



Northwestern Medicine

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WINTER 2021

THE XX/XY FACTOR

A breakthrough Northwestern-led study reveals the ubiquitous impact of biological sex on gene expression.

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No Stopping Science

COVID-19 is presenting many obstacles for Feinberg's research enterprise, but science keeps moving forward. Here, Rebecca Krier (right), research lab manager in the Division of Allergy and Immunology in the Department of Medicine, and Ashley Queener (left), a student in the Walter S. and Lucienne Driskill Graduate Training Program in Life Sciences, work on experiments in a lab while wearing masks and practicing social distancing. You can read more about Feinberg's exceptional year of discovery on page 10.

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ON THE COVER

A 3D illustration of a chromosome. The massive trove of information produced in a new Northwestern-led study (page 18) will lay the groundwork for understanding sex-related differences in health and disease for decades to come.

An Enduring Commitment to Healthy Communities



NORTHWESTERN MEDICINE IS COMMITTED TO HEALTHY COMMUNITIES and is privileged to partner with community organizations across Chicago. Through long-standing partnerships with organizations like Near North Health Services Corporation, Erie Family Health Centers, Chicago Alliance to Prevent Homelessness, and the Midwest Shelter for Homeless Veterans, we provide medical care, food vouchers, and housing grants for those in critical need.

Our employees and physicians contribute hands-on assistance to those in our communities by participating in Team

NM, our workforce volunteer group. Team NM projects range from home rehabilitation and food distribution to mentoring vulnerable youth. We provide students and adults career coaching, hands-on training, and mentorship through partnerships with organizations like George Westinghouse College Prep, a Chicago public high school.

the groundbreaking video series, “Clergy and Clinicians,” which features our medical experts addressing health concerns specific to the Black population.

One of Northwestern Medicine’s core values is Teamwork. Our long-standing community partnerships (which you can read more about in “There to Care” on page 22) have enabled us to deliver

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Our employees and physicians contribute hands-on assistance to those in our communities by participating in Team NM, our workforce volunteer group.

When the COVID-19 pandemic began, these partnerships made it possible for us to quickly understand and address needs in the hardest-hit communities. We responded with vital resources, including personal protective equipment, exposure protocols, and critical information about virus transmission. Through our seven-year partnership with Bright Star Community Outreach in Chicago’s Bronzeville neighborhood, we launched

accessible healthcare and extend outreach efforts to those who need it most.

We are *Better* together.

With warm regards,

Dean M. Harrison
President and CEO
Northwestern Memorial HealthCare

ON CAMPUS

Medical School Research Funding Breaks Records in 2020

Feinberg principal investigators secured a record-breaking \$643 million in research funding and awards during the 2019–2020 fiscal year, an impressive 20 percent increase over the previous year. Despite research challenges presented by a global pandemic, more than \$24 million in awards were awarded to Feinberg investigators for COVID-19-related research.

“This record-breaking year for Feinberg’s sponsored research awards is a tribute to the creativity and innovative thinking of our investigators. This is especially so in a year where the challenge of a global pandemic could have been a great distraction. We can be sure that the discoveries enabled by this external support will contribute to improving the health of our patients,” said Rex Chisholm, PhD, vice dean for Scientific Affairs and graduate education and the Adam and Richard T. Lind Professor of Medical Genetics.

Roughly 28 percent of awarded funds were allocated toward basic science department funding and 72 percent toward clinical department funding. Of the total, \$407 million was awarded by the National Institutes of Health (NIH), an 18 percent increase in funding from the NIH over the previous fiscal year. Individual grant awards included 75 individual research fellowships (F awards), 58 career development awards (K awards), and 36 training grants (T awards).

Approximately 4,169 clinical trials and research studies were conducted at Feinberg in the 2019–2020 academic year, led by 667 principal investigators and 434 principal investigators on NIH grants. Additionally, a total of 83 patents and four new start-up companies were established within the last fiscal year alone.

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MILLION**

secured in
research funding

**\$24
MILLION**

awarded for COVID-19-
related research

**\$407
MILLION**

awarded from the National
Institutes of Health

4,169

clinical trials and research
studies conducted

Feinberg Celebrates Enduring VA Partnership

The VA's groundbreaking affiliation with Northwestern in 1946 became a model for relationships across the country.

This year, the U.S. Department of Veterans Affairs (VA) and medical schools across the country are marking 75 years of academic affiliations. The first of these mutually beneficial partnerships was forged at Northwestern University after the end of World War II by Paul Magnuson, MD, then chair of the Department of Bone and Joint Surgery. Today, the VA partners with 144 LCME-accredited medical schools (and a total of 1,800 educational institutions), including Feinberg at the Jesse Brown VA Medical Center.

After the war ended in May 1945, thousands of wounded U.S. service men and women came back home to heal. The timing wasn't ideal — the Veterans Administration was in the midst of a doctor shortage. Magnuson came up with a novel idea: Staff VA hospitals with medical school faculty and resident trainees. (Read more about this visionary leader on page 41.)

On January 3, 1946, President Harry S. Truman signed a law authorizing the creation of the VA Department of Medicine and Surgery, the forerunner of today's Veterans Health Administration. A few weeks later, the new department set into motion the establishment of academic affiliations, and Northwestern's affiliation with the VA quickly became the blueprint. By 1948, 60 of the country's medical

schools had affiliated with VA hospitals. These relationships would forever change the health of the nation by providing the highest quality of care to veterans, shaping the next generation of physicians, and advancing research discoveries.

"We are incredibly proud that this important and enduring partnership — which

DECADES OF UNWAVERING PARTNERSHIP

On January 4, 1946, 56 medical residents from Northwestern and University of Illinois at Chicago (UIC) began clinical rotations at the Edward Hines, Jr. VA Hospital in Maywood, Illinois, the site of the VA's first academic affiliations. Faculty members from both institutions served as attending physicians.

In the 1950s, Northwestern's partnership with the VA grew stronger with the opening of a new Veterans Administration Research Hospital that occupied a city block steps from the Chicago campus. Later, the hospital affiliated with Northwestern. Serving as a key clinical education and research facility for students, residents, and fellows, the VA changed the name of the hospital in 1975, first to VA Lakeside Hospital and, later, to VA Lakeside Medical Center. For many years, scores of medical school faculty provided high-quality — often subsidized — care

to a deserving and diverse veteran population at Lakeside.

In 2003, the VA shifted inpatient services from Lakeside to its West Side campus hospital, which it began to modernize into the 21st century 220-bed facility it is today.

In 2004, the West Side medical center near UIC was renamed Jesse Brown VA Medical Center in honor of the late Jesse Brown,



Left: Northwestern University Alumni News cover, showing the new VA Research Hospital, steps from the Chicago campus. Right: exterior of the Jesse Brown VA Medical Center.

ensures military veterans receive the care they deserve for their service and sacrifice while our students and trainees have the opportunity to sharpen their skills and broaden their knowledge — started here at Northwestern," says Eric G. Neilson, MD, vice president for Medical Affairs and Lewis Landsberg Dean.



- 1 In 1946, Paul Magnuson, MD, General Omar Bradley, and General Paul Hawley were the architects of the VA Department of Medicine and Surgery, which led to academic affiliations.
- 2 Tim Janetos, MD, and Andrea Birnbaum, MD, in surgery at the Jesse Brown VA.
- 3 Sneha Thatipelli, MD, with fellow residents and medical students at Jesse Brown VA.

“The VA is incredibly supportive of our trainees,” says Joshua Goldstein, MD, senior associate dean for graduate medical education at Feinberg. “For our trainees, caring for veterans is an important mission. It’s an honor. Veterans have served our country, and we want to serve our veterans.”

a wounded Marine Corps veteran and U.S. Secretary of Veterans Affairs under President Bill Clinton. VA Lakeside was torn down in 2009, but the Lakeside VA Clinic still provides primary care — including mental health — services.

Despite the change of venue, the Feinberg School of Medicine’s commitment to the VA academic partnership never wavered.

“VA hospitals attract physicians equally passionate about caring for veterans and teaching trainees,” says Andrea Birnbaum, MD, PhD, associate chief of staff for education at Jesse Brown and associate professor of Ophthalmology at Feinberg. “We have an amazing medical staff at Jesse Brown, and many of them are from Northwestern.”

HONORING SERVICE WITH SERVICE

At Feinberg, VA rotations are integrated into the medical school curriculum. Internal medicine and surgery clerkships introduce many future physicians to veteran care and the VA health system. The McGaw Medical Center of Northwestern University features about 25 residency and fellowship programs with rotations at veteran’s hospitals and clinics. They run the gamut from addiction psychiatry and dermatology to ophthalmology, general surgery, and urology.

During the 2019–20 academic year, about 195 Feinberg medical students and 438 McGaw Medical Center of Northwestern University residents and fellows received their clinical education and training at Jesse Brown.

ENABLING GROUNDBREAKING SCIENTIFIC DISCOVERY

While the delivery of quality clinical care prompted Northwestern’s academic affiliation 75 years ago, it also opened the door to cooperative research studies with the VA that have greatly advanced medicine. Northwestern alumni and faculty have played a significant role in some of the VA’s groundbreaking discoveries.

Of Jesse Brown’s 80 active principal investigators today, 21 are from Feinberg. Currently, 11 medical school faculty members are supported by VA merit awards for 14 research projects, from better understanding the molecular mechanisms of nonalcoholic fatty liver disease to identifying new epigenetic targets in ovarian cancer stem cells.



Students Advance Dialogue

A new student-organized event addresses inclusion.

This past fall, in collaboration with the Office of Diversity and Inclusion, student groups organized the medical school's first Diversity and Inclusion Week.

The virtual event consisted of daily, hour-long sessions exploring a wide range of topics, including self-advocacy in medicine, gender inclusivity and affirmation for non-binary and transgender individuals, diversity and inclusion in surgical specialties, and mental health in the homeless population.

The idea for Diversity and Inclusion Week came about last year but was intensified by the COVID-19 pandemic and summer events spotlighting racial and social injustice, according to Andrea Rustad, a second-year medical student and one of the event's lead student organizers. "Talking about issues of representation and discrimination won't solve the many inequities ingrained in medicine and society, but such conversations have the potential to motivate meaningful action," she said.

Clyde Yancy, MD, MSc, the Magerstadt Professor and chief of Cardiology in the Department of Medicine, and vice dean for Diversity and Inclusion, echoed the importance of answering the call of "a generation-defining moment."

"With this new call, we have appropriately begun to think differently about the intersection of health and society, physiology and sociology, healthcare, and community engagement. I am confident we will emerge as a decidedly better, more equitable, and consistently excellent academic medical center," he said.



Second-year medical student Andrea Rustad (second from left) was one of the organizers of Diversity and Inclusion Week. Here, she is shown with fellow medical students (from left to right) Raheem Bell, Garima Tomar, and Jaafar Zaidi.

Sessions featured a wide range of topics and speakers. Allison Kessler, '12 MD, MSc, '16, '17 GME, assistant professor of Physical Medicine and Rehabilitation, discussed why there are so few individuals with physical, sensory, psychological, and learning disabilities enrolled in medical school in relation to current medical school technical standards. Roopal Kundu, '01 MD, the Jacob R. Suker, MD, Professor of Medical Education, associate dean for Admissions, and founder and director of the Northwestern Center for Ethnic Skin, spoke about the social and medical representation and discrimination of skin diversity, as well as the need for centers and clinics that focus solely on treating skin of color. Brett Lloyd, MD, PhD, '13 GME, assistant professor of Psychiatry and Behavioral Sciences, addressed how to advocate for the needs of individuals with both disability and mental health conditions. And Samantha Schroth, a fourth-year student in the Medical Scientist Training Program (MSTP), shared her story about how a spinal cord injury that left her paralyzed from the chest down

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Diversity and Inclusion Week is a safe, supportive space for intersectional talks connecting members of the Feinberg and greater Chicagoland community.

Andrea Rustad, second-year medical student

helped her realize her true passion for medicine and being an advocate for individuals with disabilities.

"The goal is to learn about challenges in diversity, inclusion, and representation in various facets of health and wellness, as well as strategies to tangibly make an impact on an individual and systemic level," said Rustad. "Diversity and Inclusion Week is a safe, supportive space for intersectional talks connecting members of the Feinberg and greater Chicagoland community."

Virtual Events Promote Scientific Discovery

LES TURNER SYMPOSIUM

The 10th annual Les Turner Symposium on ALS — the first one held virtually — highlighted the ways Northwestern scientists and clinicians have continued their pursuit of knowledge and therapies for amyotrophic lateral sclerosis (ALS). More than 300 people viewed the live-streamed event, sponsored by the Les Turner ALS Center at Northwestern Medicine, which unites all ALS basic science, clinical investigation, and patient care efforts under one umbrella. The Les Turner ALS Foundation, one of the country's oldest independent ALS organizations, established the center.

Sabrina Paganoni, MD, PhD, assistant professor of Physical Medicine and Rehabilitation at Harvard Medical School, delivered the keynote address, outlining the HEALEY ALS Platform Trial, of which she is a co-principal



Robert Kalb, PhD,
director of the
Les Turner ALS
Center and the
Joan and Paul
Rubschlager
Professor

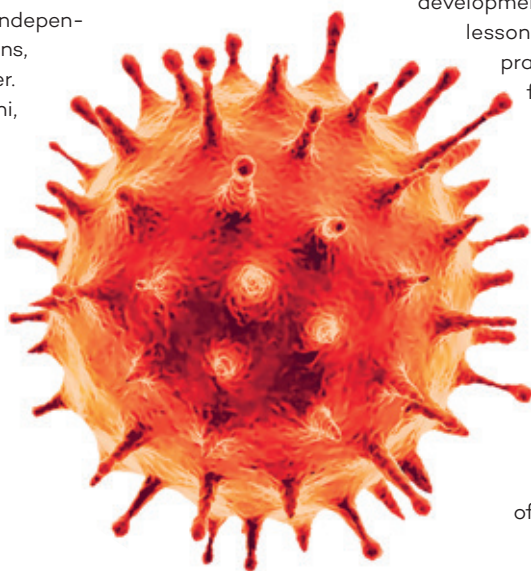
investigator; Robert Kalb, PhD, director of the Les Turner ALS Center and the Joan and Paul Rubschlager Professor, outlined his efforts to improve glycolysis in neurons affected by ALS. Other scientists (from Feinberg and across the country) presented recent scientific discoveries and updates on ongoing efforts to understand basic mechanisms of ALS and find therapies.

GLOBAL HEALTH DAY

Feinberg's Institute for Global Health held its second annual Global Health Day event, titled Global Health in the Pandemic Era. Featuring poster sessions and a keynote presentation, the virtual symposium highlighted the impact of COVID-19 on international development efforts and the lessons global health

practitioners could learn from the experience to improve health around the world.

"Global Health Day is an exciting opportunity to learn about the emerging topics of global health at Northwestern, explore the incredible breadth and depth of research here



in Chicago and around the world, and to connect with our colleagues," said Robert Murphy, MD, '81 '84 GME, the John Philip Phair Professor of Infectious Diseases and executive director of the Institute for Global Health.

Victor Dzau, MD, president of the National Academy of Medicine, the James B. Duke Professor of Medicine at Duke University, was the keynote speaker for the symposium. Dzau highlighted the disruptive nature of the pandemic to global health: many sustainable development goals have been stagnant or even regressed during 2020, as dealing with COVID-19 required enormous healthcare and financial resources.

A virtual poster session featured more than 40 posters on projects relevant to global health, including 23 submitted by trainees.

COVID-19 SYMPOSIUM

The Northwestern University Clinical and Translational Sciences (NUCATS) Institute hosted its first virtual COVID-19 symposium, a two-day event with four keynote speakers and 19 "lightning round" talks from Northwestern medical students, residents, and faculty. NUCATS also offered three \$25,000 Collaborative Innovation Awards to fund new COVID-19 research collaborations that were initiated through the event.

