Northwestern Medicine

FALL 2018

FOCUSING ON CANCER

The great minds, projects and programs at Northwestern that are helping us overcome this destructive disease • 2

INSIDE

Strike a Pose

PHD STUDENTS DECOMPRESS

Samantha Genardi (right), a fourth-year PhD student in Feinberg's Driskill Graduate Program, founded NU Pose Yoga with her classmate Elena Montauti. Wednesday afternoons they lead members of the Northwestern community through a free class — outdoors in a courtyard on campus during Chicago's warmer months.

Northwestern Medicine magazine is published quarterly for alumni and friends of Northwestern University Feinberg School of Medicine, Northwestern Memorial HealthCare and the McGaw Medical Center of Northwestern University.

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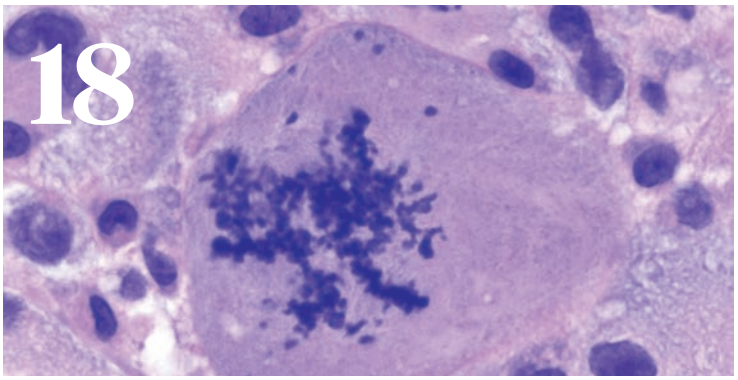
PHOTOGRAPH BY *Teresa Crawford*

Features

AN EXCEPTIONAL CANCER CENTER

The Lurie Cancer Center solidifies its place among the country's elite after extraordinary growth and a top rating from the National Cancer Institute.



CRITICAL MASS

Armed with a prestigious new grant, investigators prepare to rapidly translate scientific breakthroughs into better brain tumor therapies.

FIGHTING CANCER, BECOMING AN ADULT

Teens and young adults with cancer get support from a special oncology program.

CANCER CRUSADER

Leon Platanias steers the Lurie Cancer Center toward better patient outcomes.

Departments

ON THE COVER
Glioblastoma cells (orange) spread throughout a fly brain used to model human cancer (normal cells in blue). Image from research by Subhas Mukherjee, PhD.

FOCUSING

Millions of cells divide inside the body every second, replacing old, damaged and dying cells and enabling tissues and organs to grow, heal and support life. Unfortunately, this ubiquitous, carefully controlled process goes awry far too often: Abnormal cells with damaged DNA multiply too fast and wreak havoc on millions of bodies and lives every year.

In 2018, an estimated 1.7 million people will be diagnosed with cancer and more than 600,000 Americans will die of the disease, according to the American Cancer Society. Though five-year survival rates have increased about 20 percentage points in the last three decades, cancer remains the second most common cause of death in our country after heart disease.

Clinicians at the Robert H. Lurie Comprehensive Cancer Center of Northwestern University treat 15,000 new cancer patients every year. It's a responsibility we take very seriously. As a world-class academic health system, it is our duty to make sure that our patients have access to the best therapies and resources available. But we also recognize that in many cases, the best therapies available right now are not enough — through research we must develop better treatments for our patients.

In this issue of *Northwestern Medicine* magazine, we focus on cancer and the great minds, projects and programs that are helping us overcome this destructive disease. We examine the remarkable growth of our Lurie Cancer Center over the last five years and highlight four studies that promise to bring innovative new approaches for treating glioblastoma to patients in the short term. Both the cancer center and our brain tumor research enterprise were awarded large, prestigious grants from the National Cancer Institute this August, providing essential funding to support our work and recognition that Northwestern has the talent and infrastructure to not only make important discoveries, but also to translate them to clinics and improve patient outcomes.

In these pages, we also share the stories of two brave patients who had to face cancer during young adulthood —

ON CANCER

a time when life is hard enough without such a diagnosis — and found support from an oncology program designed to help them cope during treatment and, later, as cancer survivors. Finally, we profile Leon Platanias, MD, PhD, director of our cancer center and the tireless leader who makes sure that the many aspects of our cancer efforts come together successfully.

In this issue of *Northwestern Medicine* magazine, we focus on cancer and the great minds, projects and programs that are helping us overcome this destructive disease.

Finding, testing and implementing the best treatments for cancer is a huge challenge for scientists and clinicians given the depth and breadth of the disease. But that means the discoveries we make in our laboratories and clinical trials can lead to incredible improvements in care for countless patients in Chicago and around the world. Our experts in cancer are not only up for the challenge, they're already making extraordinary strides.

With warm regards,

Eric G. Neilson, MD
Vice President for Medical Affairs
Lewis Landsberg Dean

Dean M. Harrison
President and CEO
Northwestern Memorial HealthCare

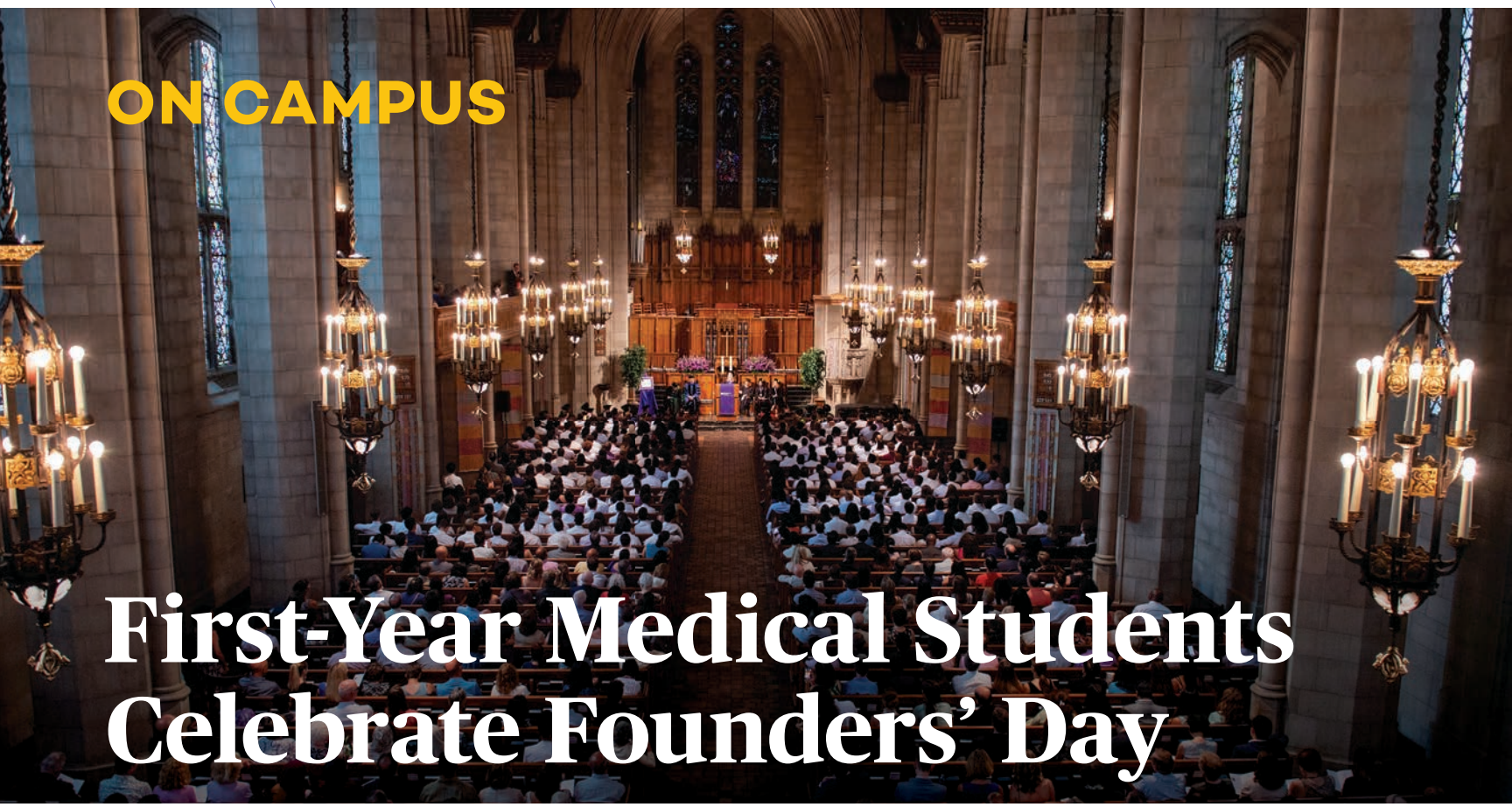
1.7 MILLION
PEOPLE DIAGNOSED WITH CANCER IN 2018

600,000
PEOPLE WILL DIE FROM CANCER THIS YEAR

15,000
NEW PATIENTS TREATED AT THE ROBERT H. LURIE COMPREHENSIVE CANCER CENTER OF NORTHWESTERN UNIVERSITY

FOCUSING ON CANCER

Watch for this icon throughout our special theme issue of *Northwestern Medicine* magazine — it pinpoints our coverage of cancer news, research and clinical activities.



ON CAMPUS

First-Year Medical Students Celebrate Founders' Day

"This was a page-turning moment," said Brandon Caldwell, MS, a first-year medical student. "Medical school started to feel 'real' during orientation week, but when I recited the oath, it felt like it was time to roll up my sleeves and get to work."

Founders' Day, an annual ceremony held Aug. 10 this year, welcomes first-year medical students to campus, honors Feinberg's founders and marks the official start of the academic year.

Caldwell was one of the 160 members of the Class of 2022 who gathered at the event, celebrating with their family, friends and the second-year medical students who presented the incoming students with their white coats.

"I'm delighted to see the families and friends who have come to welcome their loved ones as they write the next chapter of the story of Feinberg," said Eric G. Neilson, MD, vice president for Medical Affairs and Lewis Landsberg Dean. "Founders' Day is a tradition here in the medical school, but it's also about the future. It's where we start our academic year, a new beginning for students and staff."

During his opening address, Neilson touched on Feinberg's distinguished history and shared with students the unique responsibilities of the medical profession.

"An obligation to serve patients to the best of your ability no matter the circumstances is at the very core of the profession; this is the principle of altruism," Neilson said.

The Founders' Day address was delivered by Susan Quaggin, MD, chief of Nephrology and Hypertension in the Department of Medicine, director of the Feinberg Cardiovascular and Renal Research Institute and the Charles H. Mayo, MD, Professor.

"Over the course of your careers there will be amazing changes that you can't even predict," Quaggin said. "From precision medicine and artificial intelligence to a focus on health disparities, it's going to empower each of you to find your passion."

Next, Diane B. Wayne, '91 MD, vice dean for Education and the Dr. John Sherman Appleman Professor of Medical Education, led the white coat ceremony, where students don their white coats for the first time.

This moment was a lifelong dream come true for many students, including Julia Murphy, a first-year student from Denver.

> **"FOUNDERS' DAY IS A TRADITION HERE IN THE MEDICAL SCHOOL, BUT IT'S ALSO ABOUT THE FUTURE."**
>
> **ERIC G. NEILSON, MD**
> *Vice President for Medical Affairs and Lewis Landsberg Dean*

"My M2 sibling put the white coat on me," Murphy said. "I liked the symbolism of doing it together, an older colleague welcoming you into the profession. It felt special to stand up in a crowd of clean white coats."

WRITTEN BY *Will Doss* • PHOTOGRAPHY BY *Nathan Mandell*

2018 Entering Class Profile

66 *undergraduate institutions*

160 *students selected from a pool of*

7,089 *applicants*

82 *male* | **78** *female*

27 *states represented*

21–37 *years old*

31 *students from underrepresented minority groups*

36 *non-traditional*
(took two or more years off between undergraduate studies and medical school)

Feinberg-Affiliated Hospitals Among the Best in Rankings

Four Northwestern Medicine hospitals have been recognized by *U.S. News & World Report* in its 2018-19 Best Hospitals rankings:

NORTHWESTERN MEMORIAL HOSPITAL

1 in Chicago Metro Region and Illinois for the seventh consecutive year

13 on the Best Hospitals Honor Roll

11 specialties nationally ranked

3 specialties nationally ranked in the top 10: Cardiology & Heart Surgery (7th), Geriatrics (9th), Neurology and Neurosurgery (8th)

NORTHWESTERN MEDICINE CENTRAL DUPAGE HOSPITAL

6 in Chicago Metro Region

7 in Illinois

NORTHWESTERN MEDICINE LAKE FOREST HOSPITAL

13 in Chicago Metro Region

16 in Illinois

NORTHWESTERN MEDICINE DELNOR HOSPITAL

13 in Chicago Metro Region

16 in Illinois

Shirley Ryan AbilityLab

Meanwhile, the Shirley Ryan AbilityLab (previously known as the Rehabilitation Institute of Chicago) topped the *U.S. News* list for the 28th consecutive year.

Ann & Robert H. Lurie Children's Hospital of Chicago

Earlier this summer, *U.S. News* ranked Ann & Robert H. Lurie Children's Hospital of Chicago the top children's hospital in Illinois and the 10th best children's hospital in the country.

NO. 1 IN CARDIOVASCULAR RESEARCH FUNDING FROM THE AHA

Feinberg has become the top recipient of research funding from the American Heart Association, receiving nearly $17 million for active awards – more than any other institution in the United States – as of this August.

CENTEGRA JOINS NORTHWESTERN MEDICINE

On September 1, Centegra Health System became the newest member of Northwestern Medicine. Its addition adds three hospitals, 32 outpatient sites, 3,400 employees and more than 600 physicians to the growing Northwestern Medicine health system.

The affiliation was approved by the governing boards of Northwestern Memorial HealthCare and Centegra Health System earlier this year and received all regulatory approvals.

"Together with Centegra's employees, nurses, physicians and staff, we will provide patients in McHenry and Kane Counties more convenient access to clinical trials, the latest in treatment options and the ability to access world-class specialized care from one of the best hospitals in the country, Northwestern Memorial Hospital," said Dean M. Harrison, president and chief executive officer of Northwestern Memorial HealthCare.

Centegra Health System includes hospitals in Huntley, McHenry and Woodstock, Illinois, and 32 outpatient sites across McHenry and Kane counties.

WRITTEN BY *Kayla Stoner*

Cancer Patients Guaranteed Oncofertility Treatment Coverage Under New Illinois Law

Illinois cancer patients no longer have to choose between costly life-saving treatments and preserving their ability to one day have their own biological children, thanks to a fertility preservation bill signed Aug. 27 by Gov. Bruce Rauner at Northwestern Medicine Prentice Women's Hospital.

HB 02617, based in part on research and advocacy at Northwestern University, amends the Illinois insurance code to require oncofertility coverage. Illinois is the fifth state to enact such a law.

"This is a legacy moment when research, medicine and legislative decisions meet the needs of patients, families, citizens and Illinoisans," said Teresa Woodruff, '89 PhD, director of the Oncofertility Consortium at Northwestern University and the Thomas J. Watkins Memorial Professor of Obstetrics and Gynecology. Woodruff, who coined the term oncofertility in 2006, is also Northwestern's associate provost for Graduate Education and dean of The Graduate School.

"Northwestern Medicine's Fertility and Reproduction team, along with the interdisciplinary teams from the Robert H. Lurie Comprehensive Center at Northwestern University and the Oncofertility Consortium here at Northwestern have been instrumental in leading fertility preservation from the scientific bench to the patient bedside," said Kristin Smith, program manager for Fertility Preservation.

In her role, Smith consults with all young, newly diagnosed oncology patients at the Lurie Cancer Center to help them understand the fertility risk associated with treatment as well as options for fertility preservation.

Watch video online at magazine.nm.org

WRITTEN BY *Kristin Samuelson*

ONLINE HIV PREVENTION PROGRAM RECEIVES $8.8 MILLION NIH GRANT TO PUT RESEARCH INTO PRACTICE

The National Institutes of Health (NIH) has awarded an $8.8 million grant to Keep It Up!, a novel online HIV prevention program that has been shown to reduce sexually transmitted infections in gay young men by 40 percent.

Drawing in users with entertaining soap operas, exercises and interactive games, Keep It Up! is the first online HIV prevention program proven to reduce sexually transmitted infections. Its next goal is to figure out how to best scale up the program nationally.

The Institute for Sexual and Gender Minority Health and Wellbeing (ISGMH) at Northwestern University, which created the Keep It Up! program, will use the grant to implement the program in real-world settings as part of the next phase of the study.

"We have effective HIV prevention and treatment approaches, and now our greatest challenge is how to get them to the people who need them," said Brian Mustanski, PhD, senior investigator of Keep It Up! and director of ISGMH. "Implementation research can help guide our way forward."

