from list of colorectal cancer hot spots



“Rather than saying, ‘Well, we’ll just do some outreach and education and hope it works,’ we’re trying to fill in gaps wherever they arise and make a real difference in these communities we serve.”

— Graham Colditz, MD, DrPH

COMMUNITY IMPACT

31% in St. Louis and 33% in St. Louis County breast cancer mortality reduction in Black St. Louis patients over eight years

BRINGING SCREENINGS TO THE PEOPLE

In collaboration with Siteman, WashU Medicine physicians and researchers are taking important messages to both inner city and rural populations while learning more about population-based and individual barriers to screenings. This two-way communication means that the public benefits from cancer screenings, while WashU Medicine faculty gain insights that then inform their teaching and research focus.

Wang, the inflatable-colon tour guide, invites health fair visitors to take home free FIT kits – fecal immunochemical test kits – for colorectal cancer screening. The colorectal cancer screening kits allow individuals to take a stool sample and send it to a BJC HealthCare lab for a free analysis, where Wang personally reviews each result.

With an expansion of the program, FIT kits will be available through the Siteman mobile mammography unit that visits area grocery stores and similar locations. Even people who do not receive mammograms can take home a FIT kit to screen for colorectal cancer.

During Christian Hospital's Juneteenth Kickoff, Jean Wang, MD, PhD, meets with community members. The health fair also included cancer education regarding PSA and colon cancer screenings.



TIM PARKER

Community outreach to raise awareness about breast cancer is another area of focus. Katherine N. Weilbaeher, MD, the Oliver M. Langenberg Distinguished Professor of the Science and Practice of Medicine, a professor of medicine and co-leader of the Breast Cancer Research Program at Siteman, specializes in treating metastatic breast cancer and is determined to make mammograms less daunting so more women will get screened.

“Over the years, I’ve seen higher numbers of African Americans being diagnosed with advanced breast cancer, and when I look at the data that’s coming from my own backyard, there are higher mortality rates in north St. Louis County than in other areas of the St. Louis region,” she said. Weilbaeher finds this frustrating, considering that when breast cancer is diagnosed early, it is highly treatable and the five-year survival rate is almost 100%. Working together with PECaD, she joined other colleagues across WashU Medicine to address this troubling trend.

The mobile mammography unit became a crucial part of efforts to increase awareness and bring screening technology directly to neighborhoods where individuals are less likely to seek out cancer screenings. Then, working with colleagues at Christian Hospital and Northwest HealthCare, located in the areas of greatest need, Weilbaeher began to explore how to make it easier for patients to return for follow-up exams when a mammogram indicates an abnormality.

The outcome was a mammography clinic located at Siteman’s north St. Louis County location, where results are provided and follow-up exams are scheduled before the patient leaves. The idea is to prevent patients from falling through the cracks between an abnormal screening exam and follow-up.

Weilbaeher also walks the walk, getting her own screening mammograms at the Northwest HealthCare facility and works to make the experience less fraught. “We want to make this a positive experience for women,” she said.

Besides the actual screening options, women in north St. Louis County are getting information about the importance of mammograms from an unexpected source – their daughters. Lannis Hall, MD, WashU Medicine associate professor of clinical radiation oncology and PECaD’s clinical trials leader, is taking the message to Hazelwood School District high school students and encouraging them to “Tell Your Momma.” Students learn about breast cancer risk factors, screening guidelines and the importance of family history and healthy lifestyle habits.



Making the program fun by incorporating healthy activities and friendly competitions brings the message home, and providing students with a QR code that links to breast health information makes it more easily accessible.

“This partnership is unique in its goal to empower young ladies, many of whom are at high risk, to become knowledgeable about healthy lifestyle changes early in life. Their role in educating their mothers and loved ones about these changes is crucial and can positively influence screening and lifestyle behavior,” Hall said. “The program encourages this education from daughters to mothers and loved ones, emphasizing that breast health is a family affair.”

COLLABORATIVE EFFORTS EXTEND ACROSS THE REGION

WashU Medicine physicians who work with community groups also collaborate with colleagues across Missouri, Illinois and the nation. For example, Wang’s efforts to increase colorectal cancer screening and prevent new cancer cases are known throughout the state in her roles as a co-founder and past chairwoman of the Missouri Colorectal Cancer Roundtable and executive committee member of the Missouri Cancer Consortium.

Wang said the roundtable, established in 2018, is “a group that brings together all the different organizations throughout the state of Missouri that are interested in improving colon cancer screening, access and prevention.” The roundtable allows her to work with the Missouri Department of Health and Senior Services and various nonprofit and patient advocacy organizations.

These types of collaborative opportunities benefit both patients and physicians. As organizations receive information and guidance from WashU Medicine physicians, the physicians themselves discover new ways to bring health care to the public, an important aspect of their roles as clinicians.



Other physicians, including Hall and Weilbaeher, communicate with peers across the region, participating in consortiums, conferences, panels and committees. “Right now, I’m seeing a lot of collaboration,” Drake said. “There’s genuine interest across the board, beyond the borders of our campus.”

A WIN-WIN

The WashU Medicine physicians working in community-facing programs agree that medically underserved communities and demographic groups benefit from face-to-face interaction in a neutral location where they can learn about what screenings and diagnostic tests they qualify for and better understand what resources exist to support their health. Many of these patients were historically considered “noncompliant,” when in truth they were experiencing barriers that the medical establishment needed to better understand.

“Going out in the community definitely helps you to connect with the patients better,” Wang said. “I’ve been to churches in North County, spoken there, and attended health fairs. And to be in the church, in the community, it’s just a completely different way of connecting with patients compared to the clinic.”

“I’m an oncologist, and I would love to put myself out of business because women understand how to get screened and diagnosed early and how to live a healthy lifestyle that lowers their risk of breast cancer,” Weilbaeher added.

Drake is equally enthusiastic about the benefits of community outreach. “We’re really focused on hearing from the community, what their needs are, and bringing that back to clinicians and researchers,” she said. “And we’re also learning about new services that are available within the clinics and systems and getting that information out to the community so that everyone is aware of what’s available. Together, we are working to improve access and the health of everyone across the board.”

Siteman Cancer Center’s mammography van, one of the first in the country when it started in 1986, travels throughout the St. Louis area to bring preventive breast cancer screenings to the public.