Keynote speakers included Robert Murphy, MD '81, '84 GME, the John Philip Phair Professor of Infectious Diseases and executive director of the Institute for Global Health, Richard Wunderink, MD, professor of Medicine in the Division of Pulmonary and Critical Care, Jaline Gerardin, PhD, assistant professor of Preventive Medicine in the Division of Epidemiology, and Douglas Vaughan, MD, chair and the Irving S. Cutter Professor of Medicine.



Douglas Vaughan, MD,
discussed the
correlation
between elevated
levels of the
PAI-1 protein and
increased risk of
COVID-19.

FACULTY AWARDS & HONORS



1

Three faculty in the Department of Medicine in the Division of General and Internal Medicine and Geriatrics were presented with awards at the 2020 Society of General Internal Medicine Midwest Regional Virtual Meeting:

• **Muriel Jean-Jacques, MD**, associate vice chair for Diversity, Equity and Inclusion in the Department of Medicine, was presented with the award for Advocacy and Community Service. 📷 1

• **Bruce Henschen, MD**, was presented with the award for Excellence in Clinical Education.

• **Anne F. Schultz, '97 MD, '00 GME**, was presented with the Leader in General Internal Medicine Award. 📷 2

Kristine Healy, MPH, PA-C, assistant professor of Medical Education and associate director of the Feinberg Physician Assistant Program, has received the



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Illinois Academy of Physician Assistants' Lifetime Achievement Award for her service and dedication to physician assistant advocacy, education, and clinical practice. 📷 3

Shi-Yuan Cheng, PhD, professor in The Ken and Ruth Davee Department of Neurology in the Division of Neuro-oncology, has been named a fellow of the American Association for the Advancement of Science for his outstanding contributions in molecular and translational cancer research. 📷 4

J. Regan Thomas, MD, '79 GME, professor of Otolaryngology — Head and Neck Surgery, has been named president-elect of the Illinois State Medical Society (ISMS), the largest professional organization in the state representing more than 10,000 Illinois-based physicians. Thomas will assume his new role as president of ISMS in April 2021.



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Alexis Thompson, MD, MPH, section chief of Hematology in the Department of Pediatrics, received the Distinguished Alumni Award from National Medical Fellowships, a non-profit organization that provides scholarships and other support for underrepresented minority students in medicine and health professions.

Neil Jordan, PhD, professor of Psychiatry and Behavioral Sciences and of Preventive Medicine, was named director of the Center for Education in Health Sciences, the education and training center within the Institute for Public Health and Medicine.

Mary McBride, MD, MEd, associate professor of Pediatrics and of Medical Education, was named director of the Feinberg Academy of Medical Educators. McBride succeeds Walter Eppich, MD, PhD, professor of Pediatrics in the Division of Emergency



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Medicine and Medical Education, who has led FAME for three years. 📷 5

Sadiya Khan, MD, assistant professor of Medicine in the Division of Cardiology and of Preventive Medicine in the Division of Epidemiology, was recognized by the American Heart Association for her study defining epidemiologic trends in pre-pregnancy hypertension between 2007–2018. Her study — which highlights the near-doubling in hypertension rates that may potentially be fueling high U.S. maternal mortality rates — was selected as one of the most impactful papers in heart disease.

Susan Quaggin, MD, director, of the Feinberg Cardiovascular and Renal Research Institute, chief of Nephrology and Hypertension in the Department of Medicine, and the Charles H. Mayo, MD, Professor of Medicine in the Division of Nephrology and



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Hypertension, was named president of the American Society of Nephrology, effective January 1, 2021.

Melissa Simon, MD, MPH, '06 GME, vice chair for clinical research in the Department of Obstetrics and Gynecology and director of the Center for Health Equity Transformation in the Institute for Public Health and Medicine, was the recipient of the Weizmann Institute of Science's Vision and Impact Award.

Illinois Governor J.B. Pritzker appointed two Feinberg faculty to serve on the Illinois Adult Use Cannabis Health Advisory Committee:

• **John Franklin, MD, MSc, '15 MA**, associate dean for Diversity, Inclusion and Student Support, chief of Addictions and interim chair of the Department of Psychiatry and Behavioral Sciences. 📷 6

• **LaTasha Nelson, MD, '08 MS, GME**, associate professor



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of Obstetrics and Gynecology in the Division of Maternal Fetal Medicine.

Santhanam Suresh, MD, MBA, '91 GME, the Arthur C. King Professor in Anesthesiology and a professor of Pediatrics, was elected board president of the American Board of Anesthesiology. 📷 7

Thomas Meade, PhD, the Eileen M. Foell Professor of Cancer Research and professor of Radiology, was awarded the World Molecular Imaging Society's highest honor, the 2020 Gold Medal Award. He was recognized for his pioneering work in the fields of magnetic resonance and optical molecular imaging.

Susan Goldsmith, MD, '08 GME, assistant professor of Obstetrics and Gynecology in the Division of General Obstetrics and Gynecology, has been appointed associate dean for student affairs.



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MEDIA SPOTLIGHT

Chicago Tribune

Northwestern-Led Researchers Unveil Data Dashboard That Aims to Spot COVID-19 Surges Faster

A Northwestern University-based research team co-led by Lori Post, PhD, director of the Buehler Center for Health Policy and Economics, created an online COVID-19 data dashboard that aims to more quickly uncover where infections are surging in the U.S. and around the world — “before they become overwhelming,” said Post. A metric called “jerk” looks at the rate at which infection acceleration (or deceleration) is changing; another metric can help estimate the “echo effect” of new infections connected to cases from seven days prior.

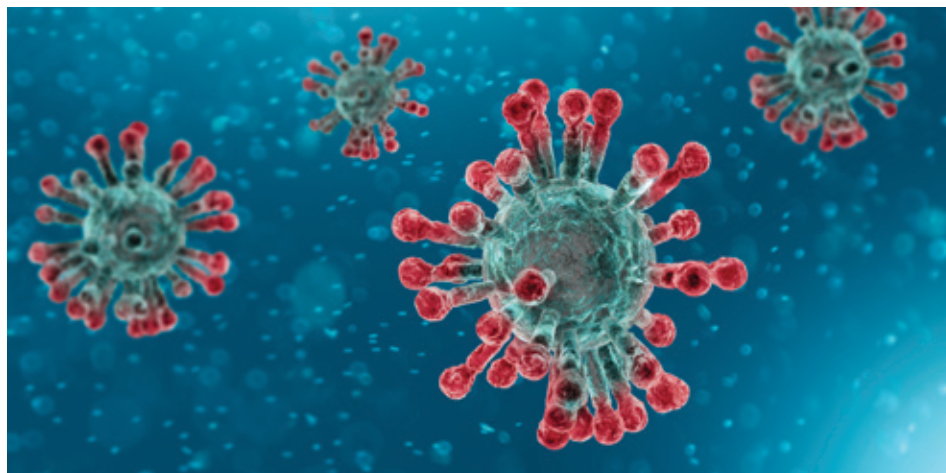
The New York Times

Nearly One-Third of COVID-19 Patients in Study Had Altered Mental State

According to a Northwestern study published in *Annals of Clinical and Translational Neurology* — the largest study to date of neurological symptoms among coronavirus patients in an American hospital system — nearly a third of hospitalized COVID-19 patients experienced encephalopathy, or, some type of altered mental function “ranging from confusion to delirium to unresponsiveness.”

Igor Koralnik, MD, chief of Neuro-infectious Disease and Global Neurology in the Department of Neurology, the Archibald Church Professor of Neurology, and senior author of the study, said, “Encephalopathy was associated with the worst clinical outcomes in terms of ability to take care of their own affairs after leaving the hospital, and we also see it’s associated with higher mortality, independent of severity of their respiratory disease.”

The New York Times pointed out there is very little evidence so far that the virus directly attacks brain cells, and most experts say neurological effects are probably triggered by inflammatory and immune system responses.



CNN

New X-Ray Technique Reveals Clues About Ancient 1,900-Year-Old Mummy

A team of scientists have pioneered a new technique that allows them to investigate the insides of a 1,900-year-old mummy — without having to tamper with the ancient artifact.

In findings published in the *Journal of the Royal Society*, lead author Stuart Stock, PhD, research professor of Cell and Developmental Biology, described using a combination of CT scanning and X-ray

diffraction for the first time, revealing clues about the Roman-era mummy (thought to belong to a 5-year-old child) discovered in Hawara, Egypt.

The technology revealed that a small scarab beetle (a symbol of rebirth) had been placed in the child’s abdomen, indicating “this person was in the upper echelons of society,” Stock told *CNN*.

The Washington Post

These Venues are High-Risk Areas for Spreading the Coronavirus, Model Suggests

A report in the journal *Nature*, co-authored by Jaline Gerardin, PhD, assistant professor of Preventive Medicine, and investigators from Northwestern and Stanford universities, found that restaurants, gyms, and coffee shops rank high among locations where the coronavirus is most likely to spread outside the home.

The scientists used anonymized data from the phones of 98 million Americans living in Chicago, Washington, New York City, and seven other metro areas and focused on movement within 57,000 census block groups from March to May 2.

In those regions, the scientists traced visits to 550,000 cafes, hotels, and other venues. Geospatial data, provided to the scientists by the company SafeGraph, showed how long people remained in locations, how frequently they visited, and how crowded those places were.

The study provides statistical support for a strategy built around limiting capacity at indoor venues — such as capping crowds at 20 percent — while allowing those locations to remain open, according to *The Washington Post*.

Big Discoveries of 2020

COVID-19 had a dramatic impact on Feinberg's research enterprise in 2020. Projects deemed essential required some investigators to socially distance in laboratories and facilities,

while others worked from home to analyze data, devise new experiments, and conduct virtual meetings. Many investigators transitioned their ongoing research to COVID-19, others had to rethink the execution of their clinical trials in order to abide by social distancing guidelines. Despite these incredible challenges and obstacles, Feinberg kept moving onward and upward. Here is a look back at a handful of groundbreaking research stories that marked an unprecedented and transformative year.

SAVING COVID-19 PATIENTS' LIVES WITH DOUBLE LUNG TRANSPLANTS



Ankit Bharat, MBBS, was lead author of a study finding that double lung transplantation may be a life-saving treatment for patients with COVID-19-associated fibrotic lung damage.



Early this summer, for the first time, surgeons at Northwestern Medicine performed a double-lung transplant on a patient whose

lungs were damaged by COVID-19. Since then, they have performed several such surgeries, and according to a Northwestern Medicine study published in *Science Translational Medicine*, double lung transplantation may be a life-saving treatment for patients with COVID-19-associated fibrotic lung damage. Using new imaging techniques to analyze the damaged lung tissue, surgeons found that COVID-19 can produce irreversible damage in some patients — for which a double lung transplant may be the only option for survival.

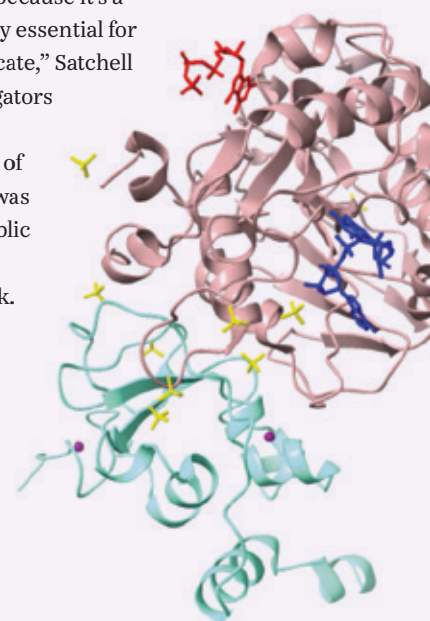
“Matrix imaging shows, for the first time, that COVID-19 destroys the basic framework of the lung — that’s what makes it unrecoverable in some patients,” said Ankit Bharat, MBBS, the Harold L. and Margaret N. Method Research Professor of Surgery, chief of Thoracic Surgery, and lead author of the study.

A new Northwestern Medicine study has identified tissue-specific epigenetic regulators in zebrafish, filling in a longtime gap in the understanding of the organism's genome.

FINDING A NEW DRUG TARGET FOR COVID-19



When the novel SARS-CoV-2 virus began to rear its spikey crown, Northwestern Medicine investigators were charged with helping to widen the scope of research. Led by Karla Satchell, PhD, professor of Microbiology-Immunology and director of the Center for Structural Genomics of Infectious Diseases, a team of scientists identified a potential drug target in SARS-CoV-2: two critical proteins in a complex called nsp10/16. According to the investigators, a drug that can inhibit nsp10/16 would allow the immune system to detect the virus and eradicate it faster. "This is a really beautiful target, because it's a protein absolutely essential for the virus to replicate," Satchell said. The investigators also mapped the atomic structure of nsp10/16, which was published for public use on the RSCB Protein Data Bank.



Above: The SARS-CoV-2, 2'-O-methyltransferase complex, nsp16-nsp10 (PDB id: 6WRZ). Nsp16 (pink) catalyzes the methyltransferase reaction, and nsp10 (aquamarine) is a co-activator required for activity.

Unraveling the Epigenome of Zebrafish



Northwestern Medicine investigators identified tissue-specific epigenetic regulators in zebrafish, filling in a longtime gap in the understanding of the organism's genome. According to Feng Yue, PhD, the Duane and Susan Burnham Professor of Molecular Medicine and senior author of the study published in *Nature*, the findings could help scientists use the model organism to unravel human diseases such as cancer, since more than 70 percent of protein-coding genes in the zebrafish genome are also present in

humans. "If you see something in the human genome and can't establish a cause, you can use this data to perform experiments in zebrafish. This will be very valuable for researchers

70%
OF PROTEIN-CODING
GENES IN ZEBRAFISH
GENOME ARE ALSO
PRESENT IN HUMANS

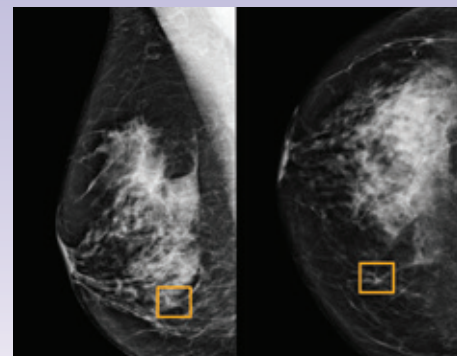
in this field," said Yue, who is also the director of the Center for Advanced Molecular Analysis at the Institute for Augmented Intelligence in Medicine.

Improving Breast Cancer Detection Through AI



An international team of investigators, including those from Northwestern Medicine, developed a new artificial intelligence (AI) model that predicted breast cancer in mammograms

more accurately than radiologists, reducing false positives and false negatives. The study, published in *Nature*, was co-authored by Mozziyar Etemadi, MD, PhD, research assistant professor of Anesthesiology and of Biomedical Engineering at the McCormick School of Engineering. "Breast cancer is one of the highest causes of cancer mortality in women," Etemadi said. "Finding cancer earlier means it can be smaller and easier to treat. We hope this will ultimately save a lot of lives."



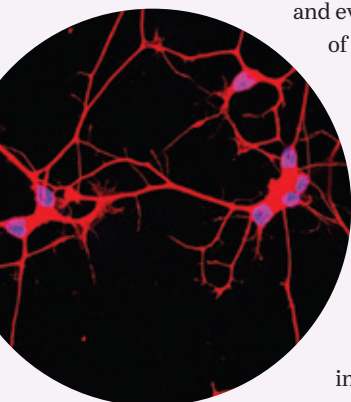
In these images, yellow boxes indicate where AI found cancer more accurately than radiologists.