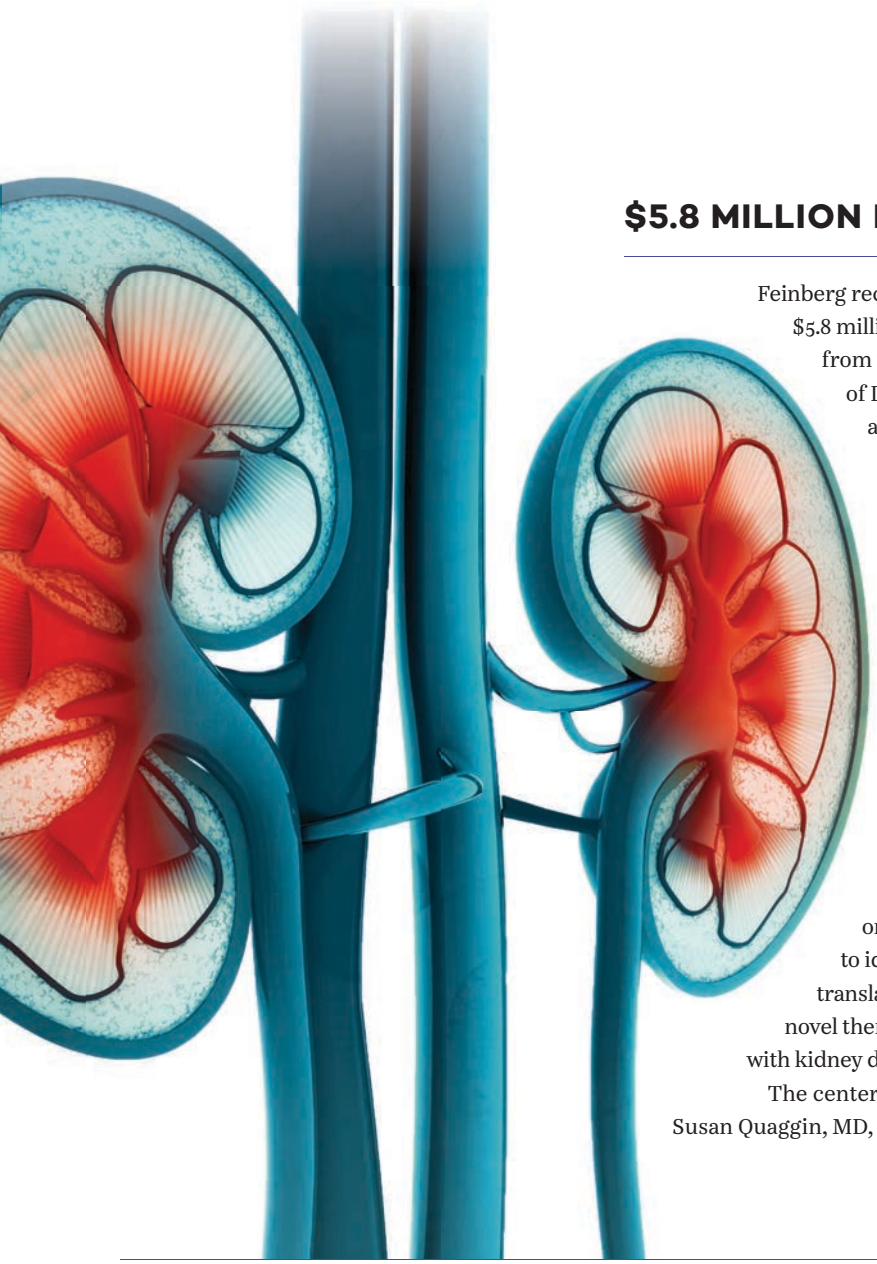
This disconnect between research and practice is a public health concern, given the pressing need for effective sex education for young men who have sex with men, a group that experiences a disproportionate burden of HIV infection and is 44 times more likely to contract the disease.

With this funding, Keep It Up! will lead the way in putting research into practice by testing two implementation strategies: delivery by community-based organizations, and a direct-to-consumer method. Following implementation, the investigators will evaluate the public health impact of both strategies.

Watch video and listen to a podcast with Mustanski online at magazine.nm.org

PHOTOGRAPHY BY *Laura Brown*

New Centers Advance Research in Health Equity, Epilepsy and Kidney Diseases



$5.8 MILLION FOR KIDNEY CORE CENTER

Feinberg received a prestigious $5.8 million, five-year grant from the National Institute of Diabetes and Digestive and Kidney Diseases to expand translational research into the prevention and treatment of kidney diseases.

The grant will fund the Northwestern University George M. O'Brien Kidney Core Center, bringing together basic and clinical scientists in a collaborative hub dedicated to identifying, testing and translating discoveries into novel therapeutics for patients with kidney diseases.

The center will be directed by Susan Quaggin, MD, chief of Nephrology and Hypertension in the Department of Medicine and the Charles H. Mayo, MD, Professor.

"The center brings together incredible scientists across disciplines on both the Evanston and Chicago campuses with a common goal — to end kidney disease. I am convinced that the unique 'We WILL' culture at Northwestern University made this possible," said Quaggin, who is also director of the Feinberg Cardiovascular and Renal Research Institute.

> **I am convinced that the unique 'We WILL' culture at Northwestern University made this possible.**

The National Institutes of Health first established the George M. O'Brien Centers in 1987 as specialized centers of research into kidney and urologic diseases. There are currently just eight O'Brien Kidney Centers at institutions nationwide.

WRITTEN BY *Anna Williams and Will Doss*

A CATALYST FOR HEALTH EQUITY TRANSFORMATION

Feinberg has established a new center within its Institute for Public Health and Medicine that will serve as a hub for students, faculty and staff.

The Center for Health Equity Transformation, led by Melissa Simon, MD, MPH, '06 GME, the George H. Gardner Professor of Clinical Gynecology, will build research infrastructure, conduct workforce development and work closely with community partners in the effort to advance population health equity.

"There is some amazing health equity work being done across the entire Northwestern campus, and I hope that this center can serve as a welcoming home and resource to support current work and, importantly, to catalyze even more transformational research, education and training that will move the needle in eliminating health disparities and promoting health equity in all sectors," said Simon, also vice chair for clinical research in the Department of Obstetrics and Gynecology and a professor of Preventive Medicine and Medical Social Sciences.

Health touches every aspect of an individual's life, but a bevy of academic literature has linked an individual's health status to their education, housing, employment, geographic location and more, Simon said. That interconnectivity requires a transdisciplinary approach to improving health equity, starting with scientific investigation.

$12 MILLION GRANT FOR EPILEPSY RESEARCH

With a new $12 million, five-year grant from the National Institutes of Health, Feinberg will establish an interdisciplinary research center dedicated to advancing the genetic understanding of epilepsy.

The Channelopathy-Associated Epilepsy Research Center, led by Alfred George, Jr., MD, chair and Magerstadt Professor of Pharmacology, will focus on investigating sodium and potassium channel genes, the dominant class of genes responsible for early childhood-onset epilepsy.

"Results from this work will contribute to improving the accuracy of genetic diagnosis of epilepsy and foster a better understanding of disease mechanisms at molecular and cellular levels," George explained. "We will also strive to determine the optimal drug therapy for specific mutations — a step in the direction of precision medicine."

Epilepsy, which affects 1 in 100 people worldwide, is a neurological disorder characterized by recurrent seizures. The disorder often has a genetic basis, especially through ion channel gene mutations, known as channelopathies. In particular, variants in the genes that code for sodium and potassium channels account for the majority of genetic variants associated with epilepsy and related neurodevelopmental disorders.

However, differentiating pathogenic versus benign variants, and characterization of the clinical relevance of specific mutations, has remained challenging. Within the new center, a multi-institutional team of investigators aim to advance the understanding of genetic variants in channelopathy-associated epilepsy and to enable a shift to a variant-based classification of epilepsy, while guiding the implementation of precision medicine.

RESEARCH BRIEFS

FOCUSING ON CANCER

SCIENTIFIC ADVANCES

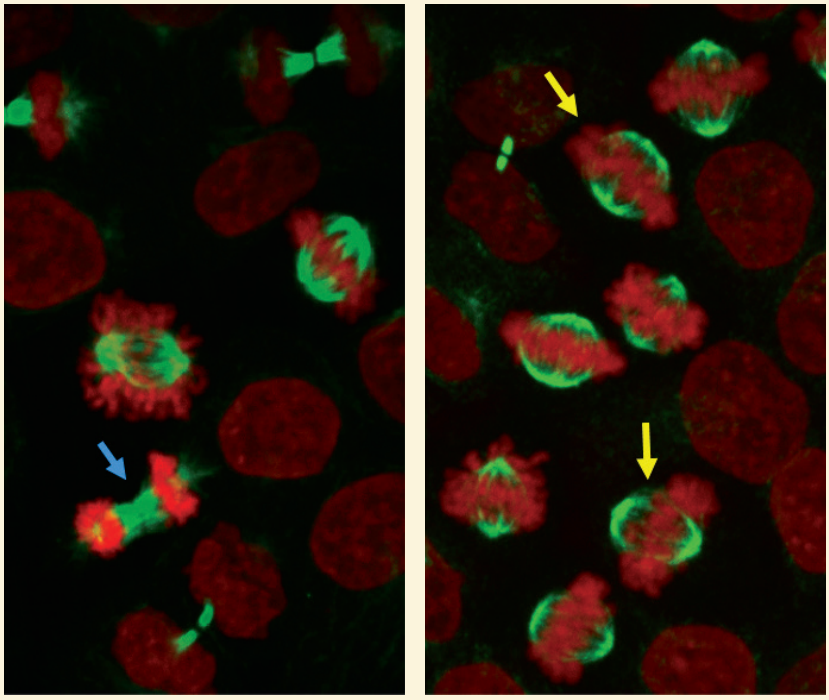
CELL CYCLE PROTEIN HAS SURPRISING SECONDARY FUNCTION

The protein CDT1, known to be involved in DNA replication during the early part of interphase, was found to also play a role in microtubule binding during mitosis, an unexpected secondary function, according to a Northwestern Medicine study published in the *Journal of Cell Biology*.

These findings could inform more effective cancer treatments and help answer larger questions about molecular mechanisms, according to Dileep Varma, PhD, assistant professor of Cell and Molecular Biology and senior author of the study.

"Some types of drugs try to inhibit mitosis in cancer cells, but normally the number of dividing cells in tissue is very small," Varma said. "If we can target CDT1, we can target two different mechanisms that cause genomic instability and eventually cell death."

This work was supported by National Cancer Institute grant R00CA178188 and an American Cancer Society Institutional Research Grant.



Dividing cells separate their duplicated chromosomes normally to two daughter cells (left, blue arrow). Cells expressing a mutated form of CDT1 are defective in binding to microtubules and exhibit severe delays in accomplishing this task (right, yellow arrows).

CLINICAL BREAKTHROUGHS

New Therapy for Rare Lymphoma

A drug called mogamulizumab significantly improved progression-free survival for patients with cutaneous T-cell lymphoma, according to the results of a clinical trial published in *The Lancet Oncology*. The findings led to the FDA's recent approval of the drug.

"For patients affected by this debilitating disease, we can now offer a novel and effective treatment option," said co-author Barbara Pro, MD, professor of Medicine in the Division of Hematology and Oncology.

"For patients affected by this debilitating disease, we can now offer a novel and effective treatment option."

Cutaneous T-cell lymphoma (CTCL) is a rare cancer of T-cell lymphocytes that primarily affects the skin. There is no cure, and the disease is difficult to treat, with few therapy options.

Mogamulizumab is a novel targeted therapy that binds to a protein called CCR4, which is expressed on the surface of malignant T-cells.

In a large multi-center phase III trial, 372 patients with the two most common subtypes of CTCL — Mycosis fungoides and Sézary syndrome — who had not responded to prior treatment were randomized to receive either mogamulizumab or vorinostat, a standard therapy.

The investigators found that treatment with mogamulizumab significantly prolonged progression-free survival, as compared to vorinostat. Mogamulizumab was also superior in terms of quality of life and the proportion of patients who achieved an overall response.

The study was supported by Kyowa Kirin, which manufactures mogamulizumab.

DISEASE DISCOVERIES

Scientists Examine Epigenetics of Breast Cancer

Understanding how and why gene expression may cause cellular dysfunction in the initial stages of breast cancer could improve early detection — one of the most efficient ways to save lives.

DUCTAL DISORDERS

A team of scientists identified three new populations of breast epithelial cells in a study published in *Nature Communications*, providing new insights on the spectrum of cell types within the human breast that may serve as cells of origin for breast cancer. Seema Khan, MD, the Bluhm Family Professor of Cancer Research and a professor of Surgery in the Division of Breast Surgery, was a co-author.

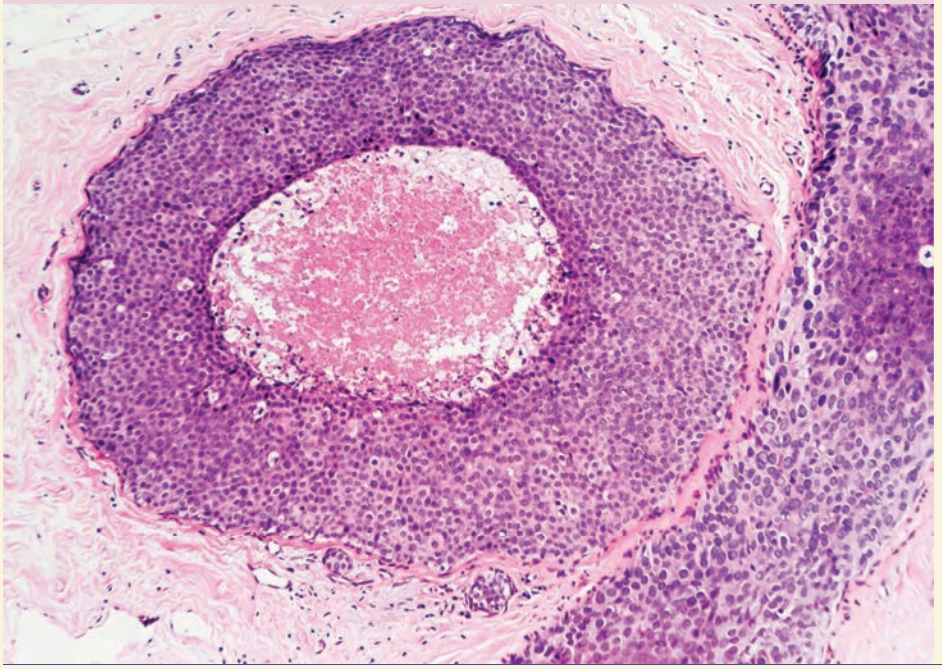
ENZYME EFFECTS

Breast tumors expressing an enzyme called AGR2 are associated with decreased breast cancer survival, likely due to the protein's excitatory effect on cellular homeostasis, according to a Northwestern Medicine study published in *Oncotarget*. Shohreh Shahabi, MD, chief of Gynecologic Oncology in the Department of Obstetrics and Gynecology and the John and Ruth Brewer Professor of Gynecology and Cancer Research, was the senior author.

CHROMATIN CONNECTION

Investigators developed a novel method to identify transcriptional regulators involved in transforming normal cells to cancer cells and validated the method in breast epithelial cells, as outlined in a study published in *Nature Communications*. This computational approach provides targets for further study by locating sections of the genome and ranking them by the likelihood they are important for a cell's transformation to a cancerous state. Zhe Ji, PhD, assistant professor of Pharmacology, was the first author.

These studies were supported by the National Cancer Institute grants R01 CA057621, U01 CA199315, R00 CA181490, K22 CA190511, CA107486 and K99 CA207865; the Chan/Zuckerberg Initiative grant HCA-A-1704-01668; the Phebe Novakovic Fund; a fellowship from the Postdoc Programme of the German Academic Exchange Service; the National Institutes of Health Ruth L. Kirschstein National Research Service Award for postdoctoral fellowship; and the Searle Leadership Fund in the Life Sciences from Northwestern University.



CLINICAL BREAKTHROUGHS

CLINICAL TRIALS SHOW PROMISE IN LEUKEMIA

Two drugs that target different mutations showed encouraging results in treating leukemia, according to recent clinical trials. Jessica Altman, MD, '07 GME, associate professor of Medicine in the Division of Hematology and Oncology, was a co-author of both studies.

Acute myeloid leukemia (AML), the most common type of adult leukemia, is a cancer of the blood-forming cells of the bone marrow. Currently, most patients with AML are treated with standard chemotherapy, but recent scientific advances have revealed that there are many forms of the disease, each with different specific genetic changes that may affect cancer growth and treatment.

In one study, published in the *New England Journal of Medicine*, investigators evaluated the safety and efficacy of an oral medication called ivosidenib, which inhibits mutated *IDH1*. Mutations in that gene are found in roughly 5 to 10 percent of adults with AML and are thought to be a driver of the disease.

Delivered to 258 patients at a dose of 500 mg daily, ivosidenib led to favorable results among patients with advanced relapsed or refractory AML and was well tolerated with a low rate of serious adverse events. The complete remission rate (including patients who did not have a full blood count recovery) was around 30 percent.

Another study, published in *The Lancet Oncology*, assessed the efficacy and safety of quizartinib among patients with refractory or relapsed AML. The drug inhibits mutations in the gene *FLT3*; about 30 percent of patients with AML have *FLT3* mutations, which are associated with particularly poor outcomes, especially among older patients.