Leaving their mark

The extraordinary achievements and milestones of those who have been, and always will be, a part of WashU Medicine continue to advance the frontiers of medicine. Their dedication to excellence and innovation not only honors our legacy but inspires current and future generations.

Our graduates and WashU Medicine family have made and continue to make significant impacts locally, nationally and globally. Their contributions to the medical field and their commitment to healing and discovery have left an indelible mark on our community and the world at large. From the breakthroughs of today to the leaders of tomorrow, WashU Medicine is changing medicine for good.



Match Day

For the Class of 2024 at WashU Medicine, March 15 was an unforgettable day of celebrating accomplishments, as graduating medical students learned where they would train for residency. This year's graduates began their professional journeys not only during the COVID-19 pandemic but with the launch of the Gateway Curriculum, which emphasizes early clinical immersion and a holistic view of patients and the profession.

Surrounded by loved ones, graduating medical student Ian Marigi celebrates news of his residency program match.



*Includes matches in general surgery, orthopaedic surgery, ophthalmology, plastic surgery, otolaryngology, neurological surgery, and urology.

21
Surgery*

20
Internal Medicine /
Primary Care

12
Anesthesiology

11
Pediatrics

ALABAMA

University of Alabama Medical Center - Birmingham
OBSTETRICS
GYNECOLOGY
Carly Duncan

CALIFORNIA

California Pacific Medical Center
OPHTHALMOLOGY
Rebecca Lin
Cedars-Sinai Medical Center
INTERNAL MEDICINE
Ruohan Gao
Cedars-Sinai Medical Center-Los Angeles
UROLOGY
Julie Solomon
Los Robles Health System
ANESTHESIOLOGY
Mackenzie Geisman

University of California-Davis Medical Center
ANESTHESIOLOGY
Caden Horgan
UCLA Medical Center
RADIOLOGY DIAGNOSTIC
Garrett Camps
UCLA Stein Eye Institute
OPHTHALMOLOGY
Lydia Zhong
University of California-San Francisco
INTERNAL MEDICINE
Miguel San Miguel Benavides
MEDICINE PRIMARY
E'lysse Santana
PEDIATRICS
Cassidy Tran

COLORADO

University of Colorado School of Medicine
ANESTHESIOLOGY
Alex Hanson
Renee Wu

CONNECTICUT

Yale New Haven Hospital
MEDICINE PRIMARY
Amal Taylor
RADIOLOGY DIAGNOSTIC
Aravinda Ganapathy

FLORIDA

Mayo Clinic School of Graduate Medical Education
DERMATOLOGY
Jordan Phillipps
University of Miami/Jackson Health System
ANESTHESIOLOGY
Barrett Dryden
NEUROLOGY
Eve Moll

ILLINOIS

Northwestern McGaw Medical Center/Lurie Children's Hospital
PEDIATRICS
Jeffrey Hansen
Arohi Saxena

Northwestern McGaw/NMH/VA
INTERNAL MEDICINE
Yupeng Liu
Zachary Neronha
University of Chicago Medical Center
ANESTHESIOLOGY
Adam Koenig
EMERGENCY MEDICINE
Emily Terian
INTERNAL MEDICINE/MD SCIENTIST
Zachary Beller

INDIANA

Indiana University School of Medicine
DERMATOLOGY
Ruple Jairath
GENERAL SURGERY
Melinda Staub
MEDICINE PEDIATRICS
Keshav Jayaraman
PHYSICAL MEDICINE & REHABILITATION
Elijah Farrales

MARYLAND

Johns Hopkins Hospital
INTERNAL MEDICINE
Christopher Yoon
PSYCHIATRY
Derek Barisas

MASSACHUSETTS

Beth Israel Deaconess Medical Center
INTERNAL MEDICINE
Erika Schneider-Smith
Boston Children's Hospital
CHILD NEUROLOGY
Christina Su
Massachusetts General Hospital
PATHOLOGY
Jared Elenbaas
Massachusetts General Hospital/Brigham & Women's Hospital
RADIATION ONCOLOGY
Jacob Hogan
Alice Silberstein

MICHIGAN
University of Michigan
Hospitals Ann Arbor
GENERAL SURGERY
Ashley Huggins

MISSOURI
Barnes-Jewish Hospital
ANESTHESIOLOGY
Andrew Benckendorf
Amanda Li
GENERAL SURGERY
Jenna Brambora
Paighton Miller
INTERNAL MEDICINE
Nicholas Griffith
Kristine Huang
James Moore
Justin Parmely
INTERNAL MEDICINE/PSTP
Kevin Tamadonfar
David Zhang
NEUROLOGICAL SURGERY
Joshua Koleske
NEUROLOGY
Jared Garland
OBSTETRICS
GYNECOLOGY
Drishti Sinha
Sarah Van Son
ORTHOPAEDIC SURGERY
Sarah Romans
PATHOLOGY
Jennifer Bentz
RADIATION ONCOLOGY
Varintra Lander
RADIOLOGY DIAGNOSTIC
David Chen
Favour Garuba
Michael Olufawo
SURGERY (PRELIMINARY)
Brooke Higgins
Children's Mercy Hospital
PEDIATRICS
Joshua Greene
St. Louis Children's Hospital
PEDIATRICS
Joshua McPhie

NEW JERSEY
Virtua
INTERNAL MEDICINE
Jayson Cruz

NEW YORK
Icahn School of Medicine
at Mount Sinai-Mount
Sinai Hospital
GENERAL SURGERY/
SCIENTIST
Lindsey Steinberg
New York Presbyterian
Hospital-Columbia
University Medical Center
ANESTHESIOLOGY
Grace Huang
Christopher Wang

New York Presbyterian
Hospital-Columbia &
Cornell
OTOLARYNGOLOGY
Kwasi Enin
New York University
Grossman School of
Medicine
INTERNAL MEDICINE
Hannah Truong

NORTH CAROLINA
Duke University
Medical Center
INTERNAL MEDICINE
Larissa Lushniak
Wake Forest Baptist
Medical Center
OBSTETRICS
GYNECOLOGY
Evaline Xie

OHIO
Case Western/University
Hospitals Cleveland
Medical Center
ORTHOPAEDIC SURGERY
Ian Marigi
Cincinnati Children's
Hospital Medical Center
PEDIATRICS
Karina Smiley