UNCOVERING THE CELLULAR MECHANISMS BEHIND GENETIC MUTATIONS IN ALS



A team of Northwestern Medicine scientists led by Evangelos Kiskinis, PhD, assistant professor in the Ken and Ruth Davee Department of Neurology, discovered that mutations in the largest genetic contributor to ALS leads to the dysfunction

and eventual degeneration of motor neurons in the brain. Published in *Neuron*, the findings shed light on the mechanisms and consequences of a defect in a gene called C9orf72, which disrupts the localization of proteins involved in RNA and protein metabolism. The study may also aid the development of novel therapeutic interventions for patients with the neurodegenerative disease, which currently has no cure.



Offering New Hope for Autism Diagnosis



A team of investigators from Northwestern Medicine, Ben Gurion University, Harvard University, and the Massachusetts Institute of Technology developed a novel precision medicine technique that uses AI to identify a subtype of autism by overlaying an array

"THIS DISCOVERY COULD SHIFT THE PARADIGM."

of biomedical and healthcare data. The technique, detailed in a study published in *Nature Medicine*, successfully identified

through elaborate data analysis dyslipidemia-associated autism, which represents 6.55 percent of all diagnosed autism spectrum disorders in the United States. "Today, autism is diagnosed based only on symptoms, and the reality is that when a physician identifies it, it's often that early and critical brain developmental windows have passed without appropriate intervention. This discovery could shift that paradigm," said Yuan Luo, PhD, associate professor of Preventive Medicine in the Division of Health and Biomedical Informatics and co-first author of the study.

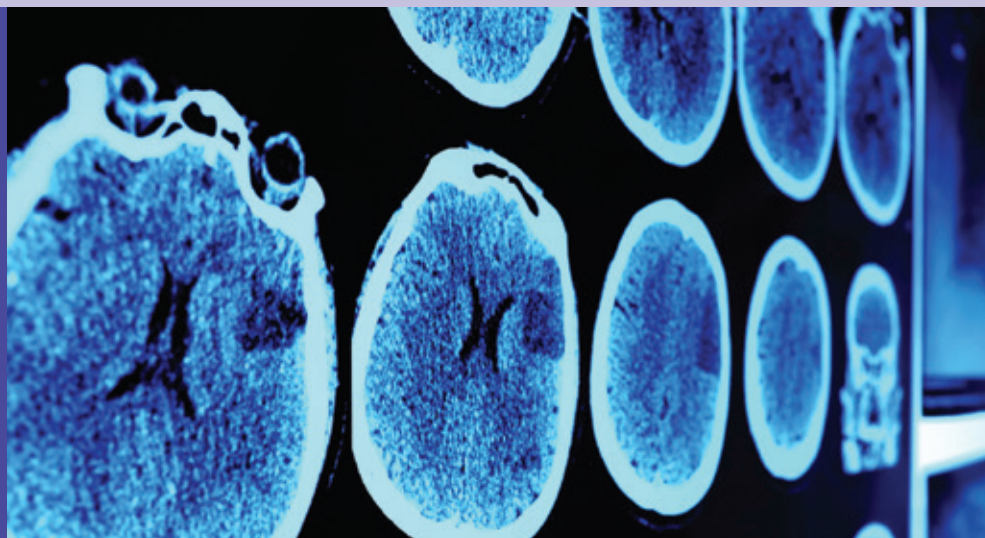


UTILIZING B-CELLS TO PROMOTE GLIOBLASTOMA IMMUNITY



Northwestern investigators developed a novel vaccine that utilizes a specialized group of B-cells to promote anti-tumor

immunity against glioblastoma, with the findings published in the *Journal of Experimental Medicine*. The vaccine, which is still in pre-clinical stages, is the first of its kind and may be an alternative to currently available immunotherapeutic approaches to treat the fatal brain cancer. Catalina Lee Chang, PhD, research assistant professor of Neurological



Surgery, was the first author of the study and Maciej Lesniak, MD, chair and the Michael J. Marchese Professor of Neurosurgery, was the senior author. "With this vaccine, we are targeting the dual functionality of B-cells to tackle tumor immunosurveillance escape," Lee Chang said. "We aim to utilize both the cellular and humoral immunity of B-cells."

THE VACCINE IS THE FIRST OF ITS KIND AND MAY BE AN ALTERNATIVE TO CURRENTLY AVAILABLE IMMUNOTHERAPEUTIC APPROACHES TO TREAT THE FATAL BRAIN CANCER.

Groundbreaking Prostate Cancer Treatment



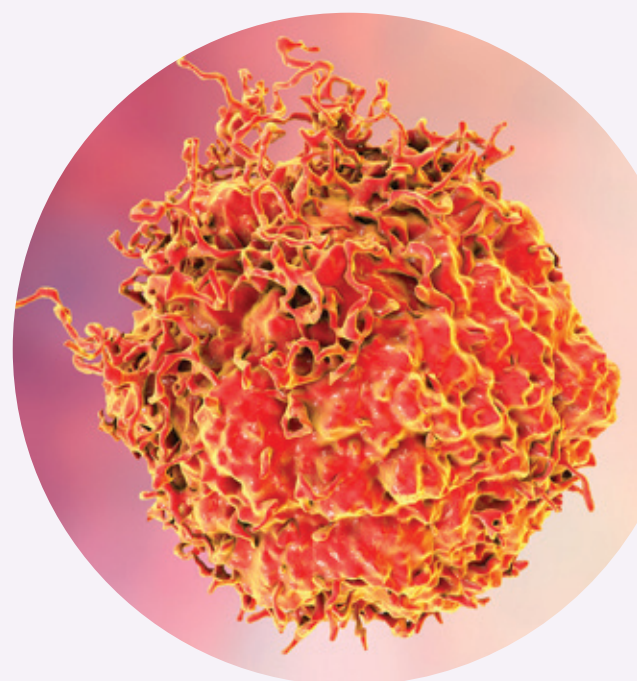
In a first-of-its-kind clinical trial, advanced prostate cancer was treated based on its genomic makeup, and delayed progression for patients with metastatic castration-resistant prostate cancer, a deadly and

60%
OF MEN IN THE OLAPARIB GROUP SHOWED NO DISEASE PROGRESSION AT SIX MONTHS

treatment-resistant form of the disease. Patients randomly selected to receive the drug olaparib experienced delayed disease progression for seven months on

average compared to just three months for the standard treatment cohort. Additionally, about 60 percent of men in the olaparib group showed no disease progression at six months compared to 23 percent in the standard cohort.

The clinical trial, published in the *New England Journal of Medicine* and led by Maha Hussain, MBChB, the Genevieve E. Teuton Professor of Medicine in the Division of Hematology and Oncology, represents a breakthrough in treating this deadly cancer and for precision medicine more broadly.



Next-Gen Sequencing

BY WILL DOSS

Northwestern's investment in next-generation sequencing is leading to unprecedented avenues of discovery.

THIRTY years ago, the Human Genome Project started, and it took 13 years and nearly \$3 billion to complete. Now, thanks to next-generation sequencing (NGS), human genomes can be sequenced in just a few hours for less than \$1,000.

"NGS has opened up a new understanding of DNA and chromosome structure, and for human genetics, we are able to sequence many more people and better understand genome variation across individuals and populations," says Elizabeth McNally, MD, PhD, the Elizabeth J. Ward Professor of Genetic Medicine and director of the Center for Genetic Medicine, which provides full NGS capability to Northwestern.

Recognizing the power of this revolutionary technology, Northwestern has in recent years made a significant investment not only in NGS instruments, but also in the computational analysis of NGS, building a sophisticated infrastructure that according to McNally aids investigators across the research enterprise.

"Every day, investigators around campus are producing and analyzing sequence data," she says. "And as much data as we generate, we have to analyze it. So we have dedicated about a hundred nodes in Quest — Northwestern's central computing system — exclusively to genomics analysis."

At any given time, says McNally, as many as 450 analysts from more than 200 labs are using those nodes, culling NGS data that informs a wide range of studies. "It's created an enormously wonderful community of people who then can interact and help each other across specialties," she says.

Supercharging discovery for COVID-19 and beyond

The breakthrough science that NGS has enabled in the past year alone at Northwestern has been remarkable — from the profiling of the three-dimensional genome structure of

zebrafish by Feng Yue, PhD, the Duane and Susan Burnham Professor of Molecular Medicine, published in *Nature* (read more on page 10) to a large-scale study about the influence biological sex has on gene expression, led by Barbara Stranger, PhD, associate professor of Pharmacology, published in *Science* (read more on page 18).

NGS has also been a boon for the fast-growing field of epigenetics, according to Ali Shilatifard, PhD, chair of the Department of Biochemistry and Molecular Genetics and the Robert Francis Furchgott Professor of Biochemistry and Molecular Genetics and of Pediatrics. The Shilatifard Lab recently took advantage of NGS and CRISPR screening capabilities to define the role of epigenetic factors in stem cell development and differentiation for a study that was featured in a cover story in *Nature Genetics*.

But it is NGS's critical role in COVID-19 research, starting from the earliest days of the pandemic, that has been this powerful tool's biggest contribution to discovery this year.

"Rapid sequencing of the SARS-CoV-2 RNA genome using NGS immediately provided insight into the singular properties of this coronavirus strain to scientific and clinical communities," says Shilatifard. "Without NGS, there would not have been a COVID-19 vaccine developed this rapidly today — no way, no how."

Shilatifard, who is the director of the Simpson Querrey Institute for Epigenetics (SQE), adds that a whole-genome sequencing instrument (acquired by SQE with strategic planning from Northwestern leadership and support from the Simpson Querrey family) provided critical assistance to Northwestern's Successful Clinical Response in Pneumonia Therapy (SCRIPT) study, published in *Nature*. Led by co-senior authors Richard Wunderink, MD, professor of Medicine in the Division of Pulmonary and Critical Care, and Scott Budinger, MD, chief of Pulmonary and Critical Care, in the Department of Medicine, this was the first study in which scientists analyzed immune cells from the lungs of COVID-19 pneumonia patients in a systematic manner and compared them to cells from patients with pneumonia from other viruses or bacteria.

NGS also allowed Northwestern investigators to "map" gene expression in the lungs of COVID-19 patients onto those of fibrosis patients — a method that can help identify which patients are recovering well and which might require a lung transplant, such as the unprecedented life-saving lung transplant surgeries that have already been performed on patients with COVID-19 at Northwestern Memorial

“Next-generation sequencing has put the molecular details of human cancer at our fingertips.”

Sarki Abdulkadir, MD, PhD,
the John T. Grayhack, MD,
Professor of Urological Research



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Hospital. This study was led by Ankit Bharat, MBBS, chief of Thoracic Surgery at Northwestern Medicine and director of the Lung Transplant program, and published in *Science Translational Medicine* (read more on page 10).

Northwestern investigators across many fields and specialties have emphasized how this fast and cost-effective technology has aided them in making discoveries, from examining the genetic components of Alzheimer’s disease to deploying clinical genetic screening and uncovering how genes influence cancer.

Probing Alzheimer’s disease

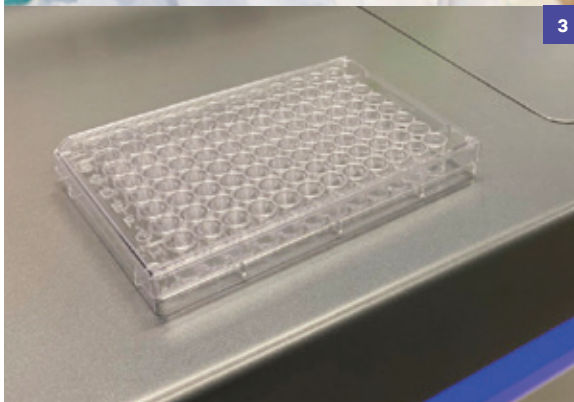
NGS has opened new doors in the study of Alzheimer’s disease, according to Robert Vassar, PhD, the Davee Professor of Alzheimer Research.

Recently, Vassar and collaborators took advantage of a database with whole-genome sequencing of 446 families with Alzheimer’s disease, searching for disease-associated variants of the gene coding for angiotensin-converting enzyme (ACE). Then, investigators created genetically modified mice with the newly discovered variants and discovered that those mice had neurodegeneration similar to that observed in brains with Alzheimer’s disease.

Going one step further, they treated the mice with ACE inhibitors and found ➔



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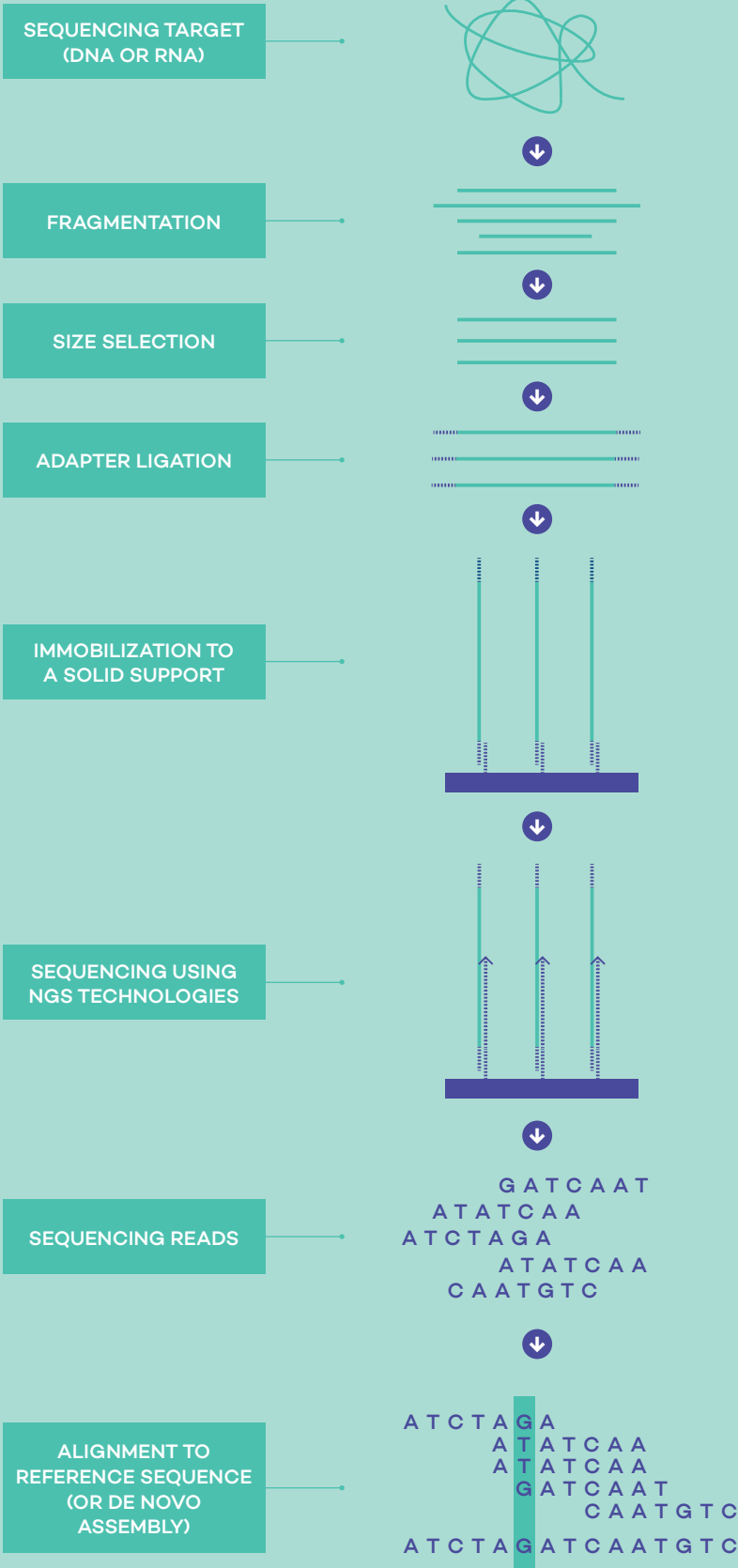
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- 1 Sarki Abdulkadir, MD, PhD, the John T. Grayhack, MD, Professor of Urological Research and vice chair for research in the Department of Urology, collaborates with Vinay Sargar, PhD, a postdoctoral fellow in the Abdulkadir laboratory.
- 2 Elizabeth McNally, MD, PhD, the Elizabeth J. Ward Professor of Genetic Medicine, is the director of the Center for Genetic Medicine, which provides full NGS capability to Northwestern through NUSeq, and a principal investigator on the Electronic Medical Records and Genomics Network Phase III (eMERGE III) Project.
- 3 Quantitative and Multiplexed Analysis of Phenotype by Sequencing (QMAP-Seq) is a new tool developed by a team of Feinberg investigators led by Marc Mendillo, PhD, assistant professor of Biochemistry and Molecular Genetics. It will allow scientists to combine dozens of genetically modified cell lines — subjected to thousands of different drug treatments — in just one screening plate. Shown here: a QMAP-Seq assay plate being prepared for use in a sequencer.
- 4 Ali Shilatifard, PhD, chair of the Department of Biochemistry and Molecular Genetics and the Robert Francis Furchgott Professor of Biochemistry and Molecular Genetics and of Pediatrics, is the director of the Simpson Querrey Institute for Epigenetics (SQE), which is another source of NGS technology for Northwestern investigators.