Wuizartinib was generally well-tolerated in the study of 33 patients and had a high rate of response, particularly among patients who were FLT3-ITD positive. The composite complete remission rate was around 50 percent.

The NEJM study was supported by Agios Pharmaceuticals, which owns ivosidenib. The Lancet Oncology study was supported by Ambit Biosciences, which was acquired by Daiichi Sankyo. Research funding was provided by Daiichi Sankyo, which owns quizartinib. The work was also supported by the National Cancer Institute Leukemia SPORE grant P50 CA100632 and Core Grant P30 CA016672.

MEDIA SPOTLIGHT

AP Associated Press · The New York Times · The Washington Post · npr

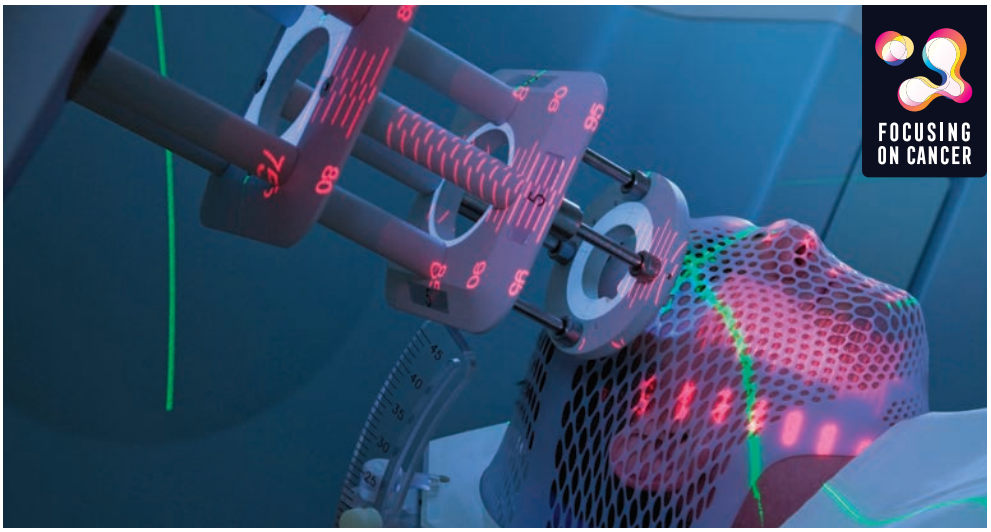
Helping Nature: Inducing Labor Avoids Cesarean for Some Moms

First-time moms at low risk of complications were less likely to need a cesarean delivery if labor was induced at 39 weeks instead of waiting for it to start on its own, found a big study published in the *New England Journal of Medicine*. Their babies fared better, too. The results overturn the longtime view that inducing labor raises the risk for a C-section, and prompted two leading OB-GYN doctor groups to say it's now reasonable to offer women like those in the study that option. William Grobman, MD, MBA, '97, '00 GME, the Arthur Hale Curtis, MD, Professor of Obstetrics and Gynecology, led the research, which was also featured in the spring 2018 issue of *Northwestern Medicine* magazine.

The New York Times

Diet and Exercise May Stem Weight Gain of Pregnancy, but Should Begin Early

More than half of all pregnant women in America are overweight or obese when they conceive, putting them and their children at a higher risk of developing health problems. Starting a diet and exercise program around the beginning of their second trimesters helped many of these women avoid excess weight gain during their pregnancies, according to a study published in *Obesity*. But it did not lower their rate of gestational diabetes, hypertension and other adverse outcomes. "We are going to have to start talking to women who are overweight or obese even before pregnancy and explain to them the risk of that weight on a potential pregnancy," said lead author Alan Peaceman, MD, chief of Maternal Fetal Medicine in the Department of Obstetrics and Gynecology.



Chicago Tribune

Cancer Isn't a War or a Battle, but Maybe Cancer Research Is

"War encourages a singular, unified effort against an enemy and encourages sacrifice of unnecessary indulgences to support the cause. This is an incredibly effective strategy and metaphor for cancer research, which is expensive, time-consuming, and mentally and emotionally draining," wrote Suneel Kamath, MD, chief fellow in Hematology/Oncology in a commentary. "However, cancer for patients is not a war because cancer by its nature is a form of ourselves. Cancer forms from our own cells by hijacking normal pathways to make tumor cells that live longer and multiply faster. … The war metaphor also implies incorrectly that surviving cancer is mostly about toughness, fighting hard and staying positive. While a good attitude certainly helps, the greatest predictors of cancer survival are how aggressive the cancer is and the stage."

npr · The Atlantic

Treating Teen Depression Might Improve Mental Health of Parents, Too

When a teen's symptoms of depression improve as a result of treatment, it's more likely that their parent's mood lifts, too, new research shows. Graduate student Kelsey Howard and her advisor, Mark Reinecke, PhD, chief of Psychology in the Department of Psychiatry and Behavioral Sciences, analyzed data from a 2008 study that followed more than 300 teenagers getting treatment for depression over the course of about nine months. Before the kids started treatment, about a quarter of parents were experiencing high levels of depression, but their symptoms improved over the course of the study. "We exist in families, we exist in social networks. And a lot of our well-being, a lot of our highs and lows might come from these relationships," explained Howard, who presented the results of the research at the annual convention of the American Psychological Association.

FACULTY AWARDS & HONORS

Jason Wertheim, MD, PhD, vice chair for research in the Department of Surgery and the Edward G. Elcock Professor of Surgical Research, was named associate director for admissions of Feinberg's Medical Scientist Training Program. 1

Ali Shilatifard, PhD, chair of Biochemistry and Molecular Genetics, director of the Simpson Querrey Center for Epigenetics and the Robert Francis Furchgott Professor, was appointed editor of *Science Advances*, an open-access journal published by the American Association for the Advancement of Science, which also publishes the journal *Science*.

Steven DeVries, MD, PhD, the David Shoch, MD, PhD, professor of Ophthalmology, was awarded the Brian Boycott Prize at the 2018 Federation of American Societies for Experimental Biology Science Research Conference on Retinal Neurobiology and Visual Processing. The prize honors career achievements in retinal neuroscience, with the winner chosen by a committee of prominent scientists in the field. 2

FOCUSING ON CANCER

Leonidas Platanias, MD, PhD, director of the Robert H. Lurie Comprehensive Cancer Center of Northwestern University; the Jesse, Sara, Andrew, Abigail, Benjamin and Elizabeth Lurie Professor of Oncology; and professor of Medicine and of Biochemistry and Molecular Genetics, was elected to the Association of American Cancer Institutes (AACI) Board of Directors. Comprised of 98 premier academic and freestanding cancer research centers in the United States and Canada, the AACI is dedicated to reducing the burden of cancer by enhancing the impact of the leading academic cancer centers *(read more about Platanias on page 26)*.

Sheetal Kircher, MD, '11 GME, assistant professor of Medicine and medical director of the Cancer Survivorship Institute at the Lurie Cancer Center, was one of two health policy fellows selected by the American Society of Clinical Oncology for 2018-2019. In her role, she will have the opportunity to shape cancer policy and gain leadership experience. 3

June M. McKoy, MD, '01 GME, JD, MBA, associate professor of Medicine and Preventive Medicine, was named an associate editor of *JNCCN—The Journal of the National Comprehensive Cancer Network*.

Jane Holl, MD, MPH, director of the Center for Healthcare Studies and Center for Education in Health Sciences, both within Feinberg's Institute for Public Health and Medicine, and professor of Pediatrics, Medicine and Preventive Medicine, received the 2018 John M. Eisenberg Excellence in Mentorship Award at the 24th Annual Agency for Healthcare Research and Quality Research Conference. 4

Jaehyuk Choi, MD, PhD, the Ruth K. Freinkel, MD, Research Professor and assistant professor of Dermatology and of Biochemistry and Molecular Genetics, was selected as one of three finalists by the Foundation for the National Institutes of Health for the inaugural Trailblazer Prize.

Joan Guitart, MD, chief of Dermatopathology in the Department of Dermatology and a professor of Pathology, was named president of the International Society of Cutaneous Lymphomas. Guitart also received the 2018 Founders Award by the Chicago Dermatological Society. 5

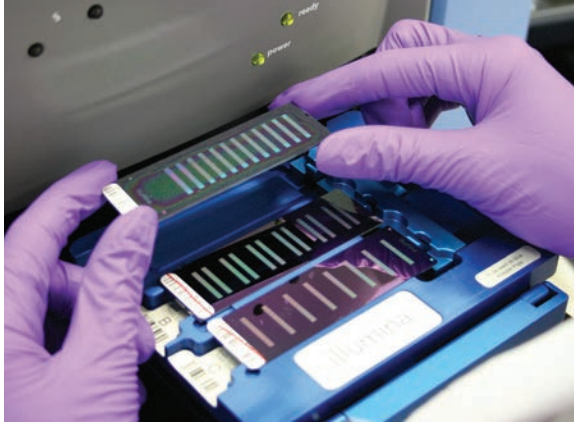
Amy Paller, MD, '81, '83 GME, the Walter J. Hamlin Professor and chair of Dermatology, was elected president of the International Society for Pediatric Dermatology.

Lois Hedman, '87 MS, DScPT, associate professor of Physical Therapy and Human Movement Sciences, was named president elect of the Northwestern University Faculty Senate. Hedman's term began this fall at the beginning of the 2018-2019 academic year. 6

Erin Hsu, PhD, research associate professor of Orthopaedic Surgery, was named assistant director of the Simpson Querrey Institute for BioNanotechnology (SQI). Hsu will help develop new programs to foster connections between Feinberg faculty, key collaborators at SQI and faculty on the Evanston campus.

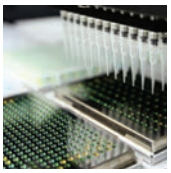
The following faculty have been invested into endowed professorships:

- **C. David James, PhD**, vice chair for Research in the Department of Neurological Surgery and professor of Neurological Surgery and of Biochemistry and Molecular Genetics, as the Jean Malnati Miller Professor of Brain Tumor Research *(read more about James' work on page 18)*
- **Sanjiv Shah, MD**, professor of Medicine in the Division of Cardiology, as the Neil J. Stone, MD, Professor 7
- **Robert G. Kalb, MD**, chief of Neuromuscular Disease in the Department of Neurology, as the Les Turner Professor



AN EXCEPTIONAL CANCER CENTER



$31.5 MILLION
in core funding awarded this year

The Lurie Cancer Center solidifies its place among the country's elite after extraordinary growth and a top rating from the National Cancer Institute.

To defeat a disease as prevalent and complex as cancer, science must form a united front. That is the fundamental principle behind the National Cancer Institute's Comprehensive Cancer Centers — an elite group of institutions that lead the nation's efforts to study, control and cure cancer.

As hubs dedicated to attacking cancer from all angles, Comprehensive Cancer Centers not only provide world-class clinical care to patients with cancer, but also integrate the spectrum of cancer research — laboratory work, clinical investigation and population studies — to more rapidly and meaningfully impact outcomes. The idea is that such a team approach better serves patients today and cultivates discoveries that lead to tomorrow's treatments.

At the Robert H. Lurie Comprehensive Cancer Center of Northwestern University, this sense of synergy in the name of fighting cancer has never been stronger.

In August, the Lurie Cancer Center was awarded the highest rating possible from the National Cancer Institute (NCI) — an overall "exceptional" score — during the renewal of its designation as a Comprehensive Cancer Center. The score, also the highest in the history of the Lurie Cancer Center, brings with it more than $31.5 million in core funding — a dramatic 36 percent increase over the previous award.

"This renewal reflects the overall strength and reach of the Lurie Cancer Center and the larger Northwestern institution," says Eric G. Neilson, MD, vice president for Medical Affairs and Lewis Landsberg Dean. "It's a result of the outstanding basic and clinical science, patient care and collaboration that takes place here every day, and it is an acknowledgment of the center's extraordinary growth over the previous five years under the leadership of Leon Platanias."

The rating is also a window into what's to come: The grant will have a profound impact not only on the thousands of patients living with cancer across the Chicagoland area, but also in driving practice-changing discoveries capable of reducing cancer around the globe.

"The success of our cancer center reflects the innovation and remarkable achievements of our talented clinicians, clinical investigators, scientists and staff," says Leonidas Platanias, MD, PhD, director of the Lurie Cancer Center. "We are now positioned among an elite group of top cancer centers in the country and poised for the next phase of growth. We look forward to expanding our capabilities and intensifying our efforts to defeat cancer as a disease."

"BEING A COMPREHENSIVE CANCER CENTER WITH AN EXCEPTIONAL SCORE REALLY SAYS A LOT ABOUT THE COLLABORATION AND BRAIN TRUST THAT WE HAVE HERE AT NORTHWESTERN."

50%
increase in NIH research funding over the last five years

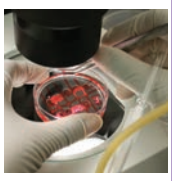
Why Comprehensive Matters

Since the "War on Cancer" was first declared in 1971, establishing the NCI in its current form, there have been significant advances in the prevention, diagnosis and treatment of cancer. But despite steady decreases in mortality rates, cancer remains the second-leading cause of death in the United States.

As a result, there are currently hundreds of institutions, hospitals and clinics across the country that conduct cancer research and/or provide patient care. But among these, a select 70 have been designated as NCI Cancer Centers, a highly-competitive status recognizing excellence and scientific leadership. Of those, just 49 have earned the full designation of a Comprehensive Cancer Center — a title that distinguishes centers that not only provide state-of-the-art cancer care and conduct leading-edge research, but also demonstrate a special ability to bring scientists together for transdisciplinary research, while also conducting community outreach and education. In other words: the full range of what it will take to confront cancer.

"The designation of a Comprehensive Cancer Center is essentially a testament to the capacity of our team to provide the whole spectrum of exceptional care to patients," explains Maha Hussain, MD, deputy director of the »

WRITTEN BY *Anna Williams*



36%

increase in core funding over the previous award in 2013

Lurie Cancer Center and the Genevieve E. Teuton Professor of Medicine.

"It starts with the primary goal of saving human life and addresses all kinds of issues across the spectrum — from enhancing survivorship outcomes, quality of life, prevention and access to care — that are very critical and require specialized expertise. Being a Comprehensive Cancer Center with an exceptional score really says a lot about the collaboration and brain trust that we have here at Northwestern."

Measuring Success

Northwestern's cancer center, established in 1974, was first awarded the prestigious "comprehensive" title from the NCI in 1997. This year's renewal marks the fourth consecutive time the Lurie Cancer Center has renewed the designation and the center's highest evaluation ever.

The NCI assigns numerical scores to centers on a unique scale that ranges from 10 to 90, with 10 being a perfect score. This year, the Lurie Cancer Center received the highest possible qualitative rating of "exceptional" and earned a near-perfect impact score of 12 — a remarkable leap from the previous score of 20 in 2013.

A score of 12 is essentially like receiving a 98 percent out of 100, explain Aleksandar Zafirovski, MBA, associate director for Administration, and Renee Webb, associate director for Research Administration, both at the Lurie Cancer Center. Simply put, the NCI score signifies that the nation's experts consider Lurie one of the best cancer centers in the country.

Earning such acclaim from the NCI is no easy feat. The renewal is the result of a rigorous peer-review process that includes more than a year of preparation, a site visit and intensive analysis by leading basic, clinical and population scientists on a wide range of measurements — NIH funding, high-impact research publications, recruitment to clinical trials and leadership.

"SIMPLY PUT, THE NCI SCORE SIGNIFIES THAT THE NATION'S EXPERTS CONSIDER LURIE ONE OF THE BEST CANCER CENTERS IN THE COUNTRY."

Dramatic Growth

A neuroscientist, a chemist and a clinical oncologist — typically, such experts would move in very separate research realms. But connected through the Lurie Cancer Center, Alexander Stegh, PhD, Chad Mirkin, PhD, and Priya Kumthekar, MD, '11 '12 GME, came together for a highly translational effort that resulted in a clinical trial testing a new therapy for the deadly brain cancer glioblastoma.

Stegh, assistant professor of Neurology in the Division of Neuro-Oncology, first identified the gene *BCL2L12* to be overexpressed in glioblastoma. Working in collaboration with Mirkin, the George B. Rathmann Professor of Chemistry at the Weinberg College of Arts and Sciences and director of Northwestern's International Institute for Nanotechnology, the two scientists developed a drug that uses spherical nucleic acids to target the cancer-causing gene. The drug, NU-0129, is now in a Phase 0 clinical trial led by oncologist Kumthekar, assistant professor of Neurology in Neuro-oncology and of Medicine in Hematology and Oncology. **Read more about Northwestern's brain tumor research on page 28.**

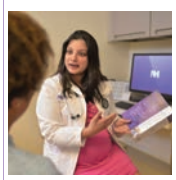
While NU-0129 is still in very early stages, the project is a prime example of the possibilities of the translational research environment that has strengthened at Lurie in recent years.

"The NCI reviewers recognized that by bringing together a unique and powerful combination of nanotechnology, chemistry and life sciences across the Evanston and Chicago campuses, we are uniquely positioned to translate what have been historically great basic science discoveries into innovative treatments and diagnostics," explains Kathleen Green, PhD, associate director for Basic Sciences Research at the Lurie Cancer Center and the Joseph L. Mayberry, Sr., Professor of Pathology and Toxicology.