OREGON
Oregon Health &
Science University
ORTHOPAEDIC SURGERY
Caellagh Catley

PENNSYLVANIA
Children's Hospital of
Philadelphia
PEDIATRICS
Frances Avila-Soto
Jessica D'Addabbo
Hospital of the University
of Pennsylvania
EMERGENCY MEDICINE
Justin Yu
GENERAL SURGERY
Vikram Pothuri
INTERNAL MEDICINE
Elizabeth Cordell
PLASTIC SURGERY
(INTEGRATED)
Kaamya Varagur
RADIOLOGY DIAGNOSTIC
Tzvia Pinkhasov
University of Pittsburgh
Medical Center
OTOLARYNGOLOGY
Sabrina Goyal

RHODE ISLAND
Brown University/
Butler Hospital
PSYCHIATRY
Hana Hajda

Brown University/Rhode
Island Hospital
EMERGENCY MEDICINE
Marina Perez-Plazola
ORTHOPAEDIC SURGERY
Emma Landes

SOUTH CAROLINA
Medical University of
South Carolina
RADIOLOGY DIAGNOSTIC
Wyatt Rumrill

TENNESSEE
University of Tennessee
Health Science Center
GENERAL SURGERY
Jonathan Fox

TEXAS
Baylor College of Medicine/
Cullen Eye Institute
OPHTHALMOLOGY
Beau Sylvester
University of Texas Medical
Branch Galveston
ANESTHESIOLOGY
James Wondra II
University of Texas
Southwestern
Medical School
PEDIATRICS
Rowan Gannon

UTAH
University of Utah Health
INTERNAL MEDICINE
Jackson Burton
OBSTETRICS
GYNECOLOGY
Mackenzie Lemieux

WASHINGTON
University of Washington
Affiliated Hospitals
CHILD NEUROLOGY
Rachel Butler
DERMATOLOGY
Nora Alexander
EMERGENCY MEDICINE
Karlee De Monnin
Matthew Joseph
PEDIATRICS/HEALTH
EQUITY
Shireen Roy
PLASTIC SURGERY
(INTEGRATED)
Evan Marsh
PSYCHIATRY/RESEARCH
Suelynn Ren

WISCONSIN
University of Wisconsin
Hospitals and Clinics
PEDIATRICS
Ann Iverson



Find your friends.

Classnotes are organized first by year of degree/training completion and then in alphabetical order.

How about you?

To share your news, visit alumni.med.washu.edu/class-note. Submissions will be printed in a subsequent issue of Outlook magazine as space allows. Photos are welcome.

1970s

Marshall Bloom, LA '67, MD '71, celebrated 51 years as a virologist/scientific administrator with the National Institute of Allergy and Infectious Diseases in July 2023. Most of his career has been spent at Rocky Mountain Laboratories in Hamilton, Mont. His research continues to focus on the biology of tick-borne viruses. In 2020, he was inducted into the Montana BioScience Alliance Hall of Fame. His primary avocations are the five-string banjo, trout conservation and fly-fishing. Bloom and his wife, Tonia, remain in good health. Both of their sons, Jesse and Seth, are infectious disease research scientists. Bloom said, "I eagerly read Outlook magazine and think fondly of the time I spent at WashU. Hopefully, I will make the next reunion!"

Marilyn Escobedo, MD '70, received the Virginia Apgar Award in October 2023 by the American Academy of Pediatrics, the most prestigious honor awarded by the Section on Neonatal Perinatal Medicine. It recognizes an individual whose lifetime achievements have made a significant and lasting impact on the health and well-being of newborns.



Toby Simon, MD '70, retired from his position as senior medical director at global biopharmaceutical firm CSL Ltd., but will remain professionally active as a consultant to the company and the industry trade and professional association. Simon continues to reside in Albuquerque, N.M. He plans to relocate to Brookline, Mass. to be closer to his daughter and her family in fall 2024.



Lary Robinson, MD '72, is a thoracic surgical oncologist at Moffitt Cancer Center, the only National Cancer Institute-designated Comprehensive

Cancer Center in Florida. He is a professor of surgery at the University of South Florida College of Medicine and a senior member in the Moffitt Medical Group. Robinson is starting his 30th year of clinical practice at the center. He also is a principal investigator on three prospective clinical trials involving immunotherapy and the gut microbiome, lung cancer biomarkers, and lung cancer in never-smoking women. Robinson was named director of the new Moffitt Lung Cancer Early Detection Center, which includes the Lung Nodule Clinic, Lung Screening Program and the Lung Surveillance Clinic. Outside of medicine, his hobbies include running half-marathons, biking, playing piano and writing. Robinson and his wife, Susannah, their two goldendoodles and two cats, continue to enjoy the good Florida life in Tampa.

Bela Denes, LA '69, MD '73, HS, vice president of global medical affairs at Lantheus Medical Imaging, was honored with the 2023 Global Visionary Award at the International Prostate Cancer Update conference.

Ronald Ziman, MD '73, HS, is retired after most recently working as a certified expert witness providing neurological opinions in federal court. Previously, he was founder and president of a single-specialty neurology group and chief of staff and founding director of the first certified stroke program in the San Fernando Valley at a UCLA-affiliated

teaching hospital with 800 medical staff. Ziman also was the founder, president and CEO of the Center for Alzheimer's Research and Education. He is now enjoying life, traveling and staying in touch with friends and family, but he remains connected to medicine. "After all this time, it's fused with your DNA," he said. Contact him at rbziman@gmail.com or 818-745-5051.

Paul Golden, MD '74, retired in May 2013. One of his greatest achievements was serving as the nephrologist for a patient who, as of December 2023, was the only surviving human recipient of an en bloc tracheal/laryngeal transplant. Golden continues to serve as an advocate for bipolar disease; mentors UCSF medical students on their psych rotations; and volunteers for the group, Compassion and Choices. He has authored numerous books, particularly on the topic of bipolar disease.



Robert Weiss, MD '74, retired on Dec. 31, 2015. His son was married July 9, 2022. His strongest memory of his student days is of **Al Berg, MD '74**, building a clavichord.

He is in awe and inspired by the generosity of two former professors, Roy Vagelos and Phil Needleman.