Next-Generation Sequencing Explained



At Northwestern, most genetic sequencing is handled by NUSeq, a research core led by Xinkun Wang, PhD, research associate professor of Biochemistry and Molecular Genetics.

Next-generation sequencing (NGS), Wang says, enables simultaneous analysis of the genome, transcriptome, and epigenome. Older methods read a single DNA fragment at a time, but rapid advances in instrument automation, digital imaging, and data science allow NGS to read through massive numbers of DNA or RNA molecules simultaneously.

“This means reading the entire human genome takes just hours, compared to older techniques that took years,” Wang says.

According to Wang, with a continuous increase in NGS throughput and speed comes a corresponding decrease in cost. In 2010, sequencing a human genome could cost as much as \$50,000. Today, it costs less than \$1,000, and is likely to drop further.

“The unprecedented ability to rapidly read the genome, transcriptome, and epigenome has afforded us a holistic view of the DNA, RNA, and epigenetic codes in each of our cells, and thereby transformed the landscape of biomedical research,” Wang says.

the drugs prevented neurodegeneration and neuron death. These findings, published in *Science Translational Medicine*, helped further map out the disease-causing mechanisms underlying Alzheimer's disease.

"NGS made possible the discovery of the ACE variant and the generation of the genetically modified mice that have provided important insight into the etiology of Alzheimer's disease," Vassar says. "As the cost of NGS goes down, it will continue to have an ever more significant impact on biomedical research."

Providing genetically tailored clinical care

The rapid advance of NGS has made genetically tailored care increasingly viable, an evolution witnessed firsthand by Laura Rasmussen-Torvik, PhD, chief of Epidemiology in the Department of Preventive Medicine. Rasmussen-Torvik was a doctoral student in 2007 when the first genome-wide analysis platforms were made available to scientists, and she says it was a paradigm shift. One of



"The only limitation of next-generation sequencing technology is our imagination."

Lifang Hou, MD, PhD, chief of Cancer Epidemiology and Prevention in the Department of Preventive Medicine and director of the Center for Global Oncology at the Institute for Global Health



The brain of a genetically modified mouse showing ACE1 (green), neurons (red), and nuclei (blue).

the biggest leaps today, she says, is the ability to "examine genes across very large numbers of people."

With the Electronic Medical Records and Genomics Network Phase III (eMERGE III) Project, that's exactly what Rasmussen-Torvik and colleagues did. Over several years at 10 sites, the investigators screened more than 20,000 patients for damaging variants in 109 genes (looking for genes associated with cancer and cardiovascular disease) and found actionable gene variants in 3 percent of patients, according to a study published in *Genetics in Medicine*.

In the next phase of the study, according to McNally (who is also a principal investigator), the team will do the same for somewhere between five and 10 different common diseases. "We'll recruit about 3,000 people and be able to tell them their genetic risk for getting one of these diseases," she says.

This upcoming study, along with other implementation projects, suggests that clinical genetic screening is here to stay, according to Rasmussen-Torvik.

"It's been a tremendously exciting 15 years to be in the field of genetic epidemiology, and I think we are going to see amazing discoveries and clinical uses in the next 10 years," Rasmussen-Torvik says.

Attacking cancer

At Northwestern, some of the most important discoveries made possible by NGS have come in the fight against cancer. Designing precision-medicine cancer therapies is a cutting-edge application of genetics. The improved power and speed of NGS allows scientists to test thousands of candidate drugs that work against cancer on a fundamental biological level. The technology has helped Northwestern investigators, including Sarki Abdulkadir, MD, PhD, the John T. Grayhack, MD, Professor of Urological Research, crack the code for treating cancers caused by MYC.

MYC, a protein implicated in a wide variety of cancers, has an unorthodox structure that has bedeviled drug development for two decades. Abdulkadir and his collaborators used NGS to find non-toxic molecules that could bind to and block the protein, publishing their findings in *Cancer Cell*.

"NGS was instrumental in our ability to define the on-target versus off-target effects of various candidate MYC inhibitors, helping us to choose more specific, better tolerated compounds," says Abdulkadir, who is also a professor of Pathology and principal investigator of the prostate cancer Specialized Programs of Research Excellence (SPORE) grant at the Robert H. Lurie Comprehensive Cancer Center of Northwestern University. "It's put the molecular details of human cancer at our fingertips."

Jaehyuk Choi, MD, PhD, the Ruth K. Freinkel, MD, Research Professor and an assistant professor of Dermatology and of Biochemistry and Molecular Genetics, sequenced genetic data from 29 patients with cutaneous gamma delta T-cell lymphoma in a study finding that the origin of cancer cells influences skin cancer prognosis, published in *Nature Communications*.

"We have a large number of these patients, but we didn't have a framework to diagnose, stage or treat them," says Choi. "This is our attempt to break through that clinical question by bringing personalized medicine to skin lymphomas."

Other investigators, including Lifang Hou, MD, PhD, chief of Cancer Epidemiology and Prevention in the Department of Preventive Medicine and director of the Center for Global Oncology at the Institute for Global Health, delve into epigenetics (the mechanism that determines whether or not a gene is expressed), which is increasingly recognized as a vital part of oncogenesis. Hou developed a machine-learning approach that studies how one epigenetic mechanism, DNA methylation, impacts the risk of cancer through "junk" DNA, published in *Clinical Epigenetics*.

"Next-generation sequencing is becoming a fundamental tool in biomedical research," Hou says. "The only limitation of next-generation sequencing technology is our imagination." ■



THE XX/XY FACTOR

Barbara Stranger, PhD, reveals how sex differences in gene expression may contribute to disease and medication response. Written by Bridget M. Kuehn



“The scale of the study was so massive that no one laboratory could have pulled it off alone.”

In many diseases or clinical traits, prevalence, severity, and other aspects differ by sex — and doctors know these differences exist, according to Barbara Stranger, PhD, an associate professor in the Department of Pharmacology. “But for the most part,” she says, “scientists haven’t known what causes them.”

Some investigators have hypothesized that hormones, the sex chromosomes themselves, differences in behavior, or environmental exposures may contribute to sex differences, explains Stranger, who is also a member of Northwestern’s Center for Genetic Medicine. Now, she and her colleagues have begun to reveal some of the underlying mechanisms.

More than 13,000 human genes are expressed at different levels in males and females, including genes important in drug metabolism, body fat, breast cancer, and birth weight, according to a study led by Stranger and involving a multi-institution team of collaborators. The study, published in *Science*, found that 37 percent of genes were expressed at different levels in male and female subjects across 44 different human tissues. The massive trove of information produced in this study will lay the groundwork for understanding sex-related differences in health and disease for decades to come.

CONSIDERING SEX

Stranger and an international team of colleagues analyzed the expression of more than 35,000 genes in 44 post-mortem tissues using data from 838 deceased adult donors as part of the National Institutes of Health’s (NIH) Genotype-Tissue Expression (GTEx) Project. Previous studies had analyzed sex differences in only a handful of tissues, she says, but the GTEx and NIH’s support

enabled the team to develop the most comprehensive catalogue of sex-differences in gene expression to date. The scale of the study was so massive that no one laboratory could have pulled it off alone, she emphasizes.

“It was a great opportunity at the right time,” says Stranger, who chairs the Biological Sex working group of the GTEx Consortium.

The scientists found widespread but subtle sex differences in gene expression throughout the tissues, says study lead author Meritxell Oliva, a post-doctoral scholar at the University of Chicago and a visiting scholar at Northwestern. More study is needed to determine the exact origins of the differences, but according to Oliva, they may be leftovers from early development.

“The overall picture is that there are lots of them, but they have very small effects,” Oliva says.

The differences were also largely specific to each tissue type, says Stranger, whose laboratory focuses on creating and applying leading-edge techniques to understand how genetic differences and genetic regulation translate into physical or physiological characteristics.

“It’s not just that the sex differences are ubiquitous,” Stranger says. “It’s very controlled



in each tissue type, so that makes us think that there must be a reason for that.”

Transcription factors — genes that control the expression of other genes — appear responsible for some of the differences. Others appear to be the result of genes escaping X-linked gene regulation. Stranger explains that in females, one of the two X chromosomes they receive from their parents is silenced in each cell to help balance gene expression between females and males, who receive one X and one Y chromosome. But some genes on the X chromosome escape inactivation in females. There also ➤

“As demonstrated in this study, consideration of sex as a biological variable can generate new knowledge that could benefit anyone.”

Barbara Stranger, PhD,
associate professor in the
Department of Pharmacology

appears to be epigenetic differences contributing to sex-bias in gene expression.

Some of their discoveries have important implications for medicine. For example, they discovered previously unknown sex differences in genes that affect how an individual metabolizes certain medications, a finding that could have implications for the treatment of many diseases. Stranger says that, historically, many preclinical studies have included only male mice, and women have been excluded from or underrepresented in clinical studies. This limits the amount of information available about female-specific responses to drugs or dosing considerations. But by looking at sex-specific genetic regulation of gene expression, they identified 58 new sex-specific links between genes and traits, including birth weight, blood pressure, cholesterol levels, breast cancer, and body fat. Interestingly, they also discovered that 35 previously reported links between genes and traits were driven by effects in only one sex. This new knowledge was directly enabled by looking for sex differences.

“We were able to identify links with diseases and complex traits that could not have been identified without considering sex,”

Oliva says. For example, they found some genes expressed more in female subjects were linked to breast cancer or autoimmune conditions like inflammatory bowel disease, which are more common among females. They also found higher expression of genes associated with baldness and body fat in male subjects.

OPENING DOORS

Although Stranger, who is a geneticist by training, has been interested in sex differences her entire career, she hasn’t always found a receptive audience with other scientists. In fact, she noted that for a variety of reasons, many scientists have viewed sex as a “nuisance variable” that has to be adjusted for.

“Until recently, the impact of sex on the genetic basis of disease has been grossly understudied,” she says.

One program that has both helped get her career off the ground and get more scientists interested in sex dif-

35

previously reported links between genes and traits were driven by effects in only one sex

ferences was a \$100,000 grant supplement offered by the NIH’s Office on Women’s Health Research. As a junior faculty member, Stranger approached more senior colleagues working on NIH grant-funded research to apply for the supplements to examine sex differences in their studies.

“It was a great way to get my lab started,” she says. “A lot of investigators and trainees have benefited from that program, and it boosted the science of sex differences and expanded the pool of scientists working in that area.”

Now, Stranger, who joined Northwestern’s faculty in September 2019, says it has been gratifying to work at an institution that supports the study of sex differences. “I feel like the type of research I do is valued here,” she says.

Stranger says she hopes the study published in *Science* also helps eliminate the misperception that research on sex differences is only about women’s health.

“Although women’s health has been historically understudied and needs attention, the study of sex as a biological variable can uncover discoveries valid for either sex that remain masked when males and females are studied together as a single group,” she says. “As demonstrated in this study, consideration of sex as a biological variable can generate new knowledge that could benefit anyone.”

The study has already led to a flurry of collaborations with scientists working on many diseases. For example, Stranger is collaborating with experts in drug response to understand how sex differences in gene expression may affect the way women and men respond to drugs. She is also studying differences in gene expression in tumors in males and females with different types of cancer and will compare those to the differences she and her colleagues have documented in healthy tissues.

“We are using the *Science* study as a reference for looking at sex differences in cancer,” she says. What they discover could lead to new approaches to personalizing care for cancer that take sex differences into account. Stranger was nominated for the 2020 Top 10 Clinical Research Achievement Award as a result of the publication.

Oliva, who is currently focusing on trait-linked epigenetic features, believes more effort should be put toward studying the role epigenetics play in sex-differences in gene expression. For example, she’d like to see research focused on exploring whether modifying epigenetic marks affects sex-differences in the expression of genes important for drug metabolism. She would also like to have her hypothesis that epigenetic differences between males and females originate in early development tested.

STUDY FINDINGS

CONTRIBUTIONS TO SEX-DIFFERENTIATED HUMAN TRAITS

Disease and non-disease human traits are shaped by the combined effects of an individual's genome, the environment, and the interaction between the two.

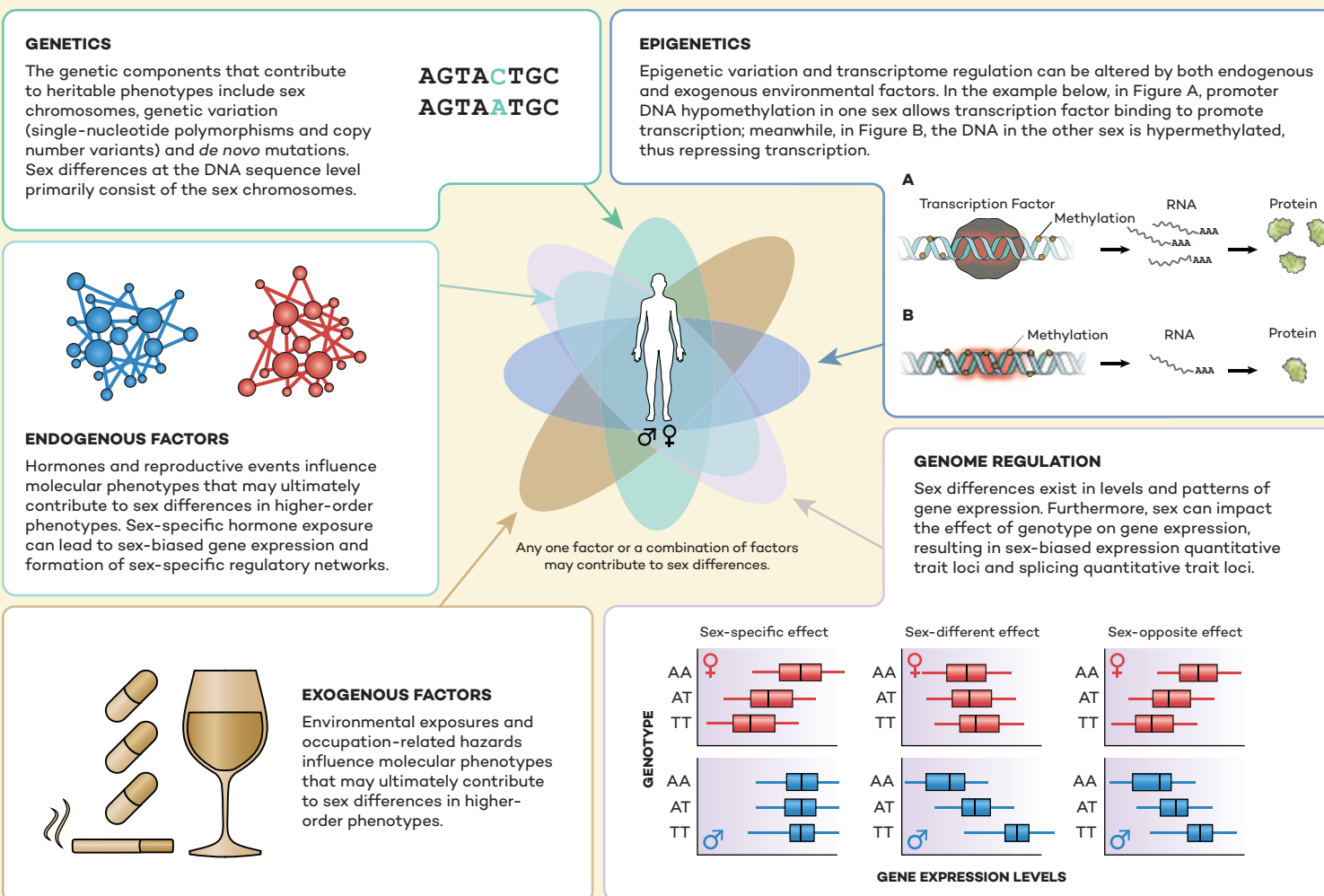


Illustration by Mao Miyamoto, adapted from a diagram printed in *Nature Reviews Genetics*, alongside an article co-authored by Stranger in 2018.