But the team's research efforts extend well beyond the search for new therapies: Its population science programs in cancer prevention, secondary cancer control and survivorship scored high in the grant review, too.

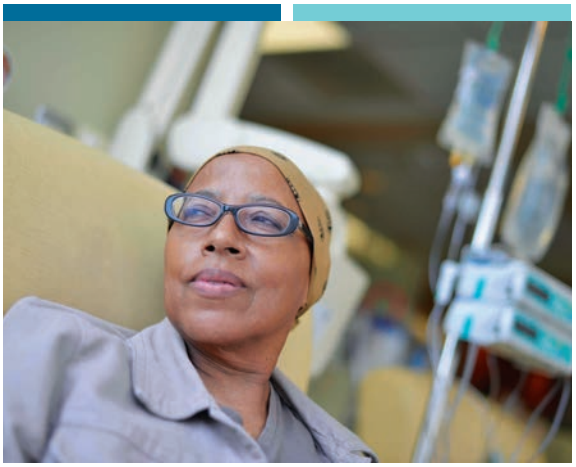
"Scientists in our division are national leaders and trendsetters in behavioral and biological approaches to preventing cancer, evaluating and improving the quality of life of people living with cancer, and extending principles and practices of cancer prevention and control into our diverse Chicago community," says David Cella, PhD, associate director for Cancer Prevention and Control Research at the Lurie Cancer Center and the Ralph Seal Paffenbarger Professor and chair of Medical Social Sciences.

Hard numbers also demonstrate the Lurie Cancer Center's progress over the last five years: NIH research funding has soared nearly 50 percent (an incredible improvement, given a national downward trend), enrollment in clinical trials has more than doubled, and 90-plus new faculty members have been recruited since the previous review.



90+

new faculty members recruited since the previous review



On the clinical side, Northwestern Memorial HealthCare has rapidly grown to one of the largest health systems in the state, and cancer care at Northwestern Memorial Hospital — the Lurie Cancer Center's primary teaching affiliate — has been ranked No. 1 in Chicago and Illinois for seven consecutive years by *U.S. News & World Report*.

Many also point to the leadership of Platanias, who was named director in October 2014, as being instrumental in tying Lurie Cancer Center's diverse efforts together — and driving the significant improvement seen since the last grant renewal in 2013. **Read more about Platanias on page 26.**

Looking Forward

With a solid structure in place, the Lurie Cancer Center now has its eyes on the future.

Basic science remains the bedrock of cancer research and will be an important area of growth over the next grant period, which runs through 2023. In particular, cancer immunotherapy, metabolism, epigenetics, cancer cell biology and synthetic biology will be key focuses in the coming years — as will further expanding clinical trials and enhancing the center's translational efforts.

"We have exciting plans for the future," says Platanias, also the Jesse, Sara, Andrew, Abigail, Benjamin and Elizabeth Lurie Professor of Oncology. "We are expanding our precision medicine capabilities and cutting-edge clinical trials across the rapidly growing Northwestern Medicine network."

Scaling to communities across the Chicagoland region, in order to bring novel treatments and exceptional care closer to where patients live, will also be a key mission moving forward. Just as important will be expanding scientific partnerships.

"Our track record was fantastic before, but it's even more fantastic now. Consequently, this will open up the door for collaborations at multiple levels with other academic institutions, private entities, pharmaceutical companies and foundations," Hussain says. "The fact that within a short period of time, the strength and impact of the Lurie Cancer Center has increased so significantly means the sky is really the limit now."

MILESTONES FOR THE CENTER

1974
Northwestern's Cancer Center established

1997
awarded the prestigious "comprehensive" title from the NCI and renamed the Robert H. Lurie Comprehensive Cancer Center of Northwestern University

Robert H. Lurie Comprehensive Cancer Center of Northwestern University

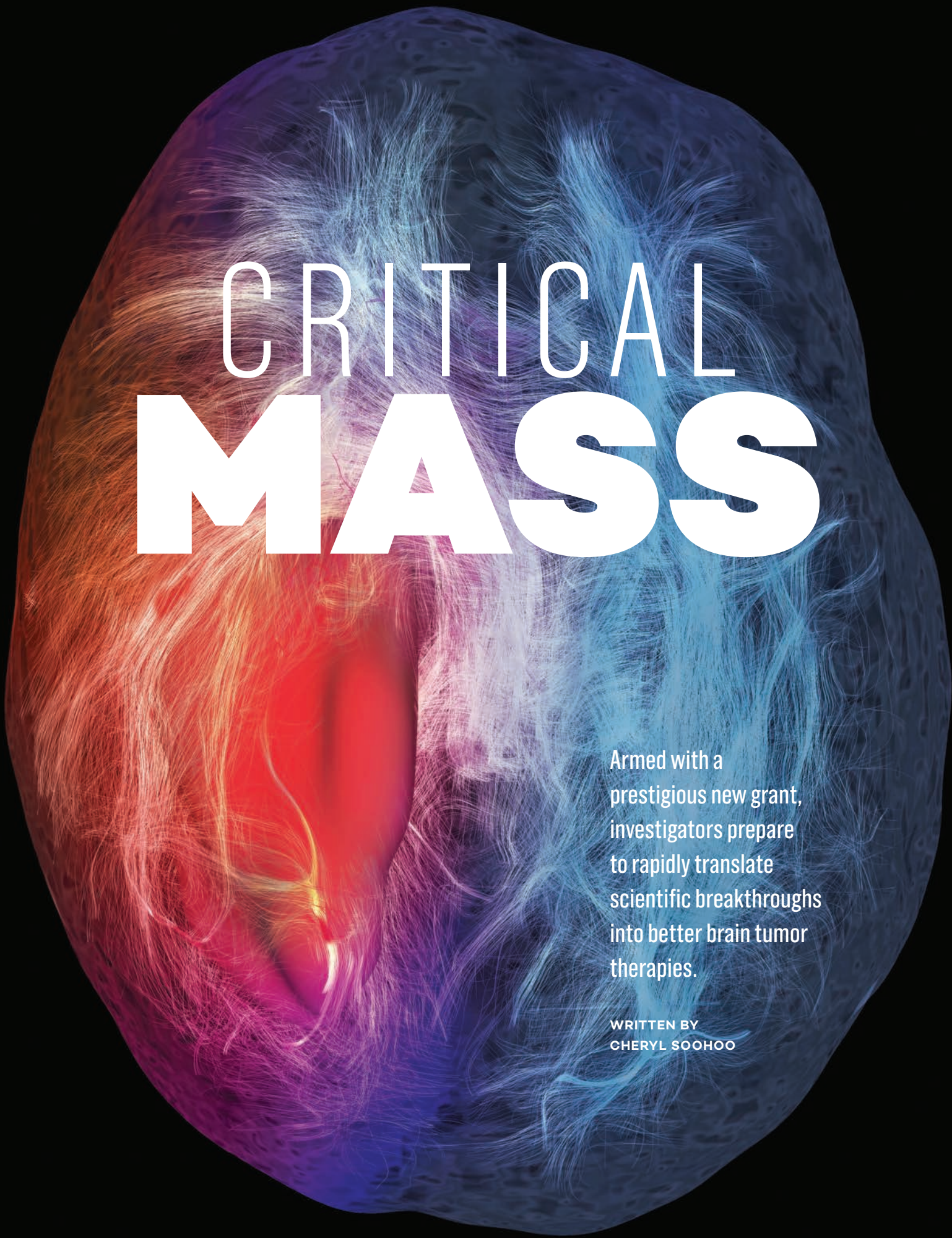
2013
Last grant period began

2014
Leon Platanias named director

2018
Received the highest possible rating of "exceptional"

2023
Next grant period begins

PHOTOGRAPHY BY *Laura Brown and Jim Prisching*



CRITICAL MASS

Armed with a prestigious new grant, investigators prepare to rapidly translate scientific breakthroughs into better brain tumor therapies.

WRITTEN BY
CHERYL SOOHOO

IMAGE BY *Sherbrooke Connectivity Lab/Science Source*

Of the more than 23,000 people diagnosed with a brain tumor each year, some 65 percent will not be able to beat their disease. Glioblastoma (GBM) remains one of the most common and aggressive of primary malignant brain cancers. While gains have been made in treating GBM, today's standard of care only yields a median survival rate of 15 months. Very few reach the cancer survivorship milestone of five years.

This sobering reality has driven Feinberg and the Robert H. Lurie Comprehensive Cancer Center of Northwestern University to create a robust brain tumor research enterprise to vastly improve patient outcomes. In just a few short years, the strength of this institutional commitment has allowed Feinberg to attract leading investigators from around the world, develop the necessary research infrastructure and build momentum in the field of brain cancer.

To top it off, in August, Northwestern Medicine scientists obtained a highly competitive $11.5 million grant from the National Cancer Institute (NCI). With this large new award to the Lurie Cancer Center, Northwestern neuro-oncology investigators are now leading a Specialized Program of Research Excellence (SPORE) in brain cancer with a special emphasis on glioblastoma.

"Not only is this the first brain tumor SPORE ever awarded in the state of Illinois, but it is also the first SPORE for Northwestern that's not shared with another institution," says Maciej "Matt" Lesniak, MD, the Michael J. Marchese Professor, chair of Neurological Surgery and a principal investigator (PI) of the grant. "This is truly a transformative opportunity for us."

The NCI's SPORE funding program advances cancer research focused on specific organ sites, from breast to lung and brain to prostate. It awards institutions around the country that demonstrate they have the talent and resources to bring scientific breakthroughs to the clinical setting. Designed to promote discoveries that rapidly translate to human application of novel cancer therapies, these prestigious grants support projects — typically a total of four — currently in or poised to enter clinical trials. The NCI stipulates that these studies must touch and significantly benefit the lives of oncology patients within the five-year period of the grant.

Earlier this year when Lurie Cancer Center investigators applied for the brain tumor SPORE, two of their proposed GBM studies were already in clinical trials: one featuring a stem cell-based virotherapy that harnesses the power of the common cold virus to attack brain cancer cells, and the other a novel therapy that uses nanoparticles to suppress gene expression in tumor cells. Another study that takes an immunosuppressive approach to fighting GBM is projected to enter clinical trial status in 2019. The fourth study, aimed at overcoming a glioblastoma survival mechanism, is slated to enter human study within the funding period.

"WE HAVE A CRITICAL MASS OF INVESTIGATORS IN OUR BRAIN TUMOR COMMUNITY WHO ARE UNIQUELY FOCUSED ON A SPECIFIC BRAIN CANCER. VERY FEW INSTITUTIONS IN THE COUNTRY CAN MATCH OUR DEPTH AND BREADTH OF EXPERTISE."

David James, PhD, and Maciej "Matt" Lesniak, MD, principal investigators of the new brain tumor SPORE grant.

Although Northwestern's application scored exceptionally well with the four initial studies proposed, C. David James, PhD, the Jean Malnati Miller Professor of Brain Tumor Research and vice chair for research in the Department of Neurological Surgery, says the school has additional outstanding projects in development and poised for near-term clinical application.

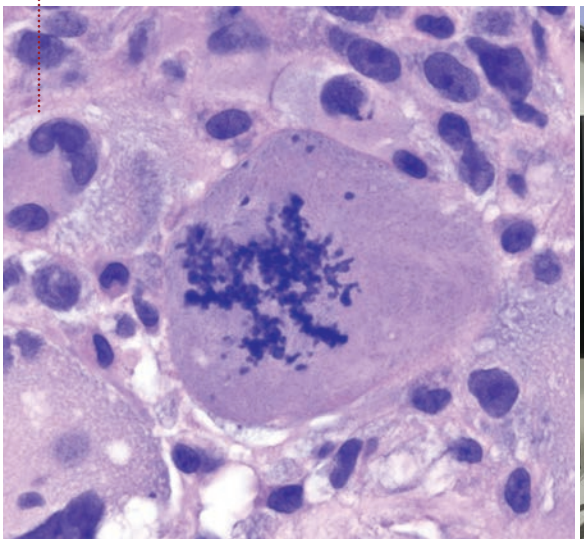
"We have a critical mass of investigators in our brain tumor community who are uniquely focused on a specific brain cancer. Very few institutions in the country can match our depth and breadth of expertise," says James, who is also a professor of Biochemistry and Molecular Genetics. His research interests center on understanding how gene alterations cause tumors to develop and increase their aggressive biologic behavior.

James speaks from experience: Before joining Feinberg in 2014, he was a faculty member at the University of California, San Francisco, where he served as a project PI for one of the first brain tumor SPORE grants awarded by the NCI. Now, he is a co-PI of Northwestern's SPORE. »

PHOTOGRAPH BY *Nathan Mandell*

C. David James, PhD (middle), one of the SPORE's principal investigators, with collaborators Craig Horbinski, MD, PhD (left), and Derek Wainwright, PhD (right).

Highly atypical mitosis in a recurrent glioblastoma.



Neuro-oncologists Karan Dixit, MD, '16 GME, and Priya Kumthekar, MD, '11, '12 GME, another investigator in the SPORE.

To date, with the addition of Northwestern, only eight institutions around the country have received SPORE funding to support brain cancer research in the 26-year history of the NCI's funding program.

MOVING THE NEEDLE

Despite advances in surgery, radiation and chemotherapy in the past couple of decades, less than two years is the best estimate that modern medicine can currently offer GBM patients. Says James, "That's where the needle is now stuck." The Northwestern projects supported by the new SPORE grant all involve innovative treatment strategies to enhance patient outcomes as quickly as possible. In the two studies currently in clinical trials and both coincidentally launched in May 2017, first-of-a-kind drug delivery vehicles offer hope for attacking deadly brain cancer.

One of the SPORE projects features the first drug to use nanoparticles or spherical nucleic acids to deliver and target gene suppression in tumor cells. Developed by Chad Mirkin, PhD, director of Northwestern's International Institute for Nanotechnology, and Alexander Stegh, PhD, associate professor of Neurology in the Division of Neuro-Oncology, the novel glioblastoma drug has been shown to cross the challenging blood-brain barrier to reach intracranial tumors in animal models. In the phase 0 clinical trial that is ongoing, the drug targets the gene BCL2L12 to promote therapy-induced apoptosis or cell death in glioblastoma. The study seeks to determine if systematically administered nanoparticles do, indeed, reach tumors cells in patients with deadly brain cancer.

A second Northwestern SPORE project involves a first-of-its-kind clinical trial employing neural stem cells that work with a common cold virus to infect and kill tumor cells. Developed by Lesniak, the drug is injected throughout the brain cavity during the time of surgery to remove the tumor. The phase I study aims to show that the novel stem cell therapy, which targets cancer cells hiding deep within the brain that are normally resistant to therapies, can be safely administered to patients newly diagnosed with GBM and ultimately improve outcomes. To date, eight individuals have participated in the clinical study and the results have been promising. Says Lesniak, "All of the patients have been doing favorably, so we are cautiously optimistic and looking ahead to a phase II study next year if all continues to go well."

WEAKENING TUMOR SURVIVAL

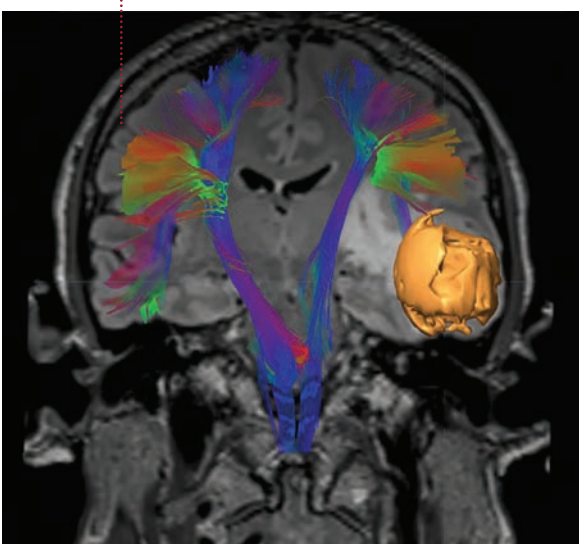
Ironically, as patients battle to outlive their brain cancer, their tumors often find ways to survive as well. The capability of tumors cells to protect themselves frequently reduces the effectiveness of the most advanced cancer treatments.

The third project, co-led by Derek Wainwright, PhD, assistant professor of Neurological Surgery, Medicine in the Division of Hematology and Oncology, and Microbiology-Immunology, and Rimas Lukas, MD, associate professor of Neurology, uses immunotherapy to stimulate an immune system anti-tumor response against glioblastoma. The Wainwright laboratory has studied the influence of an enzyme known as IDO1, which is found in many types of tumors. Overexpression of IDO1 in glioblastoma is associated with decreased overall survival. Devising strategies to block the enzyme with already approved and available pharmaceutical IDO1 inhibitors, the team plans to bring this novel concept to the clinical trial stage next year.