David A. McLain, HS '79, was elected to the Royal College of Physicians (RCP) by current fellows of RCP in recognition of his significant contributions to the field of medicine. Established in 1518, the RCP is the oldest medical college in England and has a fellowship community of more than 18,000 senior medical leaders worldwide. McLain is the symposium director of the second largest annual rheumatology meeting in the U.S., the Congress of Clinical Rheumatology (CCR) East in Destin, Fla., and West in San Diego, Calif. CCR has evolved with the collaboration of his wife, Dr. Pamela McLain, to include physicians throughout North America, South America, Africa, Europe, Asia, and Australia. He is also the executive director of the Alabama Society for Rheumatic Diseases.

1980s

LeAnn Larson, MD '85, HS '89, has been retired for one year. While she loved her work, she misses it less than she expected. Larson has been enjoying exploring the country in her Class B camper ("It is old but seasoned — the camper, that is," she said) with her mutt and visiting friends along the way. Her sons and their significant others are in the Denver area, so she plans to get a condo there — heads-up to her classmates in Colorado! She would welcome any visitors driving through the Iowa City area.

Douglas Noordsy, MD '85, co-founded the Stanford Lifestyle Medicine (SLM) program, which established the United States' first lifestyle medicine course for credit at Stanford University School of Medicine. The SLM mission is to conduct research and provide expert guidance in healthy aging and optimal performance to create actionable, reliable and up-to-date resources that translate evidence-based research into consumable content for all. Noordsy supervises Stanford undergraduates, medical students and residents in critically evaluating the literature and conducting systematic reviews across the field of lifestyle medicine that are disseminated in journal articles, blog posts, social media posts and presentations. Noordsy is fundraising to support seed grants and junior faculty to build the program.

Robert Sivier, MD '85, spurred by Howard Yerman's recent classnote, reports, "I want to note that after about 10 years in primary care, I have now loved 22 years of full-time ER work at small emergency rooms in southeast Ohio, mostly in Logan, Ohio, although I live near Columbus. I have been the medical director for the Hocking County EMS for about 15 years." He shared that "while that might sound impressive, the paramedics do all the work." Sivier hopes his classmates are doing well and living their dreams.

1990s

Photine Liakos, LA '88, MD '92, HS '97, had three essays in the book "What We Bring to the Practice of Medicine: Perspectives From Women Physicians," published by Kent University Press. She previously has been published online in "Intima: A Journal of Narrative Medicine." Her poem "7:30 Start" was nominated for the Pushcart Prize. Liakos and her husband, Sushil, are adjusting to life as empty nesters. Their daughter is a third-year student at Grinnell College, and their son is a first-year student at Drake University. "The Iowa interstate has become a very well-traveled road," Liakos says. She wishes the best to WUSM '92 classmates.

Victoria Akins, MD '94, retired at the end of March, and her husband, **Paul Akins, HS '95**, plans to retire at the end of 2023. The couple has three grown children and three grandchildren. Their daughter, Caroline, born in 1985, lives in Virginia with her husband, Ryan, their two sons, and their baby daughter, Sydney Hunter Simpson, born Feb. 10. Their middle child, Suzanna, born in 1992, is doing well and working for an aerospace company and acting in Hollywood, Calif. Their youngest child, Hunter, born in 1994, just earned his PhD in oceanographic acoustics at Scripps Institution of Oceanography at the University of California San Diego.



Kay (Wilcox) Smith, MSOT '97, considers it an honor to have served others in occupational therapy since 1997. She will continue to do so while also focusing on a real estate career in the Chicago suburbs. She has two daughters, ages 16 and 12.

Camilla (Hampton) Thompson, MS '97, owns a business that provides services to deaf and hard-of-hearing students in Massachusetts schools. She has taught at Central Institute for the Deaf in St. Louis and Clarke Schools for Hearing and Speech in Northampton, Mass. She resides in Lunenburg, Mass., with her husband, a scientist for BrightSpec, two teenage boys and two dogs.

Mark Cohen, EN '94, MD '98, HS, is proud to share that his daughter, Katheryn Cohen, graduated from WashU in May 2023 with degrees in biology and anthropology. "I am so incredibly proud of her," said Cohen. "I just want to say hello to all of my classmates and hope to hear from you all!"



James G. Taylor, HS '98, was awarded the 2023 John Benjamin Nichols Award from the Medical Society of the District of Columbia for contributing to

the health of the community. The award was presented at the Capital Healthcare Honors at the National Press Club on May 5, 2023. Taylor is the director of the Center for Sickle Cell Disease and a professor in the departments of medicine and microbiology/immunology at Howard University College of Medicine in Washington, D.C. He is also an adjunct professor of food and nutrition sciences at the University of Manitoba in Winnipeg, Canada. He is married to **Janet Kao Taylor, MD '95, HS '98**.



Carla Ainsworth, MD '99, of Seattle, has been elected president of the Washington Academy of Family Physicians (WAFP). She assumed the role on April

26, 2024, at the conclusion of the WAFP House of Delegates meeting in Wenatchee, Wash. Ainsworth has a long history of involvement and dedication to the specialty of family medicine and looks forward to leading the academy in its mission to advance and support family physicians in caring for patients, families, and communities to advance health for all people in Washington state. She is currently the program director of Kaiser Permanente Washington Family Medicine Residency in Seattle and has previously worked at One Medical (previously Iora), the Swedish-First Hill Family Medicine Residency program and Carolyn Downs Family Medical Center.



Jolie C. Holschen, AB '95, MD '99, was promoted to clinical professor of emergency medicine at Loyola University Stritch School of Medicine. She is also

board-certified in sports medicine and continues to work as the team physician for the Chicago Wolves hockey team, which won the Calder Cup in 2022. Holschen also serves as a volunteer providing medical care at World Cup events with U.S. Ski & Snowboard.

2000s



Stacy (Rosmoser) Bierce, MSPT '00, received the Leader of the Year Award for exceeding business and productivity goals while demonstrating the ability to lead others in her role as vice president at ATI Worksite Solutions, a division of ATI Physical Therapy. Bierce resides in San Antonio.

Josh Drummond, DPT '08, graduated with a master of health administration degree in 2018 and was named a fellow of the American College of Healthcare Executives. Drummond is working at Williamson Health in Franklin, Tenn.