Stranger was a finalist for the 2020 Top 10 Clinical Research Achievement Award as a result of her *Science* publication.

Applying emerging technology to future studies may also lead to new insights. For example, Oliva says she envisions applying single-cell gene transcription or epigenetic analysis in future studies to map the specific cell type origins of sex-biases in gene expression.

In the meantime, Stranger says the *Science* study and the techniques used in it will

likely lay the groundwork for new insights in many fields.

“We can apply our approach across lots of different diseases and traits,” Stranger says. “That’s really exciting to me, because we spent so much time trying to figure out the best way or ways to do these kinds of analyses and interpret them, and now, let’s go do them.” #

THERE TO CARE



Northwestern Medicine is leveraging its well-established community network to provide resources where they are needed most during the COVID-19 pandemic.

Written by Emily Ayshford
Photography by Meghan McCloud and Mike Hudson

Since the COVID-19 lockdowns began in March 2020, Mattie Johnson hasn't left her Humboldt Park apartment much. On good days, the 88-year-old goes for a walk with her grandson up and down the street. But like many seniors, she worries about going out, even to the grocery store, out of fear of getting sick.

"You just feel so imprisoned," she says. But she has one bright spot in her week: a grocery delivery from a Northwestern Medicine partnership with Our Lady of Angels Food Pantry and medical courier MedSpeed. The program delivers food to at-risk seniors

Clyde Yancy, MD, MSc, answers questions after students in the Northwestern Medicine Scholars program present on healthcare topics. Yancy is involved with many Northwestern Medicine community initiatives. Photographer: Meghan McCloud

on the west side of Chicago. Each week, seniors like Johnson receive a bag of fresh produce, meat, and canned goods. They received a turkey for Thanksgiving, and a special Christmas basket with extra goodies. For Johnson, it has been a potentially life-saving program.

“They have just been so helpful to me and the other seniors in the neighborhood,” she says.

The partnership (through the Kelly Hall YMCA) was one of several Northwestern Medicine community programs that were either born or supercharged from the rising needs during the pandemic. From emergency grants to personal protective equipment (PPE) donations, the hospital system provided resources where they were needed most.

“Everything we know about inequities in healthcare has been magnified by a factor of a thousand during the pandemic,” says Posh Charles, senior vice president, Administration at Northwestern Memorial HealthCare. “Communities of color were hit hardest. We really leveraged our existing network of trusted partners to try to offset everything that was happening.”

Creating a network to help the whole patient

Community care has been a Northwestern Medicine priority for years. While hospitals previously specialized in caring for patients’ immediate health concerns, clinicians and physicians began to advocate for hospital systems to better understand and help mitigate factors that can influence health, including housing, employment, access to food, and safety and security.

Over the past decade, Northwestern Medicine has developed partnerships with faith-based organizations, housing agencies, schools, food pantries, and job programs

to provide this holistic care across the city. Programs range from giving children and teens exposure to careers in healthcare to providing transitional housing for homeless people.

Perhaps its biggest success has been partnering with community- and faith-based organizations to provide behavioral health services. Northwestern Medicine has helped train leaders to provide post traumatic stress disorder counseling and resilience training for communities that have suffered through years of gun violence.

“We’ve really created a network that helps more than just a patient’s chronic disease,” Charles says. “We want to be influential in many factors that affect someone’s health.”

When the pandemic hit, Northwestern Medicine worked with that same network of partners to provide essential services to those who needed it most. The fast deployment of the weekly grocery delivery program that helped Johnson was possible thanks to an already strong relationship with Kelly Hall YMCA. Launched in April, the initiative made 1,920 food deliveries to 145 seniors and families on the west side of Chicago within five months.

“We’ve long been a partner with Kelly Hall YMCA, but when the pandemic hit, we started getting out of our comfort zone with these partnerships and pivoting to where we could make a difference immediately,” Charles says. “Food security was an immediate need.”

Bright Star Community Outreach (BSCO), a community-based organization and longtime community Northwestern Medicine partner, also pivoted to meet the needs of the community, increasing housing support and food giveaways (with support from Northwestern Medicine).

Additionally, the organization found that its flagship trauma hotline had a 50 percent increase in calls since the pandemic began. ➔

“We’ve really created a network that helps more than just a patient’s chronic disease. We want to be influential in many factors that affect someone’s health.”

Posh Charles, senior vice president, Administration, at Northwestern Memorial HealthCare

Northwestern is working to build stronger communities in Chicago, Evanston, and beyond.





Children at an after-school program at partner organization Kelly Hall YMCA receive healthy snacks and help with homework. Photographer: Meghan McCloud.



Pastor Chris Harris (right) with his son and media director Christian Harris (left) walking into Bright Star Church. Photographer: Michael Hudson.

The hotline, part of the Bronzeville organization's celebrated TURN (The Urban Resilience Network) model, had originally been conceived as a way for callers to address the effects of violence and trauma, and Northwestern Medicine's support helped train community leaders to provide trauma counseling. With callers' trauma taking the form of job and food insecurity, or the loss of a loved one, the organization has now extended its hours to keep up with demand.

"Anxiety and fear have increased, and many people just need someone to talk to," says Nichole Carter, BSCO chief program officer. Thanks to the initial training supported by Northwestern Medicine, these leaders were equipped to help callers navigate these problems during the pandemic.

Providing a trusted resource

In addition to the trauma hotline and providing food and housing support, BSCO leaders wanted to support their community by providing more workforce development opportunities.

An emergency grant from Northwestern Medicine helped upgrade technology so the organization could hold a virtual job fair, where

Northwestern Medicine shared information about open positions within the hospital system.

"Once we had the resources to meet people's immediate needs, we could focus on strengthening workforce development, to help set them up for success," Carter says.

The organization also partnered with Northwestern Medicine to develop videos called "Clergy and Clinicians," where BSCO CEO Pastor Chris Harris discusses issues with trusted medical sources. In the first video, Harris talks with Clyde Yancy, MD, MSc, the Magerstadt Professor and chief of Cardiology in the Department of Medicine, and vice dean for Diversity and Inclusion, about the impact of COVID-19 on the Black community.

"We want to show that science and religion go hand in hand," says Akilah McCord, BSCO's chief of staff. "We want to provide a platform where questions could be answered and context could be provided. There is a lot of apprehension in the Black community about issues like COVID vaccinations, because of lack of information. This collaboration is providing a safe space for those conversations to take place."

Going forward, BSCO will partner with Northwestern Medicine to continue to educate the community on topics like social

Pastor Harris talks with Clyde Yancy, MD, MSc, about the impact of COVID-19 on the Black community as part of a video series called "Clergy and Clinicians."



MEETING A RANGE OF NEEDS

Throughout the pandemic, Northwestern Medicine has provided support to community organizations around the city and state to provide resources for the immediate needs of residents.

Food Security

- ✦ Donated PPE, vouchers, and emergency grants to food pantries, including Lakeview Food Pantry and McHenry Food Pantry, and has partnered with more than 30 organizations to combat hunger
- ✦ Provided 350 food vouchers for fresh fruits and vegetables to the clients of DuPage County's Metropolitan Family Services, along with masks and thermometers to keep both clients and staff safe during the pandemic
- ✦ Provided more than 100 clients of the Midwest Shelter for Homeless Veterans with food vouchers



Housing

- ✦ Worked with the Chicago Homeless Coalition to provide diagnostic testing to homeless patients
- ✦ Partnered with transitional housing shelters to provide shelter for homeless patients when they have been released from the hospital



Access to Care

- ✦ Worked with partner Erie Family Health Centers to provide the most up-to-date information and protocols for COVID-19 for their communities and staff. Erie also developed a Social Determinants of Health



Tracy Irwin, MD, speaks with a patient at Erie Health Humboldt Park. Photographer: Mike Hudson.

Screening protocol, developed in part with investigators from Feinberg, that asked if patients needed support outside the exam room. If they answered yes, a team followed up to connect them with resources, including food, housing, and medication.

- ✦ Provided PPE and testing resources to its federally qualified health center partners to ensure that patients in a variety of healthcare settings have access to these resources

determinants of health. Carter said they are excited to continue to evolve the partnership to find new ways to help those who need it most.

"It has been an amazing partnership," Carter says. "Northwestern sits on our board and committees, helps us write grants, and steps up to the plate with volunteers. They always listen to our needs and help us creatively strategize about how we can get those needs met."

A renewed energy

Throughout the year, Northwestern Medicine continued to provide support to its partners, including grants and access to PPE. As the pandemic continued, Charles says, structural inequities that exacerbated poor health in racial minorities became more and more apparent. Early in the pandemic, more than 50 percent of COVID-19 cases and nearly 70 percent of deaths in Chicago involved Black patients. Latinx communities were also hit hard and continued to have higher positive rates than any other group throughout the pandemic.

"We already knew about these disparities, but COVID really put them into focus," Charles says. "I'm hoping this is a turning point where we can look at the root causes of what's going

on. It can start a new conversation about what we can help do in the community."

Charles said he and his colleagues hope to maintain this new level of community care and partnerships going forward, throughout the pandemic and beyond.

"It has renewed our energy, and folks are really excited about how we can continue to evolve our partnerships going forward," he says. #

"I'm hoping this is a turning point where we can look at the root causes of what's going on. It can start a new conversation about what we can help do in the community."

Posh Charles, senior vice president, Administration, at Northwestern Memorial HealthCare



Northwestern Medicine partners with Our Lady of Angels Food Pantry and medical courier MedSpeed to deliver groceries to people in need. Photo courtesy of Our Lady of Angels Food Pantry.

CHARTING A NEW COURSE

When Marianne Green, MD, was young, her father, a biochemistry professor, took her to a colleague's lab. On a table was an anesthetized frog. Peering through a microscope at the web of the frog's foot, she was able to see the stream of red blood cells traversing the capillaries and arteries.

"I thought, 'This is the coolest thing ever,'" she says. Her fascination with human physiology and pathophysiology was born, ultimately leading her to medical school at the University of Illinois at Chicago School of Medicine. She found that her curiosity was most often satisfied in the specialty of internal medicine, but she could not commit to one sub-specialty. "I'm interested in too many organ systems to devote my career to only one," she says. "In primary care, you may see a patient with autoimmune disease one moment and an ankle sprain the next. It is never boring, and I am always learning."

The desire to share her curiosity with the next generation of physicians ultimately propelled her to a career in medical education at Feinberg, where she has received more than a dozen teaching awards while innovating the school's curriculum. After serving in

New vice dean for education
Marianne Green, MD, has big
goals for Feinberg's curriculum

Written by Emily Ayshford
Photography by Kim Becker

several leadership roles, she has now been appointed vice dean for education, chair of the Department of Medical Education, and president of McGaw Medical Center.

In her new role, Green, the Raymond H. Curry, MD, Professor of Medical Education and of Medicine in the Division of General Internal

Medicine and Geriatrics, hopes to take her educational passion — assessment — to continue to steer Feinberg's curriculum into the future.

THE POWER OF ASSESSMENT

Green didn't always have her sights set on education. After a residency in internal medicine at



“

The most powerful learning occurs when you make mistakes.

she didn't want the exam to be graded. "I wanted to create a learning environment that allows students to make mistakes without fear of consequences," she says. "The most powerful learning occurs when you make mistakes."

In developing the exam, she began to think about the power of assessment — how feedback and learning were intimately integrated. Shortly after arriving at Feinberg, she had a personal encounter with her own assessment. She participated in a clinical communications study, where her visits with patients were recorded and assessed. "I thought of myself as a pretty good doctor with excellent patient interactions, and I received a report afterward that showed how little time I spent asking the patient if they had questions or sharing the side effects of medications," she says. "It was so eye-opening and powerful, and I changed my practice. That's the kind of learning environment I want to create for students — an environment where each one of them welcomes feedback that will make them a better physician."

When she became associate dean for medical education and competency achievement, medical schools were just beginning to move toward competency-based education ➤

Beth Israel Hospital at Harvard Medical School, she went into private practice. But a move to Chicago in 1997 had her reconsider the direction of her career. "I realized how much I wanted to share my love of medicine with the next generation," she says. "And that's where I really found my stride."

She joined Feinberg as an instructor and found her passion when she became the primary care clerkship director. As an administrator, she could reach even more students by putting new programs into place. She developed Feinberg's first clerkship-associated objective structured clinical examination (OSCE) and realized that



Green with her daughters (from left to right) Sarah, 28, a strategic analyst at a learning technology company in Chicago, Hannah, 21, who will be starting at Feinberg in August, and Leila, 25, a high school history teacher in St. Louis.

“

I always tell my students that my job is to make them a better doctor than I am.

approaches. She led the process — which included inputs from students, residents, faculty, nurses, and social workers — to ultimately define what Feinberg’s competencies should be.

She also designed the electronic assessment portfolio to review longitudinal student performance. When she developed it, she again thought back to that clinical communications study that showed her where she needed to be better. “Students need to know when they are going in the right direction and when they are going off course, and this assessment system gave students the opportunity to look at their feedback and performance over time,” she says. “It’s an opportunity for students to engage and be reflective in their own learning.”

Along the way, she continued to teach, garnering more than a dozen awards, including the Association of American Medical Colleges Alpha Omega Alpha Robert J. Glaser Distinguished Teacher Award.

DRIVING THE FUTURE OF MEDICAL EDUCATION

In her new role, Green has several goals. First, she is committed to creating a learning environment that allows people from all backgrounds to succeed. “We need to increase the diversity of our physician population to reflect the patients that seek our help,” she says. “While efforts at increasing the pipeline by expanding

STEM programming in early education are critical, so too are the experiences that these students have while in medical school.” The medical school has recently released its commitment to social justice report, and Green is excited to help implement these efforts.

Other goals include encouraging more opportunities for interdisciplinary education. Medicine, she says, is practiced in teams, and physicians need to know how to interact and work with nurses, physical therapists, social workers, and pharmacists to provide the best holistic care for patients. She also hopes to expand community partnerships so students can better understand how social determinants — such as access to food and neighborhood safety — can negatively affect health. “Emotion drives learning,” she says. “Teaching social determinants in a classroom is not effective. They need to see it firsthand.”

Green was also recently named the co-director of the Center for Medical Education in Data Science and Digital Health within the Institute for Augmented Intelligence in Medicine, where she hopes to help create a curriculum that will give students a foundational understanding of machine learning, data science, and the application of augmented intelligence in clinical care.