The final project focuses on a glioblastoma survival mechanism known as autophagy, a natural process that tumor cells employ for self-preservation when avoiding cell death

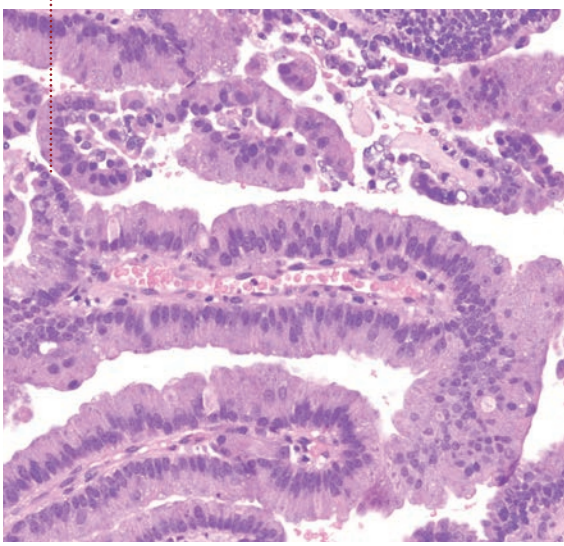
PHOTOGRAPHY COURTESY OF *Northwestern Medicine*

A functional MRI image shows presurgical brain mapping of the critical motor and language white matter pathways around a glioblastoma tumor for a patient enrolled in the SPORE project testing a novel neural stem cell treatment.



Roger Stupp, MD, and James P. Chandler, MD, co-directors of the Malnati Brain Tumor Institute.

Adamantinomatous craniopharyngioma, a rare tumor arising from small nests of cells near the pituitary stalk. Northwestern Medicine investigators and clinicians study and treat a myriad of tumor types beyond the new SPORE.



from standard cancer therapies such as radiation and chemotherapy. Based on a novel activator of autophagy known as ATG4B, recently discovered by Professor of Neurology Shi-Yuan Cheng, PhD, this project will investigate the effects of inhibiting this enzyme while treating animal models with either radiotherapy, the chemotherapy drug temozolomide (TMZ), or a combination of radiotherapy and TMZ.

The latter combined approach for treating GBM is known across the globe as the "Stupp Protocol" — named after renowned neuro-oncologist Roger Stupp, MD, who joined Northwestern Medicine in 2017. Stupp and Leonidas Platanias, MD, PhD, director of the Lurie Cancer Center and the Jesse, Sara, Andrew, Abigail, Benjamin and Elizabeth Lurie Professor of Oncology, are co-investigators on this SPORE project, which will also investigate an associated inhibitor, NSC185058, for possible use in patients.

In 2017, the Lou Malnati Cancer Research Foundation made a transformative gift to the Northwestern Brain Tumor Institute, now named the **NORTHWESTERN MEDICINE LOU AND JEAN MALNATI BRAIN TUMOR INSTITUTE**. James P. Chandler, MD, and Roger Stupp, MD, are co-directors of the institute, which is part of the Lurie Cancer Center with clinical operations at Northwestern Memorial Hospital. C. David James, PhD, is the scientific director, overseeing research efforts like the new brain tumor SPORE projects.

MORE SPORE

Prostate Cancer Research Thriving

Moving from bench to bedside in just five years may sound like a daunting task, but the Lurie Cancer Center's Prostate Cancer SPORE is on track to produce tangible benefits for patients as it enters its fourth year, according to principal investigator William Catalona, PhD, professor of Urology.

"Five years is a tight timeline to bring something from the research bench to a clinical trial," Catalona says. "But it brings together the clinicians and basic scientists, gets them focused and the ball moving to help patients."

Out of four current SPORE projects, two are running clinical trials and one is under review by Northwestern University's Internal Review Board, hoping to improve androgen-receptor therapies or test new targets for advanced prostate cancer treatment. The fourth project, run by Catalona, is currently genotyping DNA samples from over 6,000 patients who are undergoing active surveillance, looking for patterns in genetic variants that can cause active surveillance to fail.

Key to these efforts has been the recruitment of expert clinical trialists, urological oncologists and basic scientists.

"We've strengthened our clinical trial portfolio, especially in designing and administering trials based on science that's come out of Northwestern," Catalona says.

"I THINK BY THE TIME OUR FIVE YEARS IS UP, WE CAN POSSIBLY HAVE SEVERAL NEW TREATMENTS FOR PROSTATE CANCER THAT DIDN'T EXIST BEFORE OUR SPORE."

In addition, several pilot projects led by Prostate Cancer SPORE scientists have sprouted into fully fledged investigations, spurring additional investment into Northwestern Medicine science, including four Challenge Awards from the Prostate Cancer Foundation.

"The reason these SPOREs are successful is because the institution has recruited the scientists, clinicians and pathologists," Catalona says. "I think by the time our five years is up, we can possibly have several new treatments for prostate cancer that didn't exist before our SPORE."

– Will Doss

WRITTEN BY
EMILY AYSHFORD

ILLUSTRATION BY
KASIA BOGDAŃSKA

fighting cancer, becoming an adult

Teens and young adults with cancer get support from a special oncology program.

Jennifer Bohannon was just 24 years old when she began to feel sick. She was nauseated, woke up sweating in the middle of the night and was unable to walk upstairs without feeling out of breath. But because she was young, in shape and seemingly otherwise healthy, getting a diagnosis was difficult.

"No one could figure out what it was," she says. She was told to try changing her diet, but she knew it wasn't as simple as that. "I knew something was wrong. I had to learn to be an advocate for myself to find the answer."

The experience was similar for Graham Ikler, who had been feeling sick during the final weeks of his sophomore year of high school in the Chicago suburbs. Visit after visit to his pediatrician turned up nothing.

When their diagnoses finally came, they seemed like the worst-case scenario: cancer. Yet both patients were more relieved than upset. They finally had a roadmap for treatment, a path to getting better. But what they didn't anticipate were the particular struggles of being young adults with cancer. Neither pediatric nor geriatric, they would face unique hurdles, both biological and psychological.

Helping them on their journey was the Adolescent and Young Adult (AYA) Oncology Program of the Robert H. Lurie Comprehensive Cancer Center of Northwestern University. The program aims to help 15- to 39-year-old cancer patients navigate the healthcare system, find the best treatments and deal with the psychological effects of life-changing diagnoses and chemotherapy so they can be successful both during treatment and as cancer survivors.

"We're trying to save their lives," says Stacy Sanford, PhD, associate professor of Psychiatry and Behavioral Sciences and co-founder of the program. "A lot of young adults with cancer go on to live very long lives, but they are at risk of having other health issues as a result of treatment."

feeling out of place

When Bohannon finally got a CT scan and a diagnosis of stage four Hodgkin's lymphoma, she was connected with Leo Gordon, MD, the Abby and John Friend Professor of Oncology Research in the Department of Medicine's Division of Hematology and Oncology and a physician at the Lurie Cancer Center.

"After they read me the result of the biopsy, I felt relieved," Bohannon says. "I just exhaled. I'm competitive, so I said, "Show me how to win this."

When Gordon recommended six months of chemotherapy, Bohannon's parents asked if she would like to move back to their Michigan home so they could help her through treatment. She thanked them, but declined their offer.

"I was very adamant about it not disrupting my life," she says. She wanted to keep moving forward professionally, so she scheduled her chemotherapy appointments for Thursdays. That allowed her to recover over the weekend and return to work on Monday.

But soon she found herself becoming more of an adult than she imagined. When she arrived for her first chemotherapy infusion, she immediately felt out of place.

"You think, 'What am I doing here? These people are the same age as my grandparents,'" she says. And because chemotherapy can cause infertility, she was asked whether she wanted to freeze her eggs.

"I was 24. I wasn't thinking about starting a family," she says. "But I've known since forever that I wanted to be a mom, so we decided to do everything to cover my bases."

learning how to help

Each year, about 70,000 adolescents and young adults between the ages of 15 and 39 are »

diagnosed with cancer in the United States, almost six times the number of cases diagnosed in children up to 14 years of age. But hospitals did not think about a systematic way to help members of this large population address the unique, potentially life-changing issues they face as cancer patients until the last 15 years, says Sanford, also a professor of Medical Social Sciences.

As a psychologist with a specific interest in helping cancer patients, Sanford became part of a task force with the LiveStrong Young Adult Alliance in 2009 that looked at how best to help young adults with cancer. A landmark report by LiveStrong and the National Institutes of Health showed that while survival rates for pediatric and older adult cancers had seen great strides in recent years, teen and young adult survival rates remained stagnant. Meanwhile, as patients, teens and young adults are generally less likely to participate in clinical trials.

"We know that biologically, they are different than both children and older adults," Sanford says. "We're still learning about how best to treat them."

Mentally, these young people are becoming adults and in the process of creating their own lives. They must also consider how to prepare for their future through processes like fertility preservation.

"You're still physically developing and trying to fit in as you finish high school or college or start a career. You're dating and building relationships," Sanford says. "It's all a little fragile. People get derailed."

In 2009, Sanford teamed up with Jennifer Reichek, MD, MSW, a pediatric hematologist-oncologist at Ann and Robert H. Lurie Children's Hospital of Chicago, to start the AYA Oncology Program. Since then, a working group of physicians and faculty members has met regularly to look at research, awareness and outreach, and standards of care for this population, while Sanford and Reichek have coordinated special programs, like a monthly support group and a patient advisory board that puts on events for survivors.

"The goal was really to broaden what Northwestern as a whole was doing in all of those areas," says Reichek, also an assistant professor of Pediatrics in the Division of Hematology, Oncology, and Stem Cell Transplantation at Feinberg.

going backwards

After Ikler got his diagnosis of T-cell lymphoblastic lymphoma, he spent the next nine months in and out of Lurie Children's, getting an aggressive regimen of chemotherapy. Because he was only 16 at the time, his parents were there, spending each night with him and providing support as he experienced "every side effect you can imagine." But they also recognized that this experience had given him a fast-track to adulthood and the opportunity to be an independent self-advocate, so they consulted him before talking to his doctor.

"They said, 'We want to know what's happening, but if you don't feel comfortable, it's your body, and we won't,'" Ikler recalls.

His time in the hospital was tough. As a teenager, he was supposed to feel invincible, but instead he was surrounded by sick children much younger than him. He only ever saw one or two other patients his age.

"You feel like you're going backwards," he says. "When I had my spinal taps, they asked, 'Do you want the bubble machine?' And I'm like, 'Do I look like I want the bubble machine?'"

Reichek met Ikler when he was in the hospital and encouraged him to take part in AYA programming.

"Teenagers feel very out of place with bald two-year-olds," she says. "There is nobody else like them who has cancer. They feel different from their friends and people who were their support system before."

processing what happened

When Ikler finished his treatment and returned to high school for his senior year, he found he had become much more mature than his peers, who often complained about small things, like homework.

"I was like, 'Why are you complaining about that? Just do it,'" he says. "They hadn't experienced the year of life that I had. I had grown up so much faster."

Three years later, his cancer is in remission, but he is still dealing with side effects from treatment, both physically — he recently had his hip replaced — and mentally. He meets with a therapist to talk about what he went through, and what that means for his future.

"Will my cancer come back, and if it does, will I succeed in life?" he says. "Those questions really stress me out."

Bohannon did not think about those issues during treatment either — instead she was focused on getting through her six months of aggressive chemotherapy. When she finished in fall 2012, her cancer was gone, and she joined the AYA program's Board39, the patient advisory board of teen and young adult cancer survivors.

"Board39 is an incredible group of people who went through exactly what I went through," she says. "We want to make this process better for people who are diagnosed at our age."

Through the board, she began helping plan group outings and survivor talks and mentoring other young women who had been diagnosed with cancer, on everything from fertility preservation to tying head scarves.

But she realized then that she hadn't taken the time to understand what effect the cancer had on her life. Would she be behind in her career? What if she got sick again? She sought out Sanford for help.

"I was so eager to get back to a normal life that I just pushed through it," she says. "Stacy helped me get back on track and process what happened."

planning for the future

To help expand their offerings, Sanford and Reichek began working with nonprofit Teen Cancer America three years ago, and this June the organization awarded the Lurie Cancer Center a grant of nearly $500,000 for the AYA program. The first move will be hiring a patient navigator who can ensure teens and young adult patients have access to important standards of care such as clinical trials, financial counseling and mental health resources. That navigator will begin by connecting with patients under 30 who have been diagnosed with leukemia, lymphoma, sarcoma and brain tumors, with the goal of expanding to other disease groups and to all patients under 40.

"Someone who can field all those questions for us will be incredibly helpful," Bohannon adds.

Though they are still planning for the future, both Reichek and Sanford dream of a specific space for this group — whether it's a dedicated chemotherapy infusion center or just a lounge where patients can meet other people in their situation.

That would make the experience much better for teens, says Ikler, who spoke at the

"So I said, 'Show me how to win this.'"

1 Cancer survivor Graham Ikler during treatment at Lurie Children's Hospital; **2** Chicago Cubs player Anthony Rizzo with a message of encouragement for Ikler; **3** Ikler after treatment, back on his bike; **4** Cancer survivor Jennifer Bohannon with her fiancé after completing her first half marathon post-treatment.

award announcement. "It would be great if they offered the same options for us as they did for young kids," he says.

thankful all the time

For teens and young adults with cancer, learning to become their own advocates in the hospital shifts to learning to become themselves again once back to their daily lives.

After she finished chemotherapy, Bohannon began to find her strength by jumping rope in her apartment. The first time, she did 20 jumps. Soon she was doing 50. Before long, she was doing several thousand. Then, she slowly began to run.

Three years after her diagnosis, she ran her first half marathon. Now, at 30, she is training with her fiancé to run a marathon this fall.

"It took a few years before I looked in the mirror and recognized the person looking back at me," she says. "Now not only can I run — I can run in the morning, go to work for a full day, and do something after work and not feel exhausted. I'm thankful for that all the time."

For Ikler, who is still dealing with joint pain as a result of his treatment, getting back to riding his bicycle helped him feel like his old self. On a recent summer night, he decided to take his bike out for a ride. It had been a long time since he had done that — just ride around in the dark, with no destination and the energy to go for a half hour, then an hour, alone only with his mind.

"It was awesome," he says.

STAR PROGRAM FOR ADULT SURVIVORS OF CHILDHOOD CANCER

For many childhood cancer survivors, questions about the long-term effects from the disease and its treatment can linger well into adulthood. Will the cancer return? Will side effects from treatment put them at risk for other diseases?

The STAR (Survivors Taking Action and Responsibility) Program provides services to survivors throughout their lives, including an annual physical exam, regular medical surveillance tests, consultations and education on how to stay healthy. The program has two components: one at Lurie Children's, which includes survivors up to age 26, and one at the Lurie Cancer Center for adults older than that. The program also provides emotional support through a network of survivors who help each other take control of their lives and stay healthy.

PHOTOGRAPHY COURTESY OF *Jennifer Bohannon and Graham Ikler*

CANCER

WRITTEN BY NORA DUNNE · PHOTOGRAPH BY ANDRE LACOUR

Leonidas Platanias, MD, PhD, was a medical student in Patras, Greece, when his father was diagnosed with leukemia in the early 1980s. It made the task of choosing a specialty easy for the aspiring physician.

"I decided to follow a career treating cancer," Platanias says. "I felt that this was the most important field in medicine, and I still do. I think that everybody without exception has been affected by cancer, and it's by far the biggest health problem we have right now."

Today, Platanias is director of the Robert H. Lurie Comprehensive Cancer Center of Northwestern University, a role that puts him at the helm of clinical operations that serve more than 15,000 new cancer patients each year and a research enterprise that includes more than 100 ongoing clinical trials. In addition to this leadership position, he runs an active laboratory that investigates immune regulation in leukemias and other cancers, and he spends half a day each week in the clinic seeing patients with cancer. He is also an attending physician in the inpatient leukemia service at Northwestern Memorial Hospital, treating patients with acute myeloid leukemia.

"I do many different jobs, but it's important to understand all these different aspects of cancer and to be able to connect them," he says. "That's how the Lurie Cancer Center can have the most impact on our patients."

PRIORITY ON THE PATIENT

After earning his medical degree and PhD from the University of Patras Medical School in 1983, Platanias moved to the United States for a research fellowship at the National Heart, Lung, and Blood Institute. He went on to complete a residency in internal medicine at the State University of New York, Downstate Medical Center, and a fellowship in hematology-oncology at the University of Chicago Hospitals. He eventually became chief of Hematology and Oncology at the University of Illinois at Chicago. In 2002, he was recruited to Northwestern to be the first deputy director of the Lurie Cancer Center; in 2014, he was named its director.

In his sixteen years at Northwestern, Platanias has come to measure success in two ways: "There are academic accomplishments, and there are accomplishments that improve the lives of our patients. Academically, we have done really well, grown exponentially in research dollars from the National Cancer Institute. But to me, research is only important if it can affect the patient. Otherwise it has no meaning," he explains.