Mai-Lan Ho, MD '08, has developed an international academic reputation in advanced pediatric neuroimaging and imaging genomics. In 2022, she was

promoted to professor of radiology based on career achievements, including development of a \$10M+ enterprise imaging core facility. She continues to lecture for national/international radiology societies and has served as a visiting professor to Sweden, Brazil,

Vietnam, Ghana, Netherlands and Thailand. In 2023, she became vice chair of operations and innovation, medical director of radiology, physician director of radiology informatics and division director of neuroradiology at the University of Missouri. In this role, she is looking forward to implementing a departmental vision, mentoring faculty and establishing impactful programs in artificial intelligence and precision health. She is editing her fourth book on child neurology after publishing "Neuroradiology Signs" in 2014, The AAWR Pocket Mentor" in 2021, and "Pediatric Neuroimaging: State-of-the-Art" in 2021.

2010s

Leanne Lin, GM '13, MD '15, finished her neurointerventional radiology fellowship in June. She is joining a practice in Columbus, OH, and maintaining an adjunct position at the University of Michigan.



Nicholas Pickersgill, MD '19, and Tamara Cameo, MD '19, were married April 30, 2022, in St. Louis surrounded by family, friends and a number of their medical school

classmates. Pickersgill is a urology resident and Cameo is an OB/GYN resident, both at WashU Medicine.

2020s

Carly Rusek, OTD '20, was promoted to senior occupational therapist at Encompass Health Rehabilitation Institute of Tucson in Tucson, Ariz.

Helen Liljenwall, MD '21, was named an American Psychiatric Association Foundation (APAF) Child and Adolescent Psychiatry Fellow. APAF fellowships provide psychiatry residents the experiential learning, training and professional development to be leaders in the field of psychiatry.

Baum receives alumni achievement award



Throughout his career, **Charles "Chuck" Baum, MD '87, PhD '87**, has focused on advancing science to improve medical therapies and intervention.

After graduating from the Medical Scientist Training Program (MSTP), he quickly established himself as an astute scientist and accomplished business leader, gaining increased responsibility within the field of oncology drug research and development.

While at Schering-Plough Research Institute, he led the development of Temodar for the treatment of patients with glioblastoma. As senior vice president at Pfizer, Baum was instrumental in the development of many oncology drugs, including Inlyta, Xalkori, Ibrance and Sutent.

For the past 12 years, Baum successfully advanced Mirati Therapeutics as its president, founder and CEO. In addition to moving the company to the U.S. and having it approved for listing on the NASDAQ, Baum brought the company into the forefront of oncology care by advancing its drug discovery and research, delivering novel therapeutics that target the genetic drivers of cancer, and overseeing significant drug trials and FDA approvals.

In October 2023, Baum oversaw the sale of Mirati Therapeutics to Bristol Myers Squibb (BMS), which added the commercialized lung cancer medicine KRAZATI (adagrasib) to BMS' oncology portfolio along with several promising clinical assets developed under Baum's leadership at Mirati Therapeutics.

Baum was recently named CEO of Terremoto Biosciences, a biotechnology company developing highly targeted small molecule medicines.

In recognition of the impact the MSTP and School of Medicine have had on his career, he and his wife, Carol, created the Charles and Carol Baum Medical Scientist Training Program Fellowship in 2022, which supports MSTP trainees during their final two years of the program.



Above, Dean Perlmutter recognizes awardees Bruce Molitoris, MD; Margaret Shipp, MD; Bruce Wintroub, MD; David Lubarsky, MD; Barry Siegel, MD, and Geoffrey Uy, MD.

Alumni Achievement Awards

As part of Celebration Weekend, April 12–13, the WashU Medical Center Alumni Association recognized five Alumni Achievement Award recipients.

David Lubarsky, LA '80, MD '84, is the CEO of UC Davis Health in Sacramento and vice chancellor for health at UC Davis. He was recognized for his distinguished contributions to health care, medical education and the community.

Bruce Molitoris, MD '79, HS '79, is an emeritus distinguished professor of medicine at Indiana University. He was recognized for his distinguished contributions to nephrology.

Margaret Shipp, MD '79, is chief of the Division of Hematologic Neoplasia in the Department of Medical Oncology at Dana-Farber Cancer Institute (DFCI), director of the Lymphoma Research Center at DFCI and a professor of medicine at Harvard Medical School. She was recognized for her distinguished contributions to hematologic oncology.

Barry A. Siegel, LA '66, MD '69, is a professor of radiology and of medicine at WashU Medicine's Mallinckrodt Institute of Radiology. He was recognized for his distinguished contributions to nuclear medicine and education.

Bruce Wintroub, MD '69, served as the chair of the Department of Dermatology at UCSF from 1985 to 2022. He was recognized for his distinguished contributions to dermatology, patient care and education.

Celebration Weekend 2024

More than 200 alumni and guests returned to WashU Medicine April 12–13, to reconnect with classmates and see what's new on the Medical Campus.



Class of 2014 celebrates its 10th reunion at City Park.



Class of 1999 gathers at City Park to celebrate its 25th reunion.



Class of 1974 returns to campus for its 50th reunion, honoring half a century of remarkable achievements and lasting connections.

Save the date

Join us for next year's Celebration Weekend.

April 25–26, 2025

Learn more at alumni.med.washu.edu or scan the QR Code.



Philip E. Cryer, former director of endocrinology division, 84

Philip E. Cryer, MD, professor emeritus and former longtime director of the Division of Endocrinology, Metabolism & Lipid Research at Washington University School of Medicine in St. Louis, died Feb. 24, 2024, at a hospital in St. Louis following a heart attack. He was 84.

Cryer joined the faculty at WashU Medicine in 1971. As a distinguished researcher, clinician and teacher, he led the General Clinical Research Center from 1973-2006. He became a professor of medicine in 1981 and went on to direct the Division of Endocrinology, Metabolism & Lipid Research from 1985-2002. He was installed as the Irene E. and Michael M. Karl Professor of Endocrinology and Metabolism in 1985, a title he kept until he retired in 2014.

"Dr. Philip Cryer was an accomplished clinical endocrinologist and teacher who devoted his career to patient-oriented research and was known internationally for defining the mechanisms that correct hypoglycemia," said Clay Semenkovich, MD, director of the Division of Endocrinology, Metabolism & Lipid Research. "His many contributions included the discovery of hypoglycemia unawareness, a life-threatening disorder that occurs in many forms of diabetes. His development of therapeutic approaches for this condition decreased the suffering of countless people with diabetes."

He received the Banting Medal for Scientific Achievement from the American Diabetes Association; the Claude Bernard Prize from the European Association for the Study of Diabetes; and an honorary doctorate from the University of Copenhagen.