“Everyone who receives an MD now needs to be able to make sense of the massive

amounts of data they will have at their fingertips and how to best use the rapidly evolving decision-making tools to provide the best ethical care for the patient going forward,” she says.

Amid all these goals, Green likes to relax by spending time with her three adult daughters — often dancing to reggae in the kitchen while they cook together. The youngest will attend Feinberg beginning this summer, joining the legions of students who have benefited from Green’s innovative curriculum. “I always tell my students that my job is to make them a better doctor than I am,” she says. “And that is very rewarding.”#

Green (far right) with Pat Garcia, MD, MPH, associate dean for curriculum (left) and Sandra Sanguino, ’93 MD, ’96 ’99 GME, MPH, senior associate dean for medical education, at Match Day.





Passing the Torch

A letter from Rishi Reddy, '00 MD (HPME)

Hello, Feinberg alumni!

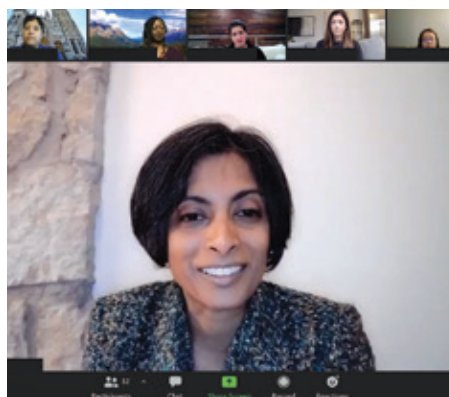
I hope you all are staying safe as COVID-19 surges throughout the country and the world. I am hoping that, by the time you read this, we are coming out of our social-distancing measures due to a successful vaccine program.

During the past year, I have come to really appreciate the bonding our alumni have had — through alumni events, alumni board meetings, and more. While the virtual meetings and programming have been great, I am excited for the opportunity for us to be able travel again (hopefully to Chicago!) to celebrate Feinberg and Northwestern.

I wanted to highlight the efforts being made by different alumni to continue engagement with students and other alumni over the past year. Despite limitations on travel, your fellow alumni members have continued to find ways to serve and interact. The current cohort of medical students at Feinberg will be one of the most unique groups in the history of our medical school, as they have adjusted to the training challenges presented by COVID-19. This cohort will need the mentorship from our alumni base even more than other classes as they, too, have been limited in their interpersonal interactions.

The Alumni Board's Women in Medicine subcommittee (led by Nupur Ghoshal, '01 PhD, '03 MD, and Kavitha Gandhi, '94, '98 MD, '99 GME) have continued to hold events that have allowed current medical students the opportunity to network with a variety of

alumni from across the country. The Women in Medicine Facebook group is growing, with almost 300 members to date. Our Mentoring Committee, led by Emily Jones, '08 MD, '11 GME,



Kavitha Gandhi, '94, '98 MD, '99 GME, has moderated four mentoring events for Chicagoland high schools as part of the medical school's new Women in STEM (WiSTEM) programming series. The most recent event, held virtually this past December, was attended by 22 students from George Westinghouse College Preparatory High School on the city's west side.

launched a new Virtual Heart-to-Hearts program that has generated over 200 virtual gatherings between our MD students and caring alumni volunteers all over the country. The Alumni Physicians of Feinberg events have also continued, but have shifted to a virtual format, allowing students to meet and network with Feinberg faculty.

As our board continues to evolve, we have tried to create new sub-committees that reflect the goals of Northwestern and Feinberg. We are

launching a Diversity in Medicine subcommittee, which we hope will help facilitate diversity efforts among alumni, the medical school, and the hospital in the future.

Despite many of us staying home, our alumni association has continued to be active and to help our current students. We hope that you will continue to engage with Feinberg and Northwestern and ask that you please contact us (via Dan Schwarzlose, daniel.schwarzlose@northwestern.edu) if you are able to mentor students, host a virtual dinner, or participate in another way.

Finally, this is my last letter as MAAB President. I am passing the torch to Edward Kim, '96 MD, who will take over in April 2021. Dr. Ghoshal will become the president-elect. They will be great leaders over the next few years — I am excited for our Alumni Board and Association.

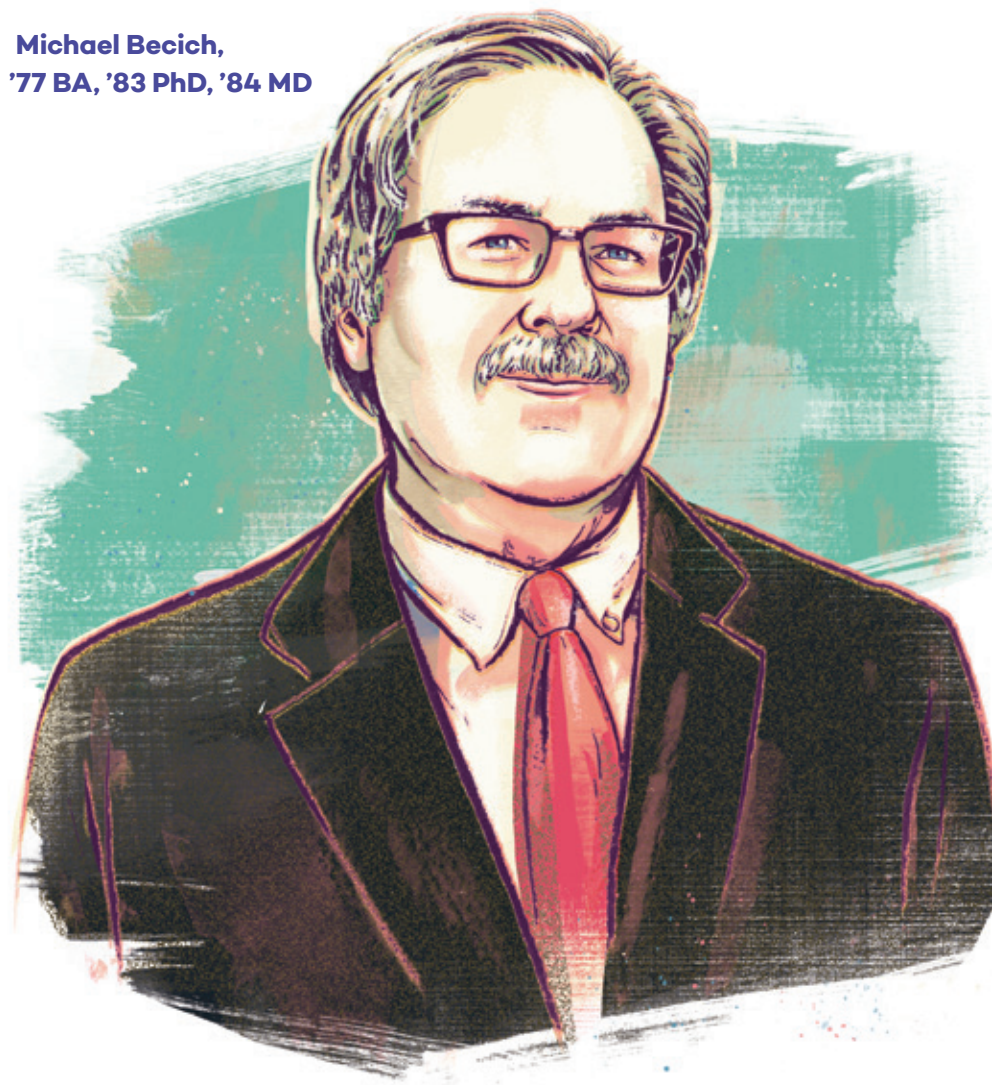
I cannot wait to live in a post-COVID world and hope that we will be able to come back to Chicago in 2022 and beyond for Alumni Weekend. Go CATS!

Stay in Touch!

For ideas on how to stay in touch and connect with current Feinberg students, go to feinberg.northwestern.edu/alumni

Advancing Health and Science Through Informatics

Michael Becich,
'77 BA, '83 PhD, '84 MD



As pathologists increasingly use machine-learning technologies to analyze digitized patient slides, they face a challenge: They have difficulty trusting computer-generated results. Michael Becich, '77 BA, '83 PhD, '84 MD, aims to solve this concern through a new technology called “explainable artificial intelligence.”

Becich, chairman and Distinguished University Professor in the Department of

Biomedical Informatics at the University of Pittsburgh, and his colleagues in Pathology have launched a start-up company called SpIntellx and created a tool called HistoMapr. This tool presents its findings — and how it reached them — to clinicians, who can then decide what to do based on the information.

“The goal isn’t to tell the computer to make the diagnosis, the goal is to give the

pathologist a cockpit of better-informed imaging tools that help guide them to the most correct answer to ensure safer and efficient care,” says Becich, who is also the University of Pittsburgh’s associate vice-chancellor for Informatics in the Health Sciences.

The work is the latest chapter in a career that has taken Becich from a cancer pathologist to a leader in the emerging field of biomedical informatics. Along the way, he has helped launch two leading academic initiatives and a department, trained scores of young people, and launched multiple start-ups.

Bringing informatics to pathology

Although he never trained in informatics, Becich’s use of computers to manage tumor biology imaging data during his graduate studies in cancer pathology at Northwestern caught his colleagues’ attention. During his residency, fellowship, and first faculty position at Washington University in St. Louis in the 1980s, he became a “go-to person” for computer-driven pathology data management. In 1991, he was hired by the University of Pittsburgh, where he helped create its first division of pathology informatics — only the second such division in the country. He also helped, in 1996, to create and run the Advancing Pathology Informatics Imaging in the Internet annual meeting (which is now called the Pathology Informatics Summit). He also helped found the Association for Pathology Informatics (2000) as well as the *Journal for Pathology Informatics* (2010).

“Pathology was where I started, and pathology has really embraced informatics as a major part of the way pathologists practice now,” he says. “I’m very lucky to be a part of that evolution.”

After 15 years of surgical pathology practice coupled with running the laboratory information systems at the University of Pittsburgh Medical Center, Becich was asked to chair the university’s first Department of Biomedical Informatics in 2006. At the time, it was the 13th such program in the country, and informatics departments and institutes have continued to expand to approximately 30 today. He explains that biomedical informatics helps makes use of the vast amounts of information collected in the process of patient care.

"We have unlocked the value of all that data for research," he says.

Along the way, his department has become one of the top biomedical informatics programs in the nation and has helped train scores of young people in the field — from high school all the way through graduate studies. He helped create a summer biomedical informatics program at the University of Pittsburgh for high school students that acts as a feeder program into the university's undergraduate bioinformatics program.

"I encourage medical students, PhD students, undergraduates, and even high school

collaborated with the French start-up Owkin to develop ways to use artificial intelligence to identify which mesothelioma tumors may be amenable to treatment. He has also created four start-up companies of his own, including the aforementioned SpIntellx.

Becich also leads the University of Pittsburgh Medical Center Enterprises, which acts like an "angel investor" to fund faculty-led start-ups, and the Center for Commercial Applications of Health Care Data, which provides early stage research to investigators from University of Pittsburgh and Carnegie Mellon University to develop technology that uses clin-

personal and professional life. Most importantly, he met his wife Barbara Dappert Becich, '79 BA, during their undergraduate studies at Northwestern. A psychology major who earned her medical degree at Rush University, she recently retired after a long career as a neurologist. They have been married 41 years and have three accomplished children (Nicole, Mikayla, and Michael).

"None of this would have been possible without the support of my family," he says.

He also credits his mentors and former Department of Pathology chairs Janardan Reddy, MD, and Dante Scarpelli, MD, PhD, with shaping his career and helping train him to be an innovative researcher.

"Northwestern has always been a home to me," he says. Now, he's pleased to be able to give back by serving on the external advisory board for the Northwestern University Clinical and Translational Science (NUCATS) Institute.

He says the most gratifying part of his career has been training young people and being of service to many other physicians and scientists.

"It has been a blast," he says. "You're around smart people, you get to use technology, you can be an entrepreneur and, most importantly, you can have a very satisfying life of service to other people through innovation in medical research."

“Pathology was where I started, and pathology has really embraced informatics as a major part of the way pathologists practice now. I’m very lucky to be a part of that evolution.”

students to get informatics under your belt and be facile with it," he says. "It's a critical skill set for career progression in our data-driven world."

Stoking start-ups

Though his focus has been on academics, Becich has also enjoyed consulting with other academic centers, cancer centers, and companies to figure out how to use artificial intelligence and other cutting-edge informatics technologies to improve clinical care and discovery in medicine. For example, he recently

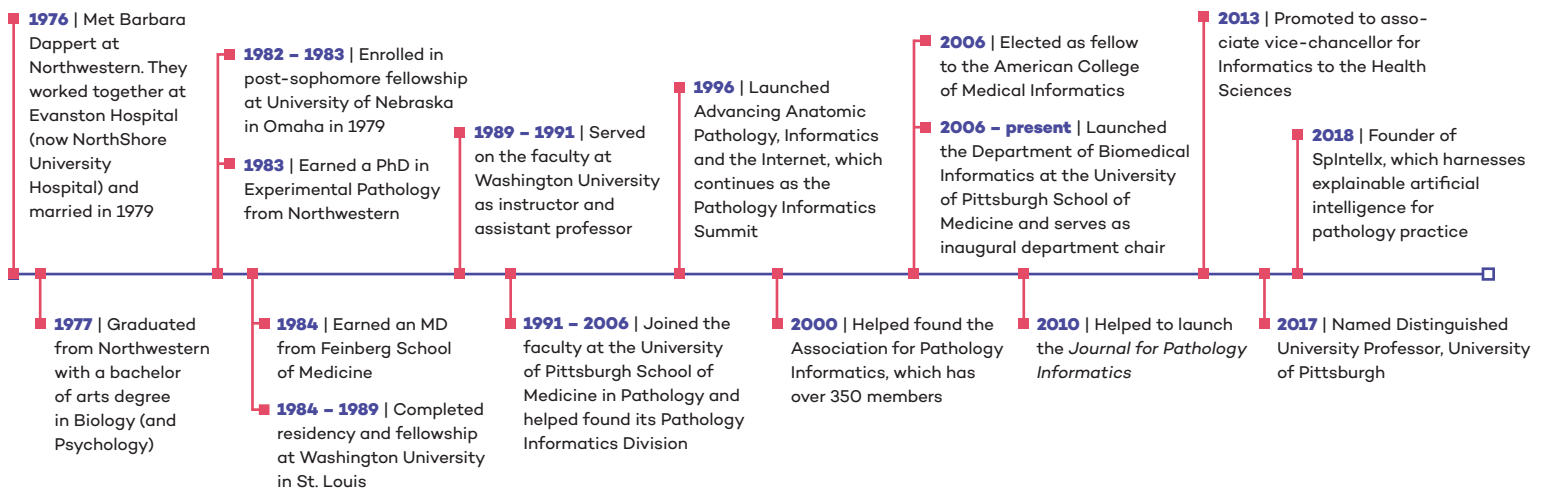
ical data to inform medical decision-making and to integrate such new tools into healthcare.

"Industry-academic partnerships are really an important part of the future to bring more resources into universities," he says. Although he acknowledged potential pitfalls, he says well-managed partnerships can yield innovation and entrepreneurship.

Where personal meets professional

Becich says his experiences at Northwestern played a transformative role in both his

Career Trajectory



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.



"This wasn't really what I had in mind when I signed up for a Rotating Internship."