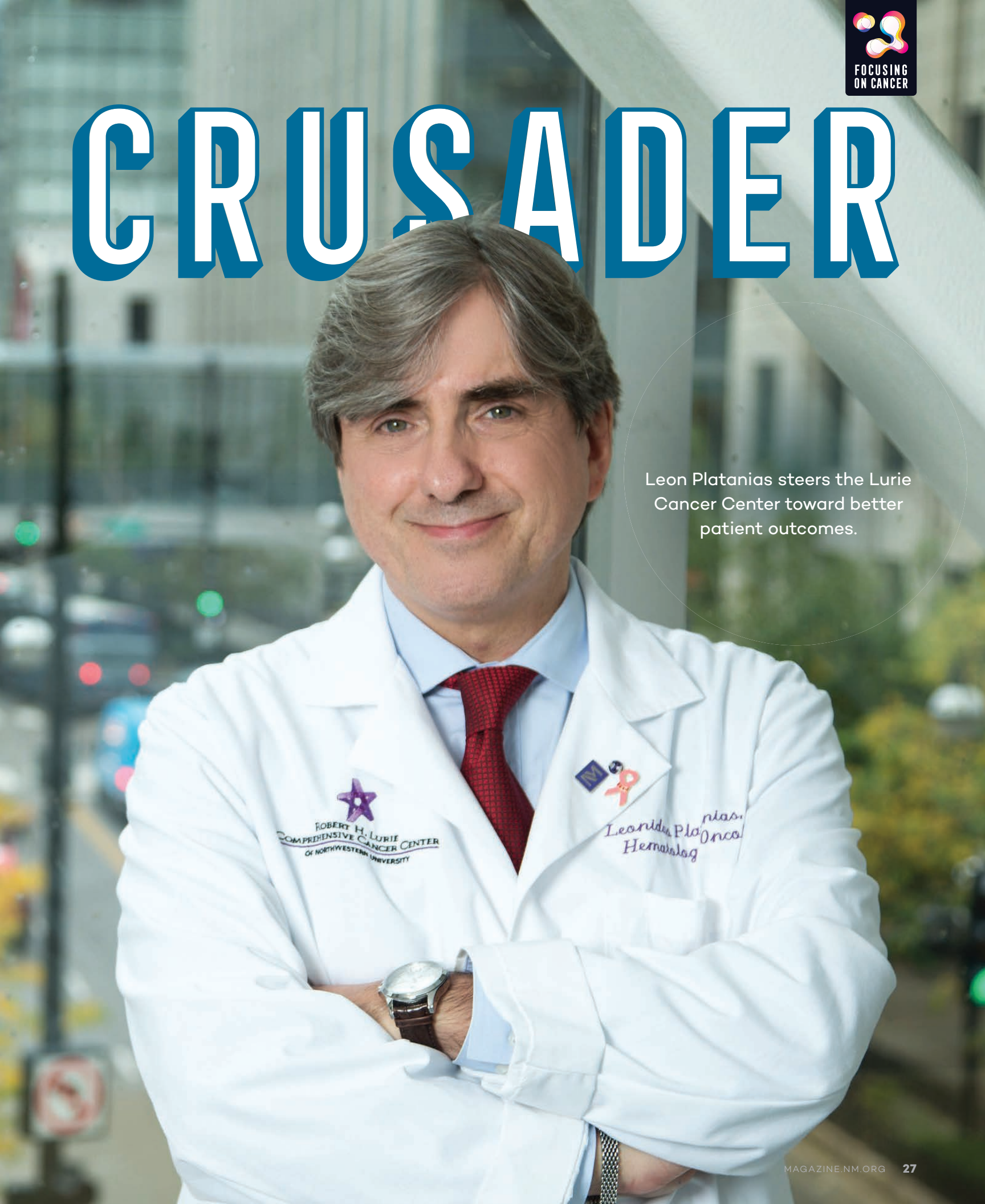
He points to examples that demonstrate how investigators in the Lurie Cancer Center have been able to translate research into new therapies for patients: Deputy Director Maha Hussain, MD, published research this summer in the *New England Journal of Medicine* showing that an existing drug called enzalutamide can lower the risk of metastasis or death in men with non-metastatic castrate-resistant prostate cancer and a rising PSA level. And Lurie Cancer Center members are currently leading two clinical trials testing brand new approaches to treat glioblastoma brain tumors (see page 18).

In his own laboratory, Platanias focuses on signaling pathways in cancer cells and developing therapies that target those pathways. His team has showed how proteins critical to the »

"I THINK THAT EVERYBODY WITHOUT EXCEPTION HAS BEEN AFFECTED BY CANCER, AND IT'S BY FAR THE BIGGEST HEALTH PROBLEM WE HAVE RIGHT NOW."

FOCUSING ON CANCER

CRUSADER



Leon Platanias steers the Lurie Cancer Center toward better patient outcomes.

Q&A

WITH LEON PLATANIAS

What promising area of cancer research do you have your eye on right now?

I think one of the most exciting areas is immunotherapy — stimulating the immune response to fight cancer. If you look at the history of this field, it goes in spikes. It started in the late 1800s by a random observation from a surgeon in New York named William Coley, who realized that cancer was subsiding among a small group of patients who developed a very bad infection. The field gradually evolved and in the 1980s Steven Rosenberg began using immune cells to treat melanoma. Then for a while, immunotherapy was dormant.

Now we understand a little bit more about the mechanisms of the immune system. We have checkpoint inhibitors and CAR T-cells and this kind of treatment is becoming a reality. But we need more basic science work to better understand the system so we could use it more effectively. We need to come up with new breakthroughs, and for this to happen we need more research. We have many investigators at the Lurie Cancer Center involved in this effort.

human immune response called interferons fight cancer cells — for this work, he was awarded the prestigious Milstein Award. He has also identified negative feedback loops in leukemia cells that allow them to survive chemotherapy and other treatments. His group aims to develop novel ways to treat cancer by targeting these feedback loops, some involving targeting of arsenic pathways. In another recent study, his team demonstrated how nanoparticles could be used to target the cholesterol signaling that allows a subtype of medulloblastoma brain tumors to grow.

"We want to be able to offer our patients treatments that will cure them today — treatments that may not become standard care at other places for another decade," Platanias says.

EPIC BATTLE

Despite the achievements the Lurie Cancer Center has made during Platanias' tenure to date, he knows its members face formidable challenges to achieve their mission of decreasing morbidity and mortality caused by the disease.

"Every day we save lives, and that's a huge accomplishment. But the problem is so big and so devastating," he says, pointing to National Cancer Institute analysis that predicts cancer will strike one in two men and one in three women.

He mentions a line in a book he read recently, "The Death of Cancer" by Vincent T. DeVita, a pioneer in chemotherapy treatments: "… as anyone who has ever been diagnosed (or loved someone who has) knows, the impact of cancer on one's body, one's life, and one's family is nothing short of epic."

"Fighting cancer is an epic battle for our patients," Platanias emphasizes. "And that is the way we as a cancer center need to view it as well."

Recognizing cancer's prevalence in the population and its profound effect on individuals, Platanias and the Lurie Cancer Center take many approaches to reach patients on both macro and micro levels. For instance, the center founded the Chicago Cancer Initiative, a collaboration with community organizations to eliminate cancer disparities among low income and medically underserved areas of the city. Meanwhile, Platanias spends a lot of time helping patients navigate the complicated healthcare system, from finding them the right doctor to connecting them to clinical trials.

"We need to remember that clinical research is not just research — it is the best clinical care for a cancer patient," Platanias says.

He believes that the center's top priority needs to be providing the resources and programs that enable basic scientists and clinicians to turn findings in the lab into better outcomes for patients.

"Cancer is not like other diseases, where you give one pill and the disease goes away. Just a fraction of patients are cured," he says. "Even in curable cancers, there are groups of patients that do not get cured. So there is always room to improve the outcomes, and that's why it is so important to get away from the old notion that separates clinical care from research. This artificial separation does not apply to the treatment of cancer."

"TO ME, RESEARCH IS ONLY IMPORTANT IF IT CAN AFFECT THE PATIENT. OTHERWISE IT HAS NO MEANING."

Platanias' father passed away in the late 1980s, only a few years after his leukemia diagnosis. He would have lived longer today with the treatments and tools now available thanks to research like the work conducted by Platanias and his team at the Lurie Cancer Center.

LEFT PHOTOGRAPH BY *Launch Digital Media* • RIGHT PHOTOGRAPH BY *Laura Brown*

What MDs Can Learn From Successful Entrepreneurs

A letter from Jim Kelly, '73 MD

What do Steve Jobs, Bill Gates and Jeff Bezos have in common? My first guess was that they were not MDs — I got that one correct. My second guess was that they were all successful founders of world-changing companies — I was two for two. But the real trait they had in common was that the growth rates of their businesses as reflected in market capitalization peaked when the founders were middle-aged. Well, two out of three will get me in the White Sox's lineup.

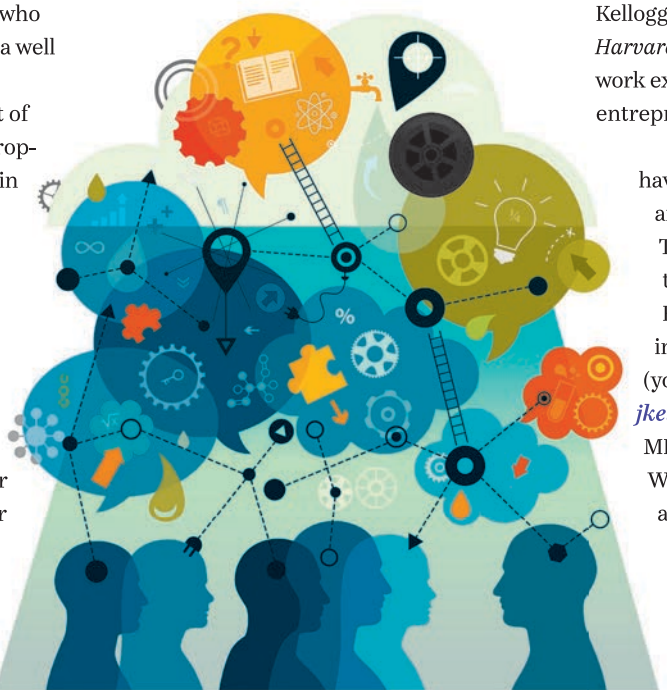
In the July issue of the *Harvard Business Review*, Pierre Ayouley, PhD, Benjamin Jones, PhD (from Northwestern's Kellogg School of Management), J. Daniel Kim and Javier Mirande, PhD, wrote an article called "Research: The Average Age of a Successful Startup Founder is 45." It has a message for all of us, not just those of us in medicine trying to marry medicine and business in an early career, but also those of us with a longer history in clinical medicine who have seen a persistent problem and have a well thought-out solution.

The authors focused on a specific set of criteria: whether firms had intellectual property, venture capital investment, worked in an industry with a high number of STEM majors and location in/near an entrepreneurial hub. The main conclusion: the average age of successful high-tech founders falls in the early forties when following the above criteria.

The dominance of middle-aged founders reflects the fact that more middle-aged people start ventures. Also, older entrepreneurs have a substantially higher success rate. The research in this article substantiates the fact that entrepreneurial performance rises sharply with age before cresting in the late fifties. The authors found that work experience plays a critical role in the success of these ventures. In fact, with at least three years of work experience in a narrow industry, entrepreneurs were 85 percent more likely to found a successful startup.

While the investigators are continuing to explore the advantage that middle-aged founders have in common, be it greater access to financial resources, deeper social networks or work experience, I think this article has several lessons for physicians just finishing their training and for those of us who have spent 15 years or more in the "trenches."

First, and primarily, not everyone is cut out to be an entrepreneur. To be successful, entrepreneurs need to embrace failure and challenge their comfort zone. In medicine, clinicians need to make a successful relationship with patients their priority. Failure to diagnose disease processes and the inability to refer patients to a specialist when we don't know the answer are not the tickets to a successful medical career.



So I propose a couple of different routes for those interested in a combined career in medicine and innovation/entrepreneurship. Everyone's primary aim should be to be a well-trained physician wherever that takes you. But my advice to younger MDs: After your training, while searching for a group of physicians to work with, discuss your interests in medicine but assess their receptivity to post-MD education and post-MD involvement in governmental affairs and hospital administration. Going forward, with five to seven years of clinical experience behind you, then decide if you even need an MBA. The opportunities for a part-time MBA or executive MBA are everywhere, but you need experience so that you can see the problems and possible solutions in clinical medicine. (I waited until 2007 to complete my MBA from Kellogg.) I'm sure that further research by the *Harvard Business Review* authors will show that work experience has the major effect on why entrepreneurial success comes with middle age.

And to the seasoned clinicians who have identified a problem in their specialty and come up with a great solution: Talk to other MDs who have identified this problem and bring your idea to us at Feinberg or to a healthcare technology incubator like MATTER in Chicago (you can even contact me directly at *jkelly1946@gmail.com* or Marcelo Malakooti, MD, at *m-malakooti@northwestern.edu*). We can help you get oriented to the available resources.

We would love to hear your stories on how you solved a clinical problem in medicine with an innovative idea. Please share by contacting us at *medcommunications@northwestern.edu.*

FDA Stalwart Janet Woodcock looks to the future of drug making and regulation.

MODERNIZING MEDICINES

Janet Woodcock, '77 MD, is one of the most powerful women in the pharmaceutical sector. As director of the U.S. Food and Drug Administration's Center for Drug Evaluation and Research (CDER), she has final say on which drugs are approved for use in the United States and oversees how the agency manages emergent drug risks. During her 30-year-plus career, she's found herself at the center of some of the biggest controversies in medicine — including the investigation of contaminated heparin and debates about side effects from blockbuster drugs like antidepressants and nonsteroidal anti-inflammatory drugs. She's served at the agency through six U.S. presidents and testified before Congress more than 50 times.

"It's an ongoing intellectual challenge," Woodcock says. "It's the intersection of science and medicine and law and policy."

She's been both applauded and criticized for her work modernizing the agency and for promoting more cooperation with the pharmaceutical industry. She helped ensure that the FDA was using the most advanced tools and science to evaluate new drugs through the Critical Path Initiative launched in 2004. She also collaborated with Congress and the Obama administration to craft the 21st Century Cures Act passed in 2016, which will provide the agency with $500 million over nine years to further accelerate the development of new drugs, among other things.

Her approach to drug safety is pragmatic. "None of them are completely safe," she says. "They all cause side effects. The question is: Can you manage them and keep the benefits outweighing the risks?"

WRITTEN BY *Bridget M. Kuehn* • ILLUSTRATION BY *Jacqui Oakley*

WOODCOCK'S CAREER TRAJECTORY

1977
Graduated Northwestern with MD

1986
Joined the FDA's Center for Biologics Evaluation and Research

Served as director of the Office of Therapeutics Research and Review

Oversaw approval of the first biotechnology-based treatments for multiple sclerosis and cystic fibrosis

1994
Became director of the FDA's Center for Drug Evaluation and Research, a role she has held off and on for two decades now

Led the FDA's effort to modernize drug manufacturing and regulation

Launched initiative to move medical discoveries from laboratories to consumers more efficiently

Introduced programs to improve drug safety management

To help the agency better track the safety of drugs over their lifespans, she launched the FDA's Sentinel Initiative and the Safe Use/Safety First program in 2009. She was also a proponent of the Risk Evaluation and Mitigation Strategy, which the FDA uses to keep physicians updated on emerging drug risks and to develop safety plans with drug makers.

Having a good foundation in chemistry and general biology from her undergraduate degree at Bucknell University and her medical degree at Feinberg have proved critical to Woodcock's career.

"I got a very nice solid education in medicine at Northwestern," she says. "All my training, I use every day."

Woodcock says she wasn't looking for a career in regulation when she first started at the FDA in 1986, just a job that would be suitable for her. She had relocated to Maryland with her husband and their 3-month-old child after her husband took a job in the area. The agency was interested in her experience investigating monoclonal antibodies. She landed a position in the Division of Biological and Investigational New Drugs at the FDA's Center for Biologics Evaluation and Research in the midst of the biotech revolution.

"I didn't know anything about the FDA," she recalls. "I couldn't believe the kind of things they were involved in because they're right at the forefront as science is going into humans."

Over the years, Woodcock has served in many director-level positions, and as the agency's deputy commissioner. During her tenure, the agency has had to adapt to a rapidly changing drug market.

"The generic industry has exploded over the time I've been here, and now 90 percent of prescriptions dispensed in the country are generic," she says. To make sure the agency keeps pace, she helped bring about a program that charges generic drug makers user fees to cover some of the costs of FDA oversight.

Currently, Woodcock is also serving as acting director of the Office of New Drugs, where she is working to modernize the way its staff reviews new drug applications. She explains that in the past applications would arrive as a "tractor trailer-load worth of papers" and staff would review them, making handwritten notes. Now, standardized data arrive electronically.

With rising costs and growing drug shortages becoming pressing concerns, Woodcock and her colleagues are also striving to improve how the pharmaceutical industry makes drugs. She says that many drug manufacturers have continued to use processes that are essentially a scaled-up version of drug compounding.

"They just continue this very old-fashioned method," she explains. "It's quite expensive, and it's quite prone to errors and problems."

> ***"It's an ongoing intellectual challenge. It's the intersection of science and medicine and law and policy."***

Meanwhile, manufacturers of chemicals, food and other products have moved on to more sophisticated, efficient and precise processes that lead to uniform results. For example, she notes, every M&M candy has a uniform coating. So, she and her colleagues are helping pharmaceutical manufacturers get up to speed through the Pharmaceutical Quality for the 21st Century program, which was launched about a decade ago.