He received R01 research support from the National Institutes of Health (NIH) for three decades, including an NIH MERIT Award.

Cryer earned his bachelor's and medical degrees at Northwestern University. He completed his internal medicine residency at what was then Barnes Hospital, followed by a fellowship at Barnes Hospital and WashU Medicine. Following his fellowship, he completed two years of research training at the Naval Medical Research Command in Bethesda, Md. He then returned to Barnes as a chief resident.

He is survived by his children, Philip C. Cryer and Justine L. Cryer Dugan; three stepchildren, six grandchildren, and one great-grandchild.



Philip Needleman, emeritus trustee, longtime benefactor, 85

Philip Needleman, a Washington University in St. Louis emeritus trustee, longtime benefactor and former department head at Washington University School of Medicine, died in an accident March 25, 2024, in Creve Coeur, Mo. He was 85.

"Phil was a pioneering pharmacologist, an esteemed faculty member and a generous benefactor whose impact on our university and the world of drug discovery cannot be overstated," said Chancellor Andrew D. Martin.

Needleman's connection to the university began 60 years ago when he became a postdoctoral fellow. He quickly rose to professor and later head of the Department of Pharmacology from 1976-1989, where he developed innovative programs for students and launched a master's program.

An expert in prostaglandin regulation, Needleman and his colleagues made key discoveries in the 1980s about the roles of the COX-1 and COX-2 enzymes and inflammation due to arthritis.

In 1989, he became chief scientist at Monsanto, where he led the development of the arthritis medication Celebrex. Later, he served as president of Searle Research and Development and then senior executive vice president after Monsanto merged with Pharmacia & Upjohn.

He remained closely tied to the university during this time, serving on the Board of Trustees beginning in 2002 and the Barnes-Jewish Hospital board. Needleman returned to WashU Medicine in 2004 when he was named associate dean and assisted with BioMed 21, the innovative research initiative designed to speed scientific discovery and to rapidly apply breakthroughs to patient care.

"Phil Needleman will long be remembered as one of the giants of science that walked the halls of Washington University School of Medicine," said David H. Perlmutter, MD, executive vice chancellor for medical affairs, the George and Carol Bauer Dean of the School of Medicine and the Spencer T. and Ann W. Olin Distinguished Professor.

He received many accolades for his work, including WashU's Distinguished Faculty Award five times, an honorary Doctor of Science degree and the School of Medicine's Second Century Award. He was elected to the National Academy of Sciences in 1987 and to the academy's Institute of Medicine in 1993.

Needleman and his wife, Sima, generously established the Philip and Sima Needleman Center for Autophagy Therapeutics and Research and the Philip and Sima Needleman Center for Neurometabolism and Axonal Therapeutics in 2019. The Needleman Program in Innovation and Commercialization launched in 2023 to foster drug development and to help the university attract and retain exceptional faculty. It aims to bridge the gap between identification of promising therapeutic targets in the lab and the start of clinical trials to evaluate potential drugs' safety and effectiveness.

Needleman earned his bachelor's and master's degrees in pharmacology from the Philadelphia College of Pharmacy and Science. He earned a doctorate in pharmacology from the University of Maryland School of Medicine.

In addition to his wife, Needleman is survived by his children, Nina and Larry (Lisa); two brothers, a sister and two grandsons.



T.S. Park, professor of neurosurgery, 77

Tae Sung (T.S.) Park, MD, a renowned neurosurgeon who pioneered a surgical technique that improved the lives of thousands of children worldwide, died Aug. 31, 2024, while on vacation with his family in Mexico. He was 77.

After a remarkable career devoted to performing life-changing surgeries for children with cerebral palsy, Park retired from Washington University School of Medicine in St. Louis in June of this year. The beloved surgeon, who treated children at St. Louis Children’s Hospital, was the Margery Campbell Fort Professor of Neurological Surgery.

“Dr. Park changed the lives of countless patients,” said Gregory J. Zipfel, MD, the Ralph G. Dacey Distinguished Professor of Neurological Surgery and head of the Department of Neurosurgery. “His brilliance in neurosurgery gave children the ability to walk, and he equipped the field with new techniques so other surgeons could do the same. He was beloved by the WashU community, and we have lost a true pioneer.”

Park joined the faculty in 1989. Over 35 years, he helped build the Division of Pediatric Neurosurgery into one of the best in the nation. Families traveled from around the world seeking his care for their children.

Park was renowned as a pioneer and, arguably, the foremost practitioner of selective dorsal rhizotomy (SDR). He performed the procedure 5,323 times, the last in May, the month before he retired. SDR surgeries enhance mobility for children who might otherwise require a wheelchair for the rest of their lives.

A native of South Korea, Park began his medical studies at the Yonsei University College of Medicine, where he also completed a neurosurgery residency. He completed further training at the University of Virginia and Ohio State University as well as research fellowships in pediatric neurosurgery at Harvard Medical School and the University of Toronto. He was on the faculty at the University of Southern California School of Medicine and the University of Virginia School of Medicine before he was recruited to WashU Medicine.

Park was deeply respected by his peers and received numerous awards over the course of his career. These include the 1999 Javits Neuroscience Investigator Award for exceptional researchers, and the 2008 H. Richard Winn, MD, Prize for Meritorious Research from the Society of Neurological Surgeons.

He was an active researcher, with a focus on vascular injuries in newborns’ brains. He also studied syringomyelia, a blockage of the flow of cerebral spinal fluid that can damage nerves in the spinal cord.

In his free time, Park was an avid golfer. He was also a competitive ballroom dancer, a pastime he credited for the precision and physical control he brought to bear so effectively in the operating room.

Park is survived by his wife, Meeaeng; his children, Thomas and Mina Park; two grandchildren, his brother, two sisters and several other relatives.

A memorial service is planned for Jan. 10, 2025, in St. Louis.



Ruth Levinsohn Siteman, philanthropist, 92

Ruth Levinsohn Siteman, a graduate and longtime benefactor of WashU Medicine, died peacefully at home in St. Louis, surrounded by her family, June 13, 2024. She was 92.

Born in Brooklyn, N.Y., she earned her bachelor’s degree from Washington University in 1975 and raised her four daughters to engage with the world in ways that would bring their lives meaning.