Robert Boxer, '56 MD, has authored several comic books titled "Boxer's Shorts" — one pun about rotating internships is shared here.

his half-century career in the Department of Dermatology. Shellow plans to spend time volunteering during his retirement. 📷 1

Stephen Michael Soreff, '69 MD, released a book, "Life's Dueling Dualities: A Grandfather's Legacy of Wisdom," which delves into six of life's contradictions, including such tensions as whether it is better to work alone or as part of a group, or if you should follow the rules or challenge them. "Life's Dueling Dualities" is told through the lens of an author — "a grandfather, a father, a psychiatrist, a son, a brother, a wish-to-be-better golfer, a jogger, a sailor, a hiker, an amateur geologist, and a veteran of the 'school of hard knocks'" — who has wrestled with all six dualities and shares his observations with his grandchildren and readers. The book is available for purchase on Amazon. 📷 2

Sheldon Rabin, '69 MD, '70 MS, a three-time Northwestern University alum, co-founded Precision Biologics, a company for the diagnosis and treatment of 12 advanced, refractory metastatic tumors, including, but not limited to the pancreas, lung, breast, ovary, colon, and esophagus. Precision Biologics has isolated specific human, immunogenic cancer antigens and has developed immunogenic monoclonal antibodies for the treatment of metastatic tumors — including 102 and 201 antibodies. 📷 3

Los Angeles, a surgical multispecialty group. He is the prior recipient of Cedars-Sinai's Medical Chief of Staff Award, a recognition of safe, quality patient care, and the Golden Apple Award for excellence in clinical teaching. 📷 4

Bob Larsen, '78 MD, clinical professor of Psychiatry at University of California San Francisco School of Medicine, will publish his first book March 2021, "Wounded Workers: Tales of a Working Man's Shrink." Larsen's book recounts the stories of America's workforce subjected to physical and psychological trauma for doing their jobs. The book focuses on tales from the trenches and workers tormented by ill fortune, both natural and man-made, says Larsen, including those subjected to shootings, amputations, and healthcare-induced disability. Larsen's personal journey as a working-class kid who becomes a scientist, physician, and professor is intertwined. More information about the book can be found at workingmansshrink.com. 📷 6

Earn Continuing Medical Education credit by listening to the Feinberg-produced *Breakthroughs* podcast! Available wherever you listen to podcasts or by visiting feinberg.northwestern.edu and searching "Breakthroughs podcast."



1960s

William V. R. Shellow, '63 MD, retired from the VA Greater Los Angeles Healthcare System on August 31, 2020 after 50 years of service. To commemorate the occasion, his colleagues awarded him with an Outstanding Leader and Mentor Award in recognition of his "excellence, dedication, and professionalism" throughout

1970s

Leo A. Gordon, '73 MD, FACS, was awarded Cedars-Sinai Medical Center's second annual Master Clinician award on November 2. Gordon is professor of Surgery at the Cedars-Sinai in Los Angeles, California, and senior consultant in Clinical Surgery at the Surgery Group of



1980s

Edward Traisman, '81 MD, '84 GME, a graduate of the Honors Program in Medical Education, completed his pediatric training at Children's Memorial Hospital in 1984, then joined Chicago Area Pediatrics. His area of interest is pediatric rehabilitation medicine and the care of the chronically ill. Traisman is a professor of Clinical Pediatrics and of Physical Medicine and Rehabilitation at Feinberg. Away from the office, he likes to run for exercise and enjoys creating clay figure sculptures. Traisman retired on July 31, 2020 and plans to spend more time with his family as well as pursuing his favorite leisure time activities.

Paul M. Palevsky, '81 MD, has begun his two-year term as president of the National Kidney Foundation Board of Directors. Palevsky is internationally recognized as an expert in acute kidney injury and critical care nephrology. He is a member of the National Kidney Foundation's Scientific Advisory

Board, professor of Medicine and Clinical and Translational Science in the Renal-Electrolyte Division at the University of Pittsburgh School of Medicine, and chief of the Kidney Medicine Renal Section at the VA Pittsburgh Healthcare System. 📷 5

Ross A. Slotten, '81 MD, MPH, recently published his memoir, "Plague Years: A Doctor's Journey Through the AIDS Crisis." After his time at Feinberg as a medical student, he completed his residency in Family Practice at St. Joseph Hospital in Chicago in 1984. He has since been practicing medicine on the North Side of Chicago and became an accidental AIDS specialist when most patients with HIV or who were at risk for HIV were shunned by the medical community in the earliest days of the pandemic. Slotten also obtained a master's degree in public health from the University of Illinois in 1994. 📷 7

John R. Ruge, '83 MD, '89, '90 GME, former Medical Alumni Association board member, was appointed chair of the Department of

Neurosurgery at Advocate Lutheran General and Advocate Children's Hospital on September 1, 2020. Along with neurointerventionalists, the department is composed of 16 neurosurgeons and 26 advanced practice clinicians. In addition to Ruge's own Northwestern legacy, his son, Nicholas, also holds a BA from Northwestern (Class of 2012). 📷 8

Silvia Sara Canetto, '87 PhD, professor of Psychology at Colorado State University, Fort Collins, Colorado, received the American Association of Suicidology Dublin Award. The award recognizes lifetime achievements and outstanding contributions to suicide prevention. Canetto is internationally recognized for her scholarship on cultural scripts of gender and suicidal behavior. A focus of her current research is vulnerability to suicide of older, white men in the U.S. and the dominant masculinity narratives that may explain it. Canetto holds graduate degrees from the University of Padova, Italy, the Hebrew University of Jerusalem, Israel, and Northwestern University Feinberg School of Medicine. 📷 9

Memories of VA Lakeside

In honor of the 75th anniversary of academic affiliations with the Veterans Health Administration, alumni share their memories and anecdotes about their time training at VA Lakeside.

Thomas J. Ekkers, '65 MD, writes about his time on his surgical rotation at VA Lakeside:

"I was in a classroom meeting when I first heard of the assassination of President John F. Kennedy. We had World War II veterans with war wounds still being treated and one of our jobs consisted of inserting pre-op NG tubes."

Mark Nolan Hill, '77 MD, FACS, remembers with fond memory:

"It was a great opportunity then to 'feel like a doctor' when we were in our pre-clinical years – a chance to examine patients, wear our short white coat, and have the VA patients actually call us doctor. The attendings and residents were very encouraging as they allowed us to examine the VA patients, under their direction, in these early years of medical school. I particularly remember Dr. Jim Hines, former chief of Surgery, and Dr. Neil Stone (Cardiology) as being enthusiastic in their mentoring at Lakeside. Most importantly, I was always impressed at how much the VA patients appreciated us medical students and were incredibly gracious and accepting of our innocence and inexperience."

Richard "Rick" Vander Heide, '86 MD, PhD, recounts how times have changed:

*"The facilities were old. During the summer months, the air conditioning (if there was any) did not work and often the windows were open in the surgery locker room to get a breeze. Medical students were asked to escort patients to and from the various testing sites, usually radiology. I remember having to wade through the cigarette smoke to get to my patient. Times have changed. The cafeteria at the VA was something out of a 'M*A*S*H' episode. The food was plentiful, but it was better if you didn't look too closely before eating it. In the outpatient clinics on the first floor, the charts (all paper of course) were color coded; I remember seeing orange charts for patients who had served and been exposed to Agent Orange in Vietnam. The call rooms were essentially old hospital ward rooms – men in one room, women in the other. All that said, I would not trade my experience at Lakeside for anything else – it was a great training experience."*

Coco Cabrel, '89 MD, was featured in the *Daily Northwestern* for her work teaching virtual flamenco dance classes and guided meditation to boost mental health during the pandemic and for offering these resources to help students reduce their stress levels during quarantine. As Cabrel shared, "In the alone times, when there is nobody to talk to, students can listen to a guided meditation and find solace from that. You can feel good, feel peace, and feel uplifted enough to keep going." 📖 10

1990s

F. Wilson Jackson, '92 MD, '95 GME, was elected vice president of the Pennsylvania Medical Society (PAMED) and will begin his term in January 2023. Jackson most recently served as vice chair of PAMED's board of trustees and leads Jackson Siegelbaum Gastroenterology. Jackson shared that he is "looking forward to serving the physicians in the state in the years going forward. I certainly have mentors and role models from Northwestern medical school and McGaw to thank." 📖 11

Edward S.H. Kim '93, '96 MD, Medical Alumni Association board member and president-elect, has been appointed senior vice president and physician-in-chief for City of Hope Orange County. Kim will also serve as vice physician-in-chief for the City of Hope National Medical Center. He previously served as chair of Solid Tumor Oncology and Investigational Therapeutics, the Donald S. Kim Distinguished Chair for Cancer Research, medical director of the Clinical Trials Office at the Levine Cancer Institute, Atrium Health in Charlotte, North Carolina, and professor of Medicine at the University of North Carolina, Chapel Hill. 📖 12

Gaurov Dayal, '96 MD, was recently appointed as president and COO of Everside Health. Everside Health is the second-largest direct primary care provider in the U.S., currently operating in 32 states with 350 clinics. In his roles prior to joining Everside, Dayal served as president of new markets and chief growth officer at ChenMed, senior vice president at Lumeris and the first chief medical officer and president of healthcare delivery, finance, and integration at SSM Health. 📖 13

Francis S. Nuthalapaty, '98 MD, was appointed program director for the planned Obstetrics and Gynecology residency program at Northeast Georgia Medical Center's Graduate Medical Education program. Nuthalapaty is a recognized expert in medical education, curriculum development, program management, and mentoring of both faculty and residents. He also will continue to practice while serving as program director. 📖 14

GME

Jeffrey R. Smith, MD, '90, '94, '95 GME, FACC, has been appointed chair for the Department of Medicine and Medical Specialties at the University of Illinois College of Medicine, Rockford. Smith is a clinical associate professor in the department and has been on faculty since 1996. He directed cardiology education for the medical school, earning the Distinguished Teaching Award in 2010, as well as other recognition. Smith has served on the college's Medical Executive Committee and several other committees and task forces.

Mark A. D'Agostino, MD, '91, '94 GME, was appointed chief medical officer of Alaxo Airway Stents, a provider of stent-based therapies. D'Agostino is board certified from the American Board of Otolaryngology and the American Board of Sleep Medicine. He is a fellow of the American Academy of Otolaryngology/Head and Neck Surgery and the American College of Surgeons; a founding member of the International Society of Sleep Surgeons; and a member of the American Academy of Sleep Medicine, New Haven County Medical Society, Connecticut State Medical Society, and the Connecticut ENT Society. D'Agostino is on staff at four hospitals (Middlesex, Midstate, Griffin, and Yale) and is section chief at Middlesex Hospital. 📍 15

Christine A. Dingivan, MD, '96 GME, has been appointed president and chief executive officer of Emmes, a clinical research company based in Rockville, Maryland. Dingivan previously served as a senior executive with Novartis, becoming the company's first global head of data and digital and creating a digital innovation lab connecting entrepreneurs with Novartis mentors,

partners, and datasets in order to stimulate healthcare innovation. Before joining Novartis, Dingivan spent eight years at PPD, Inc., a leading global clinical research organization, where she served as chief medical officer and global head of strategic client solutions, as well as a member of the executive committee.

Nina L. Alfieri, MD, '16 GME, '19 MS, recently joined the editorial advisory board of Contemporary Pediatrics. Alfieri is an attending physician in Advanced General Pediatrics and Primary Care at Ann & Robert H. Lurie Children's Hospital of Chicago and an instructor of Pediatrics in the Division of Advanced General Pediatrics and Primary Care at Feinberg. 📍 16

building, now under construction, at Augustana College in Rock Island, Illinois. While at Augustana College, Cooper was an Academic All-American student athlete and the first Black student from the college to be named as such. The Lindberg Center is set to open in the spring.

📍 17

CHRISTINE A. DINGIVAN, MD, '96 GME HAS BEEN APPOINTED PRESIDENT AND CHIEF EXECUTIVE OFFICER OF EMMES, A CLINICAL RESEARCH COMPANY BASED IN ROCKVILLE, MARYLAND.

PT

Aben E. Cooper '95 MPT, MBA, Northwestern University Physical Therapy Alumni Association vice president, will have a training lab named in his honor at the new Peter J. Lindberg, MD, Center for Health and Human Performance



MA/MS

Susan M. Rubin, '80 MA, MD, '93, '94 GME, was named the Ruth Cain Ruggles Chair of Neurology at NorthShore University HealthSystem. Rubin is clinical chair of the Department of Neurology at NorthShore and medical director of the NorthShore Neurological Institute. She is also the director of NorthShore's Women's Neurology Program and a clinical associate professor at University of Chicago Pritzker School of Medicine. Previously, Rubin served on a task force for the American Academy of Neurology and on the Board of the Illinois Chapter of the National MS Society. 📷 18

Dana R. Gossett, MD, '11 MS, has been appointed vice chair of the Department of Obstetrics and Gynecology, focusing on ambulatory care and quality, and as deputy chief clinical officer at New York University Langone Health to oversee quality initiatives across the entire outpatient network. Gossett previously served as an endowed professor at the University of California San Francisco (UCSF), and served on faculty at Feinberg for ten years. At UCSF, she most recently focused on clinical administration, women's health and ambulatory care, previously having led divisions of Obstetrics and Gynecology at both Northwestern and UCSF.

Peter S. Pang, MD, '13 MS, has been promoted to department chair for Clinical, Education, and Research Programs at the Indiana University (IU) School of Medicine, where he has served as interim chair since October 2019. Pang joined the IU School of Medicine Department of Emergency Medicine in 2014. He was later appointed to the

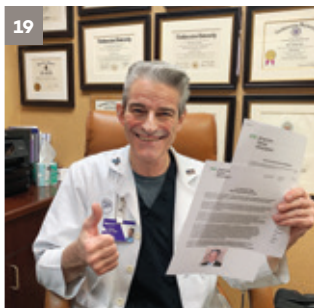
newly-created role of vice chair for Strategic Innovation and was named vice chair for Operations and Clinical Strategy. Pang previously served for 10 years on faculty at Feinberg.

DDS

Robert M. Pick, '80 DDS, '82 GME, MS, FACD, FICD, has once again been appointed as an official media spokesperson for the American Dental Association, having been appointed in the year-to-year position for the past 35 years. He serves as an expert in the areas of dental implants, lasers, and emergencies and, as a result, has been featured on various media outlets such as *Good Morning America*, *The New York Times*, *Cosmopolitan*, *Chicago Tribune*, and others.

Pick was also once again recognized in *Dentistry Today*, the No. 1 read dental journal, as one of the "Top Leaders in Dentistry" in its 23rd Annual Leaders issue, having made the list for the past 23 years. He was also elected by his peers to the Global Summit's Class of 2021, Doctor-to-Doctor World's Top 100, with 8,400 online views overnight and 241 shares (a record for the institute). 📷 19

Paul Tiwana, '96 DDS, MD, was recently nominated as a director for the American Board of Oral and Maxillofacial Surgery. Tiwana currently leads the Division of Oral and Maxillofacial Surgery at the University of Oklahoma and also operates an independent private practice. He has previously served in multiple committee chair roles for the American Association of Oral and Maxillofacial Surgeons and is a member of the Osteoscience Foundation Board. 📷 20



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 passed away. All dates are in 2020.