"It'll take time because there's investment involved in switching to more advanced manufacturing techniques," she says.

While her list of policy accomplishments is long, Woodcock says she's most proud of her role in building the CDER into an organization capable of keeping up with rapid changes in science, medicine and politics.

"My biggest accomplishment is turning the CDER into an organization that can continue to deal with the numerous challenges that we face all the time," she says.

Honoring the Legacy of Alumnus and Former Faculty Member John G. Bellows

John G. Bellows, MD, '35 MS, '39 PhD, served on Feinberg's faculty for 36 years. Recently, his son Randall T. Bellows, '71 MD, honored his father's legacy at Northwestern with a philanthropic commitment to support education initiatives at the medical school.

"John Bellows was a visionary, and through his teachings, surgical techniques, instruments and many students, that vision has been carried forward in millions of people," said Randall Bellows. "His children, myself included, learned from him that helping others is our surest way to achieve a meaningful life."

A Notable Career in Ophthalmologic Innovation

The late John Bellows was a gifted ophthalmologist, inventor, professor and prolific author. He was born John Goldfreed Bellokovsky in Russia in 1903. His family came to the United States in 1907, where their Bellokovsky surname was changed to Bellows. His father worked as a candy maker selling his product on the street corners of Chicago.

Bellows was a pioneer in cryosurgery — the use of super-cold for removal of cataracts in the eye — and invented a widely used surgical instrument for the procedure. Another one of his inventions, the principals of which are still in use today, is the autorefractor. This measures eyeglass prescriptions automatically with enhanced accuracy.

After earning his bachelor of science and his medical degree from the University of Illinois at Chicago in 1927 and 1930, respectively, he earned a master of science from Northwestern in 1935. In that same year, he joined Northwestern's medical school faculty as an associate clinical professor of Ophthalmology. He received his doctorate from Northwestern in 1938 and went on to ascend the ranks at Northwestern, eventually retiring as associate professor emeritus in 1971. He also served in the United States Army Medical Corps in World War II and attained the rank of major.

> **Like light, ophthalmic knowledge is unmeasurable and bounded only by the vision of those who seek it.**
>
> From "A View to the Future," written in 1972 by John G. Bellows, MD, '35 MS, '39 PhD, and his son, then-recent Feinberg graduate Randall T. Bellows, '71 MD.

In the 1970s, Bellows founded Mediphone, a nationwide service that put licensed physicians in contact with specialists of many varieties to assist in diagnosis and treatment via telephone. With the development of the internet, Bellows' vision of the future is now being realized in numerous business endeavors that connect physicians and patients, thus saving time and lives. Mediphone was a nonprofit extension of the American Society for Contemporary Medicine and Surgery, which Bellows also founded and directed.

A devoted husband and father, Bellows and his wife, Mary, had five children: Randall, David, Diane, Deborah and Sandra. He passed away in 1993.

WRITTEN BY *Andrea Arntsen-Harris*

The Investiture of Jayesh Mehta and Seema Singhal

On June 21, Jayesh Mehta, MD, and Seema Singhal, MD, were invested as the Chez Family Professors of Myeloma Research. Endowed professorships represent the highest honor a university bestows upon its faculty. The Chez Professorship was established with a gift from partners Ronald Chez and Athena Marks, longtime Chicago residents and philanthropists.

Mehta and Khan have served on faculty in the Department of Medicine's Division of Hematology and Oncology at Feinberg since 2000. Chez runs a financial consulting firm and has served as a board member, co-founder and director of several private and public companies. Marks worked in media management. With her late husband, Christopher Marks, she co-founded EXCL Communications, which they grew into one of the largest Spanish-language radio station groups in the country.

FOCUSING ON CANCER

Goombay Bash Raises Funds for Basic Science Research at the Lurie Cancer Center

On July 28, more than 1,000 friends and supporters of The H Foundation came together at Chicago's Navy Pier to support breakthrough cancer research at its annual Goombay Bash. For 18 years, The H Foundation has donated crucial funds for basic science research to the Robert H. Lurie Comprehensive Cancer Center of Northwestern University. This year's Goombay Bash raised more than $661,000 for basic science cancer research, bringing the group's cumulative funds raised since inception to more than $8.5 million.

The H Foundation and Goombay Bash were started by a few friends with entrepreneurial spirit who decided to make a difference in the fight against cancer after losing a dear friend to the disease.

White Coat Campaign a Success

Thank you to all the Feinberg alumni and friends who generously provided funds supporting the purchase of white coats for the 160 entering medical students in the Class of 2022. Your gifts are more than coats — they are symbols of encouragement for the newest generation of Feinberg medical students.

PHOTOGRAPHY BY *Nathan Mandell*

PROGRESS NOTES

We'd love to hear from you! Please share your recent news, accomplishments and important milestones with us.

Send your updates and high-resolution photos to **medcommunications@northwestern.edu**. We will publish them in an upcoming issue of the magazine.

1960s

Trent W. Nichols, '69 MD, '76, '78 GME, has a chapter on photobiomodulation and neurofeedback in Alzheimer's dementia in a book edited by Michael Hamblin, PhD, called "Photobiomodulation in the Brain," scheduled to publish in 2019. The chapter is based on clinical trials Nichols' group is conducting at Baylor Scott White Clinic in Temple Texas with Jason Huang, MD. They have demonstrated improvement in clock drawing, Mini Mental State Exam and memory after 28 consecutive days of BID therapy with near-infrared LED light in a placebo-controlled study with eight patients compared to four controls. This chapter complements "Pilot Placebo Controlled Trial of Near Infrared Light Helmet in Dementia Patients testing Memory and Cognition," an article published in the *Journal of Neurology and Neuroscience*.

Nichols is scientific advisor at QuietMIND Foundation and chief marketing officer at Lumineu, Inc.

1970s

Bruce F. Scharschmidt, '70 MD, was the 2018 recipient of the prestigious Service to Northwestern Award. The award is presented annually by the Northwestern Alumni Association in recognition of leadership and service excellence to an alumni group, school or unit, or other University associated program. As Medical Alumni Association (MAA) president, Scharschmidt reorganized and revitalized the MAA National Board. He currently sits on the Board's executive committee, sponsors medical students to attend Northwestern football games, and helps lead mentoring and entrepreneurship initiatives. Scharschmidt is an independent director, co-founder and consultant to biotechnology companies. 1

John Daugirdas, '73 MD, received the Belding H. Scribner Award on October 27, 2018, for his career-long contributions to the practice of nephrology. He has spent many years investigating how best to use various forms of dialysis to treat patients who have chronic kidney disease, focusing on two critical areas: dialysis adequacy and dialysis hypotension.

Daugirdas is clinical professor of Medicine in the Division of Nephrology and Hypertension at the University of Illinois at Chicago. He also serves on the editorial boards of the *Journal of the American Society of Nephrology*, *American Journal of Chronic Kidney Disease*, *American Journal of Nephrology* and *Nephron Clinical Practice*. 2

Janet Woodcock, '77 MD, has been appointed by the United States Government Accountability Office to the governing board of the Patient-Centered Outcomes Research Institute.

Read more about Woodcock on page 30.

1980s

David Aizuss, '80 MD, was inaugurated as president of the California Medical Association (CMA) on October 13, 2018. He will serve as the chief spokesperson for the CMA over the next year. Aizuss is also serving on the American Medical Association Council on Legislation. He continues to be the managing

JOHN DAUGIRDAS, '73 MD, RECEIVED THE BELDING H. SCRIBNER AWARD ON OCTOBER 27, 2018, FOR HIS CAREER-LONG CONTRIBUTIONS TO THE PRACTICE OF NEPHROLOGY. HE HAS SPENT MANY YEARS INVESTIGATING HOW BEST TO USE VARIOUS FORMS OF DIALYSIS TO TREAT PATIENTS WHO HAVE CHRONIC KIDNEY DISEASE, FOCUSING ON TWO CRITICAL AREAS: DIALYSIS ADEQUACY AND DIALYSIS HYPOTENSION.

partner of Ophthalmology Associates of the Valley, a multispecialty ophthalmology group in Encino and West Hills, California, and is an assistant clinical professor of Ophthalmology at the UCLA Geffen School of Medicine and Jules Stein Eye Institute in Los Angeles. 3

Michael Levy, '83 MD, '87 GME, was appointed chief medical advisor for Stryker's Physio-Control and Emergency Medical Services business. Levy is the medical director for the Anchorage Fire Department, the Alaska Section of Rural and Community Health, as well as a number of other agencies. 4

Sheridan Lam, '84 MD, an ophthalmologist, recently published an essay in the *Journal of the American Medical Association* (JAMA) titled "Blinded by Sight," on a unique experience he encountered in restoring the sight of one of his patients.

Lam has also recently been named chartered financial analyst (CFA) charter holder. To earn the highly coveted CFA charter, a series of three exams administered by the CFA Institute must be passed. Lam's lifelong interest in finance and economics has culminated to this tremendous achievement. 5

Kenneth W. Merkitch, '84 MD, '88 GME, a member of Feinberg's Medical Alumni Association National Board, received the Dean's Teaching Award at the University of Wisconsin School of Medicine and Public Health for his work over the past ten years as the clerkship director for the Obstetrics and Gynecology Clerkship at Gundersen Medical Center in La Crosse. Merkitch not only gives the majority of the didactic lectures there, but also runs sessions in the Integrated Center for Education where he teaches students how to manage postpartum hemorrhage and shoulder dystocia, repair fascial incisions and pelvic lacerations, and drain Bartholin Gland cysts. 6

"IT FEELS LIKE I'VE COME FULL CIRCLE. IT FEELS LIKE COMING HOME."
-KAREN JUDY, '88 MD, '91 GME

Greg Kalemkerian, '85 MD, '88 GME, received the Excellence in Teaching Award from the American Society of Clinical Oncology in Chicago in June 2018. Kalemkerian is a professor of Medicine and Associate Division Chief for Faculty Development and Education in the Division of Hematology/Oncology at the University of Michigan. He lives in Ann Arbor with his wife, ***Mary Varterasian, MD, '90 GME***, and two sons who graduated from high school this year. 7

Gabriel M. Kind, '86 MD, '94 GME, was appointed to the American Board of Plastic Surgery Advisory Council and has been nominated to be a director of the board. 8

Melanie M. Novak, '86 MD, '90 GME, has joined Jagannathan Neurosurgery, a neurosurgery, neurology and pain practice that has five offices throughout Michigan. Previously, Novak was with PCA Pain Care Center in Battle Creek, Michigan.

Elizabeth Springer, '86 MD, '90 GME, and her team will join Pinnacle Dermatology as Pinnacle acquires Duneland Dermatology. 9

Alan S. Krasner '87 MD, was appointed chief medical officer of Crinetics Pharmaceuticals, a clinical-stage pharmaceutical company focused on developing therapeutics for endocrine diseases. Krasner was previously a senior medical director at Shire Pharmaceuticals. 10

Karen Judy, '88 MD, '91 GME, worked as an internist for Centegra Health System in McHenry County for over 15 years. On September 1, 2018, she joined the Northwestern Medicine family, specializing in pediatrics. Judy recently celebrated her 30th reunion from Feinberg. "It feels like I've come full circle. It feels like coming home," she writes.

Chuck Peterson, '98 MD (left), and Stephen Gryzlo, MD, '90 GME (right), pose with their sons Josh and Dan, both members of Feinberg's Class of 2022, at Founders' Day in August. Peterson is a medical consultant for the Chicago Cubs during their annual spring training in Arizona, and Gryzlo is the team's head orthopaedic surgeon in Chicago.

ASHLEY GREEN DORIN, '06 MD, WAS AMONG THOSE NAMED IN THE 2018 "40 UNDER FORTY" LIST OF HARTFORD LEADERS BY THE *HARTFORD BUSINESS JOURNAL* FOR HER WORK AS MEDICAL DIRECTOR OF THE VILLAGE FOR FAMILIES AND CHILDREN.

1990s

William Small, Jr., '90 MD, '91, '94 GME, was named medical director of Loyola Medicine's Cardinal Bernardin Cancer Center in July 2018. Small joined Loyola University Chicago Stritch School of Medicine in July 2013, where he also serves as chair and professor of Radiation Oncology.

Joseph Shega, '96 MD, was named senior vice president and chief medical officer for VITAS Healthcare, a national provider of end-of-life care. Shega is responsible for overseeing and leading the medical direction for all VITAS locations in 14 states and the District of Columbia. Board-certified in geriatric medicine and hospice and palliative medicine, he brings 20 years of relevant clinical experience. Shega currently resides in Gotha, Florida.

Chuck Peterson, '98 MD, welcomed his son Josh to the Feinberg family during Founders' Day this August. Josh will be the third generation of Petersons to graduate from Northwestern.

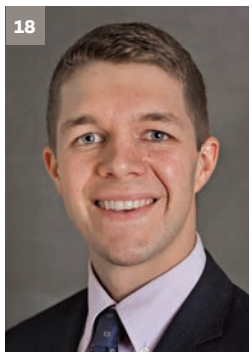
A sports medicine specialist currently living in Mesa, Arizona, Peterson is the team physician for the Arizona Diamondbacks and the local high school. He is also a medical consultant for the Arizona Cardinals, the U.S. Ski Team and the Chicago Cubs during their annual spring training in Arizona. Peterson has traveled to Haiti many times to provide medical care and training, including days after the 2010 earthquake. He and his wife Gayla have five children. 11

2000s

Neil Schwartz, '00 MD, PhD, is currently a clinical professor of Neurology and Neurosurgery (by courtesy) at Stanford University. He serves as vice chair of Education for the Department of Neurology & Neurological Sciences, program director for the Neurology Residency Program, and medical director for the inpatient neurology ward. As a vascular neurologist, he works at the Stanford Stroke Center, where he has recently launched the Young Stroke Program, a clinical, research and educational effort focused on stroke in young adults, ages 16-49.

Schwartz and his wife, ***Ruth Lin, '96 MD***, a medical geneticist in San Francisco, have two wily teenagers. Please contact Neil if you know of any promising students or residents who are interesting in the clinical neurosciences at Stanford. 12

Natasha S. Deckmann, '03 MD, '03 MBA, was recently appointed as chief executive officer of CarePoint Health of New Jersey. Deckmann previously held leadership positions at Optum Health, a health services and innovation company. 13



In Memoriam

Northwestern Medicine expresses its condolences to the families and friends of the following alumni (listed in order of their graduation year) and faculty who have recently passed away. All dates are in 2018.

ALUMNI

Frank J. Kelly, '46 MD
Woodbury, New Jersey
JULY 17

Joseph D. Schweinfurth, '50 MD
Portland, Oregon
JULY 27

Robert Blizzard, '52 MD
Charlottesville, Virginia
JULY 22

Constance Jean "Connie" Eiser, '55 BSPT
Muncie, Indiana
AUGUST 15

Elizabeth Imeson, '56 MD
East Lansing, Michigan
JULY 7

Samuel J. Sallomi, '56 MD
Sobrante, California
AUGUST 1

Robert Burdette, '62 MD
Santa Fe, New Mexico
AUGUST 30

Dana G. Maciunas, '66 MD
San Diego, California
AUGUST 25

Ralph W. Rucker, '67 MD
Haskell, Oklahoma
JULY 7

James M. Laster, '69 MD, MPH
Virginia Beach, Virginia
AUGUST 2

Gail E. Richards, '70 MD
Everett, Washington
AUGUST 30

Richard T. Yates, MD, '75 GME
Porter Ranch, California
JUNE 15

Craig B. Morrow, MD, '91 GME
Las Vegas, Nevada
JUNE 24

Matthew Jared Strouch, MD, '11 GME
Raleigh, NC
JUNE 28

FACULTY

Robert E. Geurkink, '57 MD, '62 GME
assistant professor of Surgery
Wheaton, Illinois
SEPTEMBER 4

Patrick J. Sullivan, '64 MD, '70, '75 GME
assistant professor of Medicine
Chicago, Illinois
JULY 11

Ryan Halpin, '04 MD, '11 GME, joined the Department of Neurological Surgery at Mason General Hospital and Family of Clinics in Shelton, Washington. 14

Brian Helfand, '04 PhD, '05 MD, '06, '11, '12 GME, was named Ronald L. Chez Family and Richard Melman Family Chair of Prostate Cancer by NorthShore University HealthSystem. Helfand, division chief of Urology at NorthShore and director of the John and Carol Walter Center for Urological Health, is also a clinical associate professor at the University of Chicago Pritzker School of Medicine. 15

Maulik Majmudar, '04 MD, has been hired by Amazon, as it broadens its involvement in the healthcare industry. Majmudar, a cardiologist, has been working as an associate director of the Healthcare Transformation Lab at Massachusetts General Hospital, a lecturer at MIT, an assistant professor at Harvard Medical School and a medical adviser at Biofourmis. 16

"THERE IS AN INCREDIBLE AMOUNT OF OPPORTUNITY TO BRING INTO PRACTICE EXISTING TECHNOLOGY AND DIGITAL TOOLS THAT ACTUALLY IMPROVE THE EXPERIENCE AND HEALTH AND WELLNESS OF PATIENTS."
-MAULIK MAJMUDAR, '04 MD, IN A *STAT NEWS* ARTICLE ABOUT HIS NEW JOB AT AMAZON

Ashley Green Dorin, '06 MD, was among those named in the 2018 "40 Under Forty" list of Hartford leaders by the *Hartford Business Journal* for her work as medical director of The Village for Families and Children, a nonprofit behavioral health agency for children, families and adults in the Greater Hartford region.