Along with her husband of 72 years, Alvin J. Siteman, Ruth was an ardent philanthropist and community leader. In 1999, the Sitemans made a gift of \$35 million to name the Alvin J. Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine, which today is a national leader in cancer treatment, research, prevention and education.

“Ruth was passionate that the center be focused on the patient experience and our providing hope to everyone who came to us for care,” said Timothy J. Eberlein, MD, director of Siteman Cancer Center and the Spencer T. and Ann W. Olin Distinguished Professor and senior associate dean for cancer programs at WashU Medicine. “It was of great importance to her that Siteman not only provide state-of-the-art care but also the most supportive care, treating patients as though they were members of our immediate family.”

The Sitemans also established three professorships in pediatrics and in oncology at WashU Medicine; and in marketing at Olin Business School.

The recipient, with her husband, of the Jane and Whitney Harris St. Louis Community Service Award, Ruth was passionate about women’s reproductive rights, early childhood education, civil rights and the arts. She served on the boards of The Scholarship Foundation, Reproductive Health Services and as a founding member of WashU’s National Council of Arts & Sciences, among many other organizations.

She was a highly respected docent at the Saint Louis Art Museum and was proud to serve on the 22nd Circuit Judicial Commission, where she interviewed candidates to help fill judicial vacancies on St. Louis’ 22nd Judicial Circuit Court. She also worked for many years as a counselor at Hope Clinic and Reproductive Health Services.

In addition to her husband, she is survived by her daughters, Estelle (De Kaplan) Siteman, Nancy Siteman, Joanne Gordon and Suzanne Siteman; six grandchildren; and three great-grandchildren.



Eduardo Slatopolsky, emeritus professor of medicine, 89

Eduardo Slatopolsky, MD, a pioneering physician-scientist and an emeritus professor of nephrology at Washington University School of Medicine, died peacefully April 24, 2024, at Barnes-Jewish Hospital. He was 89.

Slatopolsky served for three decades as director of the Chromalloy American Kidney Center on the Medical Campus. In that and related roles, he had a profound impact on the lives of countless patients and colleagues, and leaves behind a legacy of major contributions to his field.

He earned his medical degree from the University of Buenos Aires and completed his residency at Mt. Sinai Hospital in Cleveland.

Slatopolsky completed his fellowship at WashU Medicine, where he remained his entire career, maintaining an active research laboratory for over 50 years. His research focused on the complex interplay between mineral metabolism and kidney function. His groundbreaking work paved the way for significant advancements in the treatment of kidney diseases, particularly in the management of secondary hyperparathyroidism in patients with chronic kidney disease. He designed and served as the inaugural director of the Chromalloy American Kidney Center, the first chronic dialysis center in St. Louis. The center remains in operation today.

“Dr. Slatopolsky’s passion for science and his unwavering commitment to excellence inspired all who had the privilege of learning from him,” said Victoria J. Fraser, MD, head of the Department of Medicine at WashU Medicine and the Adolphus Busch Professor of Medicine. “Long after he retired, he continued to participate in medicine and nephrology grand rounds, and engaged with faculty and trainees at conferences.”

Slatopolsky’s legacy extends far beyond the laboratory and lecture hall. He also will be remembered for his kindness, his joie de vivre and his devotion to his wife of 52 years, Judith, who died in 2012.

He is survived by his three children, Diana (Ricardo Kohn), Daniel (Lucila Broide), and Andrea (Morten Olrik); and six grandchildren.



Kenneth Rupert Smith Jr., 91

Kenneth Rupert Smith Jr., MD ’57, HS ’63, died peacefully at his home May 16, 2024, at the age of 91.

He attended Greenville College before receiving a full scholarship to study medicine at Washington University School of Medicine, where he graduated in 1957. Smith completed his residencies at Johns Hopkins Medical Center and Barnes Hospital, specializing in neurosurgery. He also pursued fellowships in neuroanatomy at Washington University and Oxford University in England.

In 1966, Smith founded and chaired the Department of Neurosurgery at Saint Louis University Hospital until he retired in 2002 as chairman and from surgery in 2004. Throughout his career, Smith published numerous research papers and held leadership positions in various medical organizations including as president of The Society of Neurological Surgeons (1995-96), and president of the Society of University Neurosurgeons (1986) where he served as historian until his death.

Beyond his immeasurable contributions to the fields of neuroscience and neurosurgery, his other devotion was to his family. He was married to Marjorie Ruth Sandin from June 6, 1956, until his death, proudly having seven children together.