ALUMNI

Margaret "Mickey" Gerber, '44 MD
Evanston, Illinois
SEPTEMBER 23

Martha K. Knudsen, '46 BSDH
Newton, Kansas
SEPTEMBER 20

Melvin Spira, '47 DDS, '51 MSD, MD
Carlsbad, California
OCTOBER 8

Walter E. Furr, Jr., '47 MD
Miami, Florida
NOVEMBER 20

Billie H. Shevick, '48 MD
Lake Worth, Florida
SEPTEMBER 20

J. Norman Young, '51 MD
Hinsdale, Illinois
OCTOBER 13

Wallace Carpenter, '51 MD
Rock Port, Missouri
SEPTEMBER 1

Joe S. Covington, '52 MD
Meridian, Mississippi
DECEMBER 17

Charles J. Morris, '53 DDS
Meridian, Idaho
DECEMBER 24

Dorothy "Dot" Pinkston, PhD, '53 CERT
Valdosta, Georgia
DECEMBER 1

Kurt E. Nelson, '54 DDS
Rock Island, Illinois
OCTOBER 20

Constantine J. Samios, '55 MD
Monte Sereno, California
FEBRUARY 5

Myers William "Bill" Lockard, Jr., '55 DDS
Oklahoma City, Oklahoma
DECEMBER 6

William F. Malone, '55 DDS, '73 PhD
Kansas City, Missouri
OCTOBER 28

James A. Koch, '56 MD
Albuquerque, New Mexico
OCTOBER 8

Eugene Toone, '57 DDS
Phoenix, Arizona
SEPTEMBER 19

Wendell G. Venerable, '57 CERT
Oak Park, Illinois
AUGUST 28

Donald D. Dierkes, '58 MS
Orinda, California
SEPTEMBER 21

William Staehle, III, '58 DDS
Fayetteville, North Carolina
NOVEMBER 20

Maurice "Maury" Barancik, '60 MD
Naples, Florida
OCTOBER 26

William K. Platt, '60 MD
Lake Forest, Illinois
SEPTEMBER 20

George G. Markarian, MD, '61 GME
Lisle, Illinois
NOVEMBER 21

Harry S. Okuda, '61 DDS
San Diego, California
NOVEMBER 26

Paul E. Hodel, '61 MD
Goshen, Indiana
NOVEMBER 15

Susanne Mennella, '61 BSN
Scottsdale, Arizona
SEPTEMBER 30

Ann M. Luckert, '62 BSDH
Woodruff, Wisconsin
OCTOBER 30

Ellen Atwater, '62 BSDH
Mequon, Wisconsin
DECEMBER 13

Martin W. Sandstrom, '62 CERT
Chicago, Illinois
SEPTEMBER 22

James P. Himmelwright, '63 MD
Opelika, Alabama
NOVEMBER 18

Roland D. Cull, '63 MD, '64 GME
Springfield, Illinois
OCTOBER 17

Bernard "Bud" Z. Gore, '64 MD
San Francisco, California
DECEMBER 1

Ernst K. Janzen, '65 DDS, '65 MS
Northbrook, Illinois
DECEMBER 24

Jerome C. Bernhoft, '66 MD
Alamo, California
AUGUST 13

Charles S. "Chuck" Borden, Jr., DDS, '68 MS
Galesburg, Illinois
NOVEMBER 2

Eugene Means, MD, '68, '69 GME
Naples, Florida
NOVEMBER 3

J. Edward Schwenke, '68 CERT
Bourbonnais, Illinois
DECEMBER 13

J. Thomas Brown, '70 MD, '70 GME, '78 MBA, '79 GME
Estero, Florida
DECEMBER 27

Glen G. Glista, '71 MD
Oak Brook, Illinois
NOVEMBER 2

Philip Joseph Fitzsimons, '71 MD, '76 GME
Glenview, Illinois
NOVEMBER 13

Daniel W. Patterson, '72 DDS
Denver, Colorado
OCTOBER 30

Lawrence H. Luy, '73 MD
Freeport, Illinois
NOVEMBER 14

Mac M. Ross, '78 DDS
Moab, Utah
AUGUST 24

Nancy Walton Condon, '79 MD
Lake Forest, Illinois
SEPTEMBER 5

Robert M. Jarrett, MD, '79 GME
Rockford, Illinois
DECEMBER 19

FACULTY



Michael A. Heuer, '56 DDS, MS

APRIL 27, 1932 – JUNE 4, 2020

Michael A. Heuer, DDS, MS, resident of Naperville, Illinois, passed away at the age of 88. A graduate of the Northwestern University Dental School, he went on to serve his country from 1956 to 1958 in the U.S. Naval Reserve. Specializing in endodontics, he held a private practice in Chicago for just under 30 years, and tenured professorships at Loyola University and Northwestern University. Dr. Heuer also served in various positions of leadership, eventually coming full circle as dean of the Northwestern University Dental

School from 1993 to 1998 and ending his tenure in 1999 as professor emeritus of Otolaryngology in the Division of Dental Surgery. Dr. Heuer is remembered fondly by family, friends, and colleagues for his advice, sense of humor, storytelling, and passion for building model boats.



William "Bill" Schnaper, MD

MARCH 16, 1950 – NOVEMBER 19, 2020

William "Bill" Schnaper, MD, of Wilmette, Illinois, beloved husband, father, and grandfather, passed away after a long illness at the age of 70. A revered and valued member of the Northwestern Medicine com-

munity, he touched the lives of many in his various roles as doctor, colleague, mentor, and scientist. Dr. Schnaper was a professor of Pediatrics in the Division of Kidney Diseases at Feinberg and Ann & Robert H. Lurie Children's Hospital of Chicago. A graduate of Yale University, Dr. Schnaper completed his medical education at University of Maryland and training in pediatrics at Mount Sinai Hospital. After two years in the National Health Service Corp, he completed a fellowship in Pediatric Nephrology at St. Louis Children's Hospital. His first faculty appointment was at Washington University, later holding positions at the National Institutes of Health and George Washington University before joining Northwestern in 1994.

Donors Share: Why I Give to the Medical School

Generosity from alumni, faculty, grateful patients, and other friends has made a big impact on Feinberg's research and education missions. This winter, we asked our donors to share why they felt inspired to give back.



← David Rubin with his wife, Terry

"I have been a patient of Northwestern since 1968, before the hospital was called Northwestern Memorial Hospital. I have personally seen how the hospital has grown into the medical powerhouse that it has become. I deal with a lot of chronic conditions, and I have been the beneficiary of research done at Northwestern. My doctors, Sean O'Connor, MD, clinical assistant professor of Medicine in the Division of General Internal Medicine and Geriatrics, and Rod Passman, MD, the Jules J. Reingold Professor of Electrophysiology, have been very instrumental in the quality of life I enjoy. It is an honor to support the efforts of these doctors to further their work from which we have benefited."

DAVID RUBIN

“

Amazing progress is being made at the Feinberg School of Medicine, and I needed to be part of that dedicated and critical research effort to help find a cure.”

Jim Koster



← Larry Kuhn with Feinberg supporter Carole Raisbeck at an event in 2017

"My 12+ years at the medical school have been an amazing journey. I continue to be inspired by the creativity and commitment of my team, our colleagues, the faculty, and, of course, the generosity of our terrific donors. Giving back each year provides me with a sense of pride and a 'walk the walk' mentality that reaffirms I believe in our work and am a good steward of our donor community."

LARRY KUHN, associate dean for Development



← Robert Kalb, MD

"I have many fond memories of my time at Northwestern University. Not only did I receive an excellent education, but while a student at Kellogg I met the love of my life, Heather Wilson, who was an undergraduate student. After 27 years of marriage, I lost my wife to familial ALS, and I became passionate to help find a cure by supporting research. After meeting with Robert Kalb, MD, director of the Les Turner ALS Center and the Joan and Paul Rubschlager Professor, I made the decision to establish the Familial ALS Research Fund in memory of my wife. Amazing progress is being made at the Feinberg School of Medicine, and I needed to be part of that dedicated and critical research effort to help find a cure."

JIM KOSTER



← Robyn Fener and Roberta Gold

"The Shane Foundation has established the Maternal Fetal Medicine Shane Foundation Fund at Feinberg. The 501(c)(3) non-profit was co-founded by my husband, Arnold Gold, and I, Roberta Brenner Gold '68, with executive director Robyn Gold Fener '95 in the name and memory of Shane Gold, who was lost with her unborn son as a result of a preventable pregnancy-related blood clotting disorder.

The foundation's work at Feinberg, headed by Paloma Toledo, '03 MD, '07 '08 GME, '10 MPH, will advance the 'Urgent Maternal Warning Signs' patient education program recently launched by the American College of Obstetricians and Gynecologists Council on Patient Safety in Women's Health Care. This program, created as a result of a Shane Foundation proposal, enables all women to recognize and report critical symptoms for the most serious conditions leading to maternal mortality and morbidity."

ROBERTA GOLD



"To whom much is given, much is required. I am ever thankful for the privilege of being able to practice medicine. I also recognize the sacrifices and support that were available to me as I trained. For this reason, I consider it an honor to pay it forward. My contributions are in support of first-generation physicians and underrepresented minorities. I feel that fostering a diverse community of healthcare providers at Northwestern will improve the care that we are able to provide to our patients."

LATASHA NELSON, MD, '08 GME, associate professor of Obstetrics and Gynecology



"Each year I make a gift to the Institute for Sexual Minority Health and Wellbeing (ISGMH). These funds help support the next generation of leading investigators and clinicians by providing funds for pilot grants, attendance at conferences and workshops, and the stellar seminars within the institute. With donor support, our medical students have published papers as first authors in leading journals and our fellows have won competitive NIH grants. It is one of the greatest pleasures of my job to see how Northwestern has helped grow the new field of LGBTQ health. I'm proud to support the outstanding LGBTQ health research and education initiatives at Feinberg."

BRIAN MUSTANSKI, PHD, director of the ISGMH and professor of Medical Social Sciences and of Psychiatry and Behavioral Sciences

The Impact of Faculty Giving

In the last six years, committed Feinberg faculty members have contributed more than \$6 million to support students and trainees with scholarships and fellowships, or to give back to the medical school's departments, institutes, and centers with gifts to breakthrough research and education initiatives.

Faculty who would like to support a cause at the medical school's that is important to them can do so online at wewill.northwestern.edu/FSMfacultygiving.

To learn more, visit feinberg.northwestern.edu/giving/ways-to-give.

CONGRATULATIONS TO THE NORTHWESTERN UNIVERSITY PROSTHETICS-ORTHOTICS CENTER'S CLASS OF 2021

"After a challenging year in a new frontier of healthcare delivery, you have succeeded. In these times of adversity, you have found new opportunities to succeed. Your future care for the disabled can allow so many to benefit from technologies few physicians and patients are even aware exist. It is important that you advocate for these new technologies to be accepted and deployed to advance the success of all our patients. As you embark on your careers, remember you will look back some day and not always realize how you have made a difference. You will think of it as your profession, but your patients and families will remember your caring and compassion. Enjoy the fact that you will be making a difference for thousands of patients. Enjoy the journey!"

ROBERT EDWIN EILERS SR., MD, '82 GME



ADVOCATING FOR PEOPLE WHO USE DRUGS



I didn't like working with people who use drugs (PWUD) when I was a medical student. I remember Dr. John Franklin's calming voice as he attended on those with addiction. I remember thinking, "Where does that calm come from?"

Fast-forward 20+ years later, I've found my calm in working with PWUD. My calm developed through the experience of working with thousands of PWUD. I've been lucky to save lives. I've been blessed to bear witness

most passionate about is Safe Consumptions Spaces/Safe Injection Facilities (SCS/SIF). I've advocated for four years running for a bill (now called SB 57) that would authorize pilot SIF/SCS in California.

SCS/SIF represents a spectrum of medical care. They are locations where patients are provided with sterile equipment and use pre-obtained drugs under medical supervision. This was a concept that was antithetical to my values early in my career. Can we just allow people to use drugs? Aren't we only facilitating pathological behavior?

The weight of the evidence shifted my values as the years rolled on. I had a front seat to the development of the opioid epidemic. I sat helpless as patients left care and died from their addiction. Each death was a marker that we need to do things differently. I entered the practice of medicine to make a difference in all lives.

There are at least 100 SCS/SIF operating in 66 cities around the world. To date, millions of episodes of drug use have been medically supervised, and there has not been a fatal overdose death to date in an SCS/SIF. I visited the InSite Clinic in Vancouver three years ago. Patients were orderly, accessed care, and above all, grateful for the service. This alone would lend my support in the face of overdose death. But more compelling was the human narrative that underlies the robust evidence.


PWUD are not treated well by the medical system. Their complaints are discounted because of their addiction. They shun medical care because the system often shuns them. However, SCS/SIF can change the narrative that the medical system has no interest in their lives and can serve other

needs, like housing, HCV/HIV/STI testing, and infection treatment.

SIF/SCS keeps patients alive. The InSite Clinic in Vancouver has detox beds upstairs that are available on demand. There, patients with addiction can take time to consider a change; these facilities buy time for people until they are ready.

SIF/SCS participants are 33 percent more likely to enter addiction treatment. Participants don't litter the streets with needles. HIV and Hepatitis C infections drop precipitously. Massive cost savings to the medical system directly result from avoided emergency room visits and hospital admissions. Community drug use and drug-related crime do not increase.

The passing of SIF/SCS legislation would help ensure that patients like those of mine who overdosed after leaving care would have another chance to survive. There would be a place for them to turn until they are ready to step back into my office.

 The passing of SIF/SCS legislation would help ensure that patients like those of mine who overdosed after leaving care would have another chance to survive.

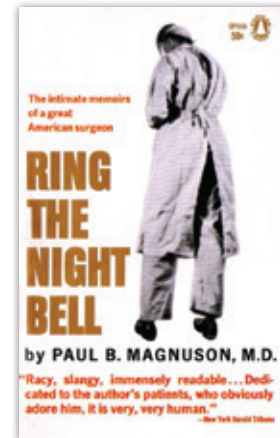
to the experience of those whose lives were immeasurably improved through recovery.

I took a job at the San Francisco VA Medical Center after completing my psychia-

try residency and forensic psychiatry fellowship. I ran the opioid treatment program (OTP) from 2005 to 2015, dispensing methadone and buprenorphine for opioid use disorder (OUD). The treatment is known as Medication-Assisted Treatment (MAT), although that term is falling out of fashion for addiction specialists.

Medications are treatment. In treating more than a thousand veterans during my 10-year career, I did not have a single patient die from an accidental overdose in the program. But the sad reality is that I would learn many died from an overdose after leaving treatment. Those patients are seared into my memory.

As a quiet Asian physician, I've grown since medical school to find own my own voice and authority. I've testified at the state capitol in Sacramento and in Washington, D.C., on issues related to addiction. The issue I remain



Above: Magnuson's autobiography
Left: Magnuson (right) presents President Harry Truman with a report of "The President's Commission on the Health Needs of the Nation" in 1952.

1884-1968

Outside-the-Box Thinker

THE NORTHWESTERN SURGEON WHO, 75 YEARS AGO, STARTED THE INNOVATIVE CONCEPT OF ACADEMIC PARTNERSHIPS WITH THE VA

Former chair of the Department of Orthopaedic Surgery Paul B. Magnuson, MD, played significant roles in the advancement of medicine, and it all stems back to when he was 7 years old, assisting the family's doctor in lancing an abscess for his mother.

"... I thought what a great man I would feel if people ever depended on my skill and judgement in that way," he wrote in his book *Ring the Night Bell: Autobiography of a Surgeon* (Little, Brown and Company, 1960). "That was when I made up my mind. I was going to be a doctor."

In 1908, Magnuson, a native of Merrian, Minnesota, graduated from the University

of Pennsylvania's School of Medicine. A professor who struggled with having one leg shorter than the other sparked Magnuson's interest in orthopaedic surgery and led him to pioneer a surgical method for bone lengthening. After moving to Chicago, he opened his first orthopaedic surgery practice above a saloon near the stock yards, and The Union Stock Yard Company and Chicago Junction Railway paid him a small retainer to take care of employees who got hurt on the job.

Magnuson later founded the Rehabilitation Institute of Chicago (now the Shirley Ryan AbilityLab) and served as the medical director for the Veterans Administration during World War II. After the war, he wrote in his memoir, "I was sitting pretty professionally and just about every other way — so I started thinking about the hundreds of thousands of wounded and sick fighting men who were coming back from the theaters of war. I thought I knew a way to get those boys decent treatment."

Magnuson hit upon the idea of shifting VA medicine from the political realm to one led by top medical schools and their faculty members, and in 1946 started the innovative concept of academic partnerships that endures today (read more on page 4).

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