Eric A. Secemsky, '09 MD, joined the Beth Israel Deaconess Medical Center CardioVascular Institute as director of Vascular Intervention. He is also the newest investigator at the Smith Center for Outcomes Research in Cardiology. 17

William Weber, '17 MPH, '17 MD, was selected to be a scholar in the MERITS program in medical education. He has published in multiple peer-reviewed journals and was recently selected to serve on the public health committee for the American College of Emergency Physicians. Weber was recently engaged to his girlfriend, Molly Crane, who will be attending Northwestern Law in the fall of 2019. 18

DANIEL SIPPLE, DO, '07 GME, IS COFOUNDER OF INSITU BIOLOGICS, A NEW BIOTECH COMPANY THAT IS DEVELOPING A NON-OPIOID PAINKILLER CALLED ANESTAGEL. ANESTAGEL IS IN THE PRE-CLINICAL STAGE AND HAS SOME VERY PROMISING RESULTS, OFFERING A POTENTIAL SOLUTION TO ENDING THE OPIOID EPIDEMIC.

GME

Harold L. Paz, MD, GME '85, was among those named in the 50 Most Influential Physician Executives and Leaders of 2018 by *Modern Healthcare*. Paz is executive vice president and chief medical officer of Aetna and is adjunct professor of Internal Medicine at the Yale University School of Medicine. He is the former senior vice president for Health Affairs and dean of the College of Medicine at the Pennsylvania State University and CEO of the Penn State Hershey Medical Center and Health System. Previously he was dean of the Robert Wood Johnson Medical School.

Stephen Bartlett, MD, '86 GME, a transplant and vascular surgeon, was recently named executive vice president and chief medical officer of the University of Maryland Medical System. 19

Geraldine Fox, MD, '86 GME, was named chair of Psychiatry at the University of Illinois College of Medicine Rockford. Fox will continue to serve as associate dean for Wellness and Resilience for all of the University of Illinois College of Medicine campuses. 20

Joanne C. Smith, MD, '92 GME, was featured in an article titled "The Most Powerful Women in Chicago Business" in *Crain's Chicago Business*. Smith is the chief executive officer of the Shirley Ryan AbilityLab, formerly the Rehabilitation Institute of Chicago. 21

R. Lawrence Moss, MD, '94 GME, was named president and chief executive officer of Nemours Children's Health System, which owns and operates two children's hospitals. Moss previously served as surgeon-in-chief at Nationwide Children's Hospital in Columbus, Ohio. 22

Larry O. Sy, MD, '94 GME, has joined Mercyhealth Roscoe, an urgent care center in Roscoe, Illinois. Sy is an internal medicine physician. 23

Rajani Katta, MD, '98 GME, recently released her seventh book, *Glow: The Dermatologist's Guide to a Whole Foods Younger Skin Diet*. Her advice on skin care and diet has been featured in multiple media outlets, including *O, The Oprah Magazine*, *Self*, *Dr. Oz*, *The Good Life* and others.

The book received a five-star rating from the *San Francisco Book Review*, while *Kirkus Reviews* described it as "accessible, evidence-based advice for those who want radiant skin."

Katta serves on the voluntary clinical faculty of both the Baylor College of Medicine and the McGovern Medical School, University of Texas Houston, and is a member of the Media Expert Team of the American Academy of Dermatology. 24

Hector Cajigas, MD, '03 GME, will join the Mayo Clinic in Rochester, Minnesota, as an associate consultant in the Division of Pulmonary and Critical Care Medicine. Cajigas previously held an appointment

at Northwestern University as associate professor of Medicine in the Division of Pulmonary and Critical Care for three years. 25

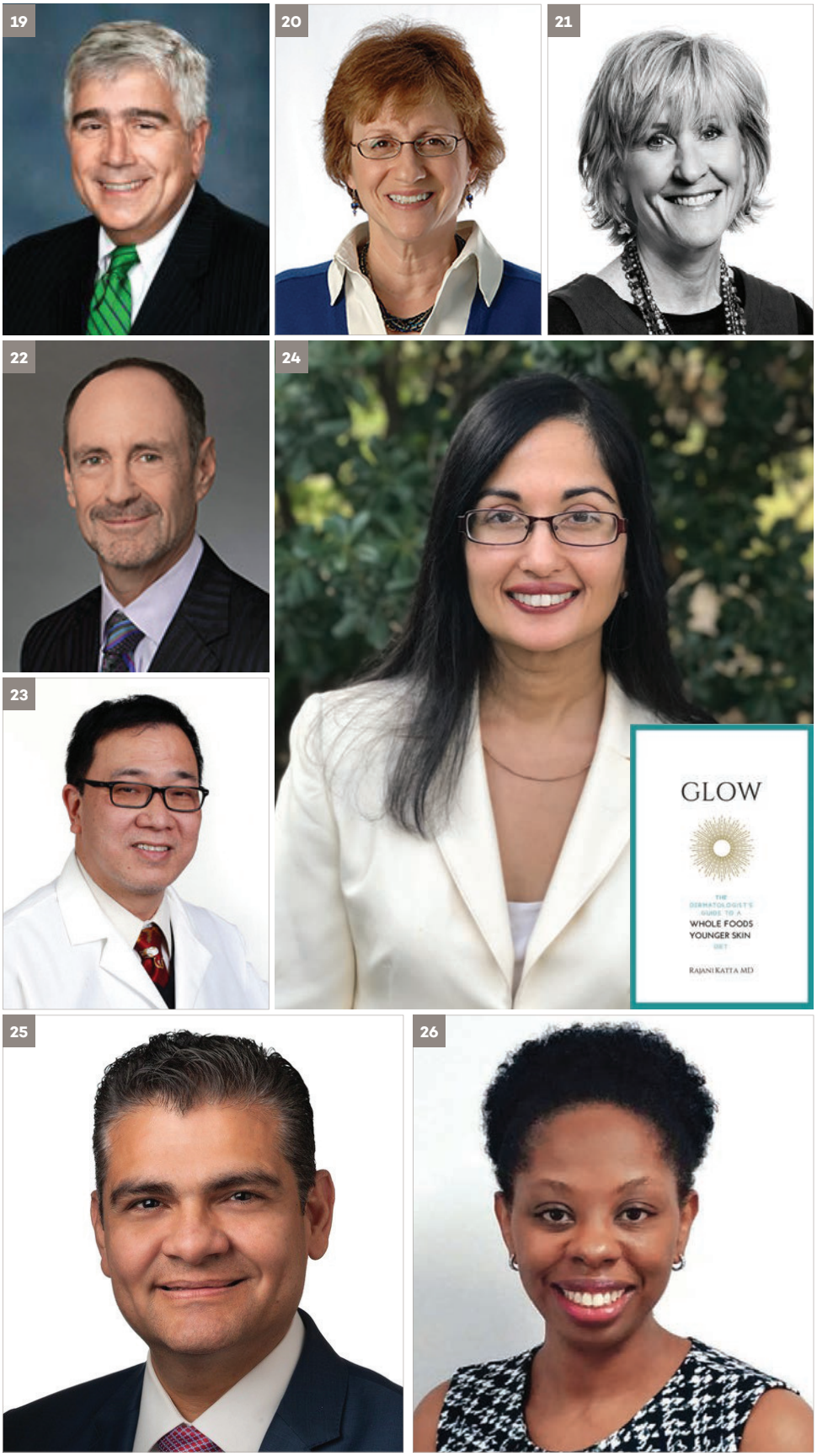
Daniel Sipple, DO, '07 GME, is cofounder of InSitu Biologics, a new biotech company that is developing a non-opioid painkiller called AnestaGel. AnestaGel is in the preclinical stage and has some very promising results, offering a potential solution to ending the opioid epidemic.

Alisha White, MD, '08 GME, was profiled in *The Telegraph*, a newspaper in Alton, Illinois. White, a general practitioner, has opened her own practice in Glen Carbon, Illinois, called Transformative Healthcare. 26

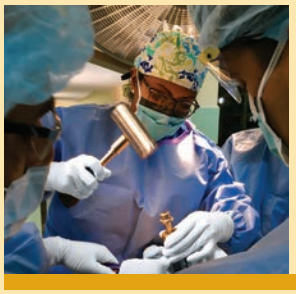
Shanti P. Ganesh, MD, MPH, MS '10 GME, and ***Danielle L. Zelnik, MD '10 GME***, published their first book: *Physical Medicine and Rehabilitation Review Questions*.

Melinda G. Abernethy, MD, '14 GME, joined the Department of Obstetrics and Gynecology at Western Michigan University Homer Stryker, MD, School of Medicine in Kalamazoo, Michigan, as an associate professor specializing in female pelvic medicine and reconstructive surgery. Previously, Abernethy was an assistant professor of Obstetrics and Gynecology at Johns Hopkins University School of Medicine.

Blair Golden, MD, '18 GME, currently the chief resident in internal medicine at the McGaw Medical Center of Northwestern University, received the Barker-Kern General Internal Medicine Housestaff Research Award from Johns Hopkins Medicine. The award is based on her abstract entitled "Learning to be a doctor: Medical students' perception of their roles in longitudinal outpatient clerkships." The research was published in *Patient Education and Counseling* as an invited manuscript for the special issue recognizing excellence at the International Conference in Communication in Healthcare.



WRITTEN BY *Linda Suleiman, MD, '17 GME*



THE RIGHT QUESTION

Inspired by previous generations, a trainee pushes aside societal expectations when pursuing her sub-specialty.

My mother and father grew up in Mogadishu, Somalia, and immigrated to Canada at the height of the civil war. They had never imagined leaving their home in the middle of their thirties and starting anew with three children under the age of ten and my teenage cousin. Before they left, my father worked for the port authority, and my mother was an anesthesiologist. She was from a low-income family (her mother never learned to read or write), but education gave her the opportunity to help others. During the civil unrest, my mother was one of the only physicians who remained in Mogadishu. I always knew I wanted to practice medicine, just like her.

We were displaced to Hamilton, Ontario, but we did not remain helpless in the midst of desperation. My mother and father, two educated Somalis with graduate degrees, worked at the local racetrack doing janitorial work while going back to school. My mother's medical degree was not recognized in North America, and I saw how devastated she was not being able to practice medicine given the hard work, sacrifice and determination it took to achieve that lifelong goal. However, she continued to help others and went on to work for several government agencies that helped new refugees settle in Canada. The fact that my mother could not use her healthcare skills only gave me more drive to become a physician.

"AT NORTHWESTERN, there was an expectation from the beginning that I belonged, that I was valuable and that I had something to offer not only this institution but also my sub-specialty.

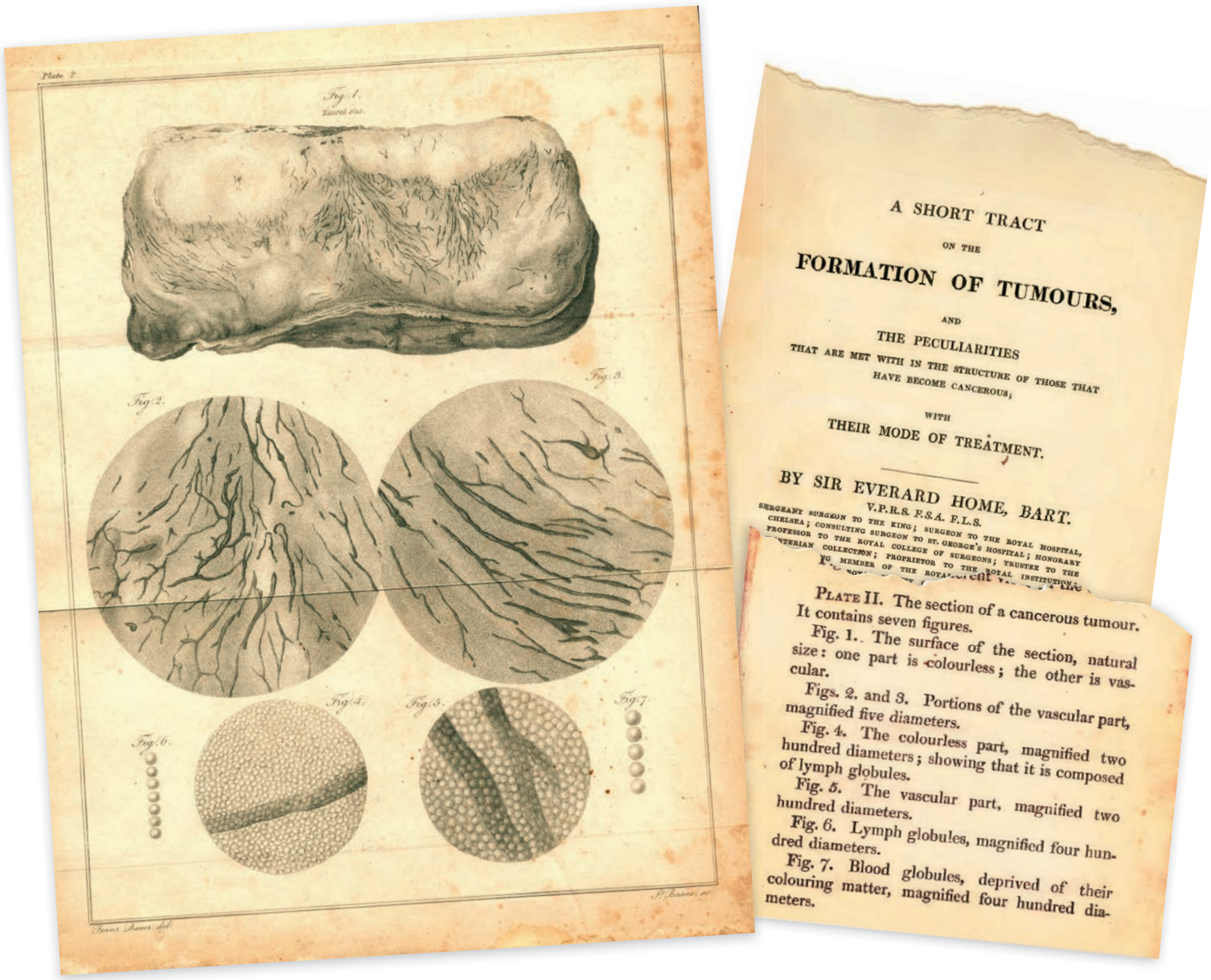
I completed my undergraduate studies in physiology and neurobiology at the University of Maryland, but it wasn't until I attended Howard University College of Medicine that I wanted to become an orthopaedic surgeon. I would walk the hallways and marvel at the pictures on the walls of impactful African-American surgeons like Dr. LaSalle Leffall. These surgeons trained at a time when they were the only doctors providing care for the underserved. They championed access for all at a time in our country when healthcare was a privilege and not a right. Howard gave me the will, purpose and confidence to seek a surgical sub-specialty in which the majority of physicians were Caucasian males. I was in an environment where women and African-Americans were encouraged to pursue orthopaedics, which was not the case for friends of mine at majority institutions. I did not realize this until my first away sub-internship elective. There, I was asked for the first time, "Why are you doing orthopaedics and not pediatrics or OB-GYN?" I went on to hear the same question from 20 other orthopaedic programs.

Northwestern was distinct in my mind, at least initially, because they had a different question. During my fourth-year sub-internship elective at Northwestern Memorial Hospital, I was asked, "What do you hope to accomplish in orthopaedics?" At Northwestern, there was an expectation from the beginning that I belonged, that I was valuable and that I had something to offer not only this institution but also my sub-specialty. I share this story when I talk to medical students of color and women interested in pursuing orthopaedics. I tell them to search for a program that is asking this question, or something like it. I am extremely grateful to Feinberg's Office of Diversity for affording me the opportunity to rotate at Northwestern. From the day I arrived on campus for the residency showcase as a third-year medical student and during my time in the visiting student clerkship, I felt valued and supported.

This fall, I became the first African-American woman to join the faculty in Northwestern's Department of Orthopaedic Surgery. This has weighed on me heavily and pushed me to mentor those who should follow in my footsteps. I owe it to my family, who sacrificed so much, to help bring the next generation forward.

Suleiman is an assistant professor of Orthopaedic Surgery at Feinberg. She performs minimally invasive hip and knee replacements at Northwestern Medicine locations.

ILLUSTRATION BY *Brianna Ashby*



1830

Early Cancer Histology

FIRST PUBLISHED MICROSCOPIC SECTIONS OF CANCER

Sir Everard Home, a British surgeon, was the first to publish histological sections of tumors in his 1830 book, "A short tract on the formation of tumours, and the peculiarities that are met with in the structure of those that have become cancerous; with their mode of treatment." A copy of the book from Northwestern's Galter Health Sciences Library Special Collections shows a plate captioned "the section of a cancerous tumour" with seven figures.

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