1940s

Amoz Chernoff, HS ’49; March ’23

1950s

Texas Boling, BSPT ’59; March ’24

Bruce Breckenridge, HS ’57; February ’23

George Broman, BA ’54, MD ’58; November ’23

Jo Davis, BSPT ’56; May ’24

Leonard Furlow, MD ’56; February ’24

Gene Graham, MD ’56; November ’23

Albert Heiser, HS ’53; August ’20

Charles Hilgartner, HS ’59; June ’23

Richard Hudson, DDS ’58; February ’24

George Irons, HS ’57; April ’23

Robert Isbell, DDS ’59; September ’23

Glen Johnston, BA ’53, MD ’56; January ’24

In Kim, MD ’59; February ’24

Wendell Kirkpatrick, MD ’51; December ’23

Wolff Kirsch, BA ’51, MD ’55, HS ’65; November ’23

Herbert Krickstein, HS ’59; July ’23

James Manis, MD ’58; January ’24

John Martin, MD ’55; January ’24

Sylvia Maxwell, BSOT ’52; July ’20

Traute Moore, BA ’54, BSOT ’56; April ’23

Frank Muddle, MHA ’56; June ’23

David Norwine, DDS ’56; October ’23

Robert Packman, BA ’53, MD ’56; September ’23

Harriett Potenza, BSPT ’56; January ’24

Joyce Quisenberry, BSPT ’56; October ’23

Bernard Robins, MD ’52; October ’23

Roger Rose, HS ’56; April ’23

Phyllis Ruppel, BSOT ’55; July ’23

Nathan Simon, MD ’55; July ’23

William Smith, HS ’55; December ’23

James Wahl, DDS ’58; January ’24

David Webb, MD ’59; October ’23

1960s

William Adams, MD ’69; October ’22

Jorge Alegre, HS; September ’23

Douglas Alvord, MD ’67; April ’24

James Ansfield, HS ’69; April ’23

Max Baker, MD ’66; April ’24

Bertus Brown, HS ’67; August ’22

Claude Brown, DDS ’61; February ’19

Andrew Carney, HS '69; February '24
Michael Cowan, MD '69; December '23
William Dieruf, MD '65; March '24
Scott Diertert, MD '62; April '24
Malcolm Doncaster, HS '62; March '24
Ernest Franklin, HS '64; September '23
Warren French, DDS '61; March '24
Roger Friedman, HS '69; February '24
Gilbert Fujimoto, DDS '64; April '24
John Funkhouser, HS '64; November '23
Don Gentry, DDS '64; January '24
Donald Giesen, MHA '64; January '24
Richard Gillis, HS '62; December '23
William Grubb, MD '60; January '24
Hugh Harris, HS '63; January '24
James Heins, HS '67; March '24
Phillip Hoffsten, BS '61, MD '65, HS '67; January '24
Stephen Katz, HS '65; February '24
Masashi Kawasaki, HS '65; April '24
Clarence Kees, HS '68; January '24
Benny King, DDS '63; November '23
Herbert Klontz, MSD '62; December '23
Noel Kroncke, MHA '61; June '23
Ellen Leavitt, BSPT '64; June '23
Randolph Lindblad, HS '67; September '23
George Lipton, MD '68; April '23
David Long, DDS '65; October '23
Charles Mason, MHA '65; August '23
Linda Meyers, BSPT '64; February '23
Sam Montazee, HS '66; November '23
Ivan Myers, HS '69; September '23
Robert O'Brien, MHA '65; March '24
Leland Patterson, HS '67; February '24
James Peterson, HS '63; February '24
Harold Quinn, HS '62; December '23
Edward Ragsdale, MD '64, HS '68; March '24
Frank Rembert, MD '62; November '23
Randall Rosenthal, MD '67; September '23
Lawrence Roth, HS '64; September '23
Michael Rumelt, MD '66; September '23
Robert Scheibe, BA '60, MD '64, HS '71; March '24
Stuart Schlossman, HS '63; August '23
Glenn Scott, MHA '62; September '22

James Seddon, MD '67; September '21
Gary Silvers, MHA '69; July '23
Jay Smith, MD '62; February '24
Tom Staple, HS '62; August '23
Margaret Telfer, MD '65; January '24
Randal Thomson, DDS '64; February '24
Brian Thornley, DMD '66; October '23
Richard Trackler, HS '68; August '23
Lawrence Unger, MD '63; August '23
George Wiseheart, BFA '58, DMD '64; January '21
Edwin Wolfram, HS '63; September '23
Roy Wright, HS '67; December '23

1970s

Samuel Bai, HS '71; December '23
Daniel Bauwens, MD '75; March '24
Mary Carruth, BSPT '76; September '23
Joseph Corrigan, MD '71; December '23
Thomas Coyle, DDS '70; February '24
Philip Cryer, HS '65; February '24
Thomas Dauten, BSBA '73, MHA '76; April '17
Clark Distelhorst, HS '73; July '23
Michael Eads, HS '78; November '12
Neal Evans, DDS '73; May '23
Marion Greene, DDS '76; May '23
Bernard Harris, HS '71; April '24
Jeanne Hoff, BA '60, HS '76; October '23
Kenneth Hoffman, MD '79; April '24
Ernest Horton, MHA '75; April '23
Eric Jacobson, HS '77; August '23
Janet Jepson, BSOT '74; March '24
Jacob Jorishie, DMD '74; September '23
Donald Kamens, HS '73; July '23
Nolan Karstaedt, HS '79; May '23
Mitsuo Kitahara, HS '75;
Eric Lindstrom, MD '75; February '24
Anthony Merlis, HS '75; July '23
Madeline Miley, BA '77, MHA '79; April '23
Steven Niethamer, DDS '74; January '24
Douglas Nuelle, MD '73; December '22
David Ortvals, MD '70; November '23
Juan Rosai, HS '70; July '20
Robert Sager, DDS '75; April '23

Kim Samuelson, DMD '77; January '24
Bernard Sinner, DMD '71; July '23
Alton Steiner, HS '70; May '23
George Stricklin, MD '77, PhD '77, HS '82; February '24
Silvestre Tomeldan, HS '78; November '23
Alan Weiss, HS '70; February '24

1980s

Phillip Ainsworth, BSOT '80; June '23
William Cosulich, MD '82, HS '86; March '24
Neal P. Christiansen, MD '81; April '24
Karl Crossen, HS '87; September '23
Saba Khalil, DMD '83; June '23
Mark Nicol, HS '82; October '23
Sharon Rose, BSOT '89; January '21
Howard Schlansky, HS '81; February '24
Olivia Stinson, HS '81; April '23
Theodore Washburne, BSPT '85; November '23

1990s

Clifford Barker, HS '94; March '24
Claudia Busiek, HS '90; December '23
Kimberly Doran, MHA '97, JD '96; December '23
Carrie Erickson, MSOT '94; June '23
Brett Lindenbach, PhD '99; December '23
Hugh Montgomery, DMD '90; December '23

2000s

Ritesh Agrawal, PhD '06, JD '13; April '23
Lawrence Cheung, HS '05; July '23
Matthew Latacha, AB '98, HS '05; September '23
Scott Lovitch, MD '07; PhD '07, April '24

In Memoriam

To view past In Memoriam listings or to submit an obituary for publication, visit alumni.med.washu.edu.



OUR PATIENTS ARE THE **WHY**
 BEHIND EVERYTHING WE DO

Powered by WashU Medicine physicians and BJC HealthCare, Siteman Cancer Center has touched the lives of millions of cancer patients and their families. Through revolutionary research and clinical trials, innovative treatments, and personalized care, we're changing outcomes and changing lives.

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Putting an end to cancer *begins with all of us.*

Katherine Glover-Collins, MD, PhD, a WashU Medicine assistant professor of surgery, brings her expertise in breast cancer surgery to Christian Hospital and Siteman Cancer Center at Northwest HealthCare, both in north St. Louis County. Lowering breast cancer rates in north St. Louis County is among the goals of Siteman cancer experts as they work toward better health outcomes in the region's underserved communities.

Siteman Cancer Center is the ultimate demonstration of collaboration, delivering best-in-class care by bringing together researchers and physicians from WashU Medicine and the technology and staff from Barnes-Jewish Hospital.