

Northwestern Medicine

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SUMMER 2022

AI MEETS BASIC SCIENCE

Northwestern investigators
are leveraging a powerful new
recipe for untangling complex
intracellular processes. • p18

INSIDE //////////////////////////////////////

NEW STRATEGIES
FOR HFPEF • 14

HELPING PATIENTS
FROM AFAR • 22

IMMUNOLOGY INNOVATOR
STEPHANIE EISENBARTH, MD, PHD • 26

SPOTLIGHT ON STEVEN
FISHMAN, '86 MD • 30



Quick Thinking

Two weeks before she'd even started her first year in Feinberg's Physician Assistant (PA) program, Nicole Pinakidis already put her emergency care skills to use when she helped save a runner's life during this year's Chicago Half Marathon.

Just 300 meters from the finish line, the runner experienced cardiac arrest, and Pinakidis and second-year PA student Kristin Brennan sprang into action. While Pinakidis administered an automated

external defibrillator machine — delivering electric shocks to the runner's heart — Brennan delivered CPR. The paramedics soon arrived, and, thanks to a team effort, the runner had the best possible outcome.

Left to right: PA students Kristin Brennan and Nicole Pinakidis with Lauren Bates, marketing associate for Stryker, holding the automated external defibrillator machine used to resuscitate a race participant. Photography by Lauren Bates.

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

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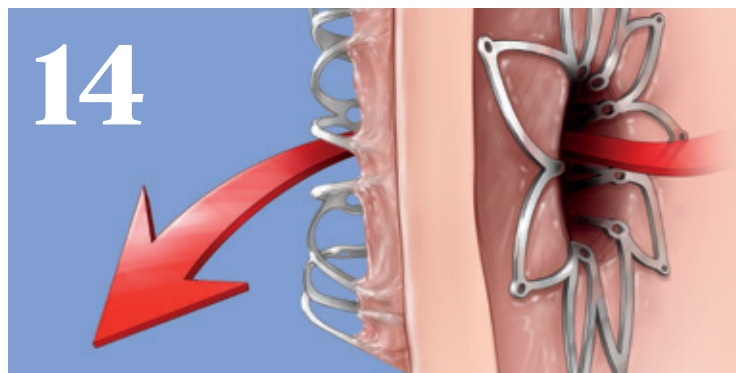
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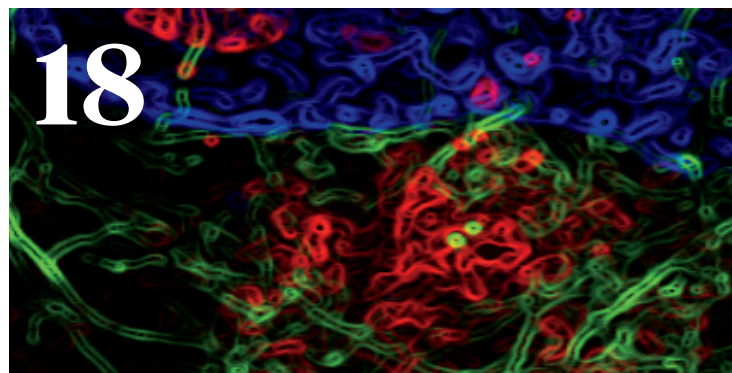
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Features



A NEW PATH

Northwestern scientists tackle heart failure with preserved ejection fraction, known as HFpEF, with novel approaches and a new urgency.



AI MEETS BASIC SCIENCE

Northwestern basic scientists are leveraging artificial intelligence and machine learning to untangle complex intracellular processes.



BEYOND BORDERS

World-class care attracts patients to Northwestern Medicine from across the globe, and Northwestern Medicine's International Health program helps them navigate every aspect of their journey.



IMMUNOLOGY INNOVATOR

Stephanie Eisenbarth, MD, PhD, hopes to provide much-needed answers about allergies as director of the new Center for Human Immunobiology and chief of Allergy and Immunology.

Departments

LEADERSHIP

02 Growing With Purpose

PULSE

03 On Campus
Graduation, millennial lung health study, and more
04 Research Briefs
08 Media Spotlight
09 Faculty Awards & Honors

ALUMNI

29 Alumni President's Message
30 Alumni Profile
Steven Fishman, '86 MD
32 Reunited at Last:
Alumni Weekend
34 Progress Notes
37 In Memoriam
38 Giving

PERSPECTIVE

40 Improving Outcomes
for Colon Cancer
Rachel Issaka, MD, MAS, '13, '14 GME

WARD ROUNDS®

41 The story behind Alice Hamilton, MD, a champion of public health in the U.S.

ON THE COVER

An artist representation of artificial intelligence (AI) and deep learning. Feinberg investigators are leveraging AI to make important basic science discoveries. See story on page 18. Image/Getty

Growing With Purpose



and telehealth. In the past year, we opened clinics in Mokena, Lake Bluff, Bloomingdale, and several Chicago neighborhoods, such as Lincoln Square. Plans are also underway to build a 120,000-square-foot outpatient facility in Bronzeville and a 150,000-square-foot facility in Old Irving Park.

Our reputation for excellence is clearly reflected in this year's *U.S. News & World Report* Best Hospitals rankings. We are proud that Northwestern Medicine hospitals and specialties again achieved impressive regional, state, and national recognition:

- Northwestern Memorial Hospital was ranked No. 9 on the national Honor Roll and No. 1 in Chicago Metro and in Illinois, with 10 clinical areas ranked nationally.
- Northwestern Medicine Central DuPage Hospital and Northwestern Medicine Lake Forest Hospital tied for No. 12 in Chicago Metro and in Illinois, with two clinical areas at Lake Forest Hospital ranked nationally.
- Northwestern Medicine Delnor Hospital tied for No. 18 in Chicago Metro and for No. 20 in Illinois.
- McHenry, Huntley, and Woodstock Hospitals (ranked as one) tied for No. 9 in Chicago Metro and in Illinois.
- Palos Hospital tied for No. 14 in Chicago Metro and in Illinois.

The benefits of our seamless clinical integration across multiple sites extend beyond clinical care. For example, the Northwestern McGaw Family Medicine Residency program now has training sites at Northwestern Medicine Delnor Hospital and Northwestern Medicine Lake Forest Hospital. These programs are training the next generation

of family physicians who will deliver excellent care to patients not just from across Chicago, but also in many other communities where growing numbers of people lack access to primary care.

Our integrated approach extends to research as well. Northwestern University Feinberg School of Medicine scientists are uncovering a wealth of translational knowledge every day, from new approaches to addressing obesity to the latest treatments for prostate cancer. These discoveries will be available to a wider patient population as we continue to expand access to clinical trials at multiple sites across the system.

Impactful collaborations are also byproducts of our uniquely integrated system. In this issue, you will read about how Feinberg investigators are applying artificial intelligence to basic science research. Their end goal is finding ways to build a bridge between the clinic and lab by combining patient data with important discoveries at the cellular level ("AI Meets Basic Science," page 18).

Growth at Northwestern Medicine is both multifaceted and strategic. It builds our reputation, enhances our students' educational experience, grows our research capabilities and, most important, allows us to serve our patients *Better*.

With warm regards,

Eric G. Neilson, MD

Vice President for Medical Affairs
Lewis Landsberg Dean
Northwestern University Feinberg School of Medicine

Dean M. Harrison

Chief Executive Officer
Northwestern Memorial HealthCare

A T NORTHWESTERN MEDICINE, WE ARE ON A CONTINUOUS QUEST FOR BETTER.

Our work to enhance and integrate our clinical services attracts a growing number of patients from all 50 states and over 100 countries. We believe highly coordinated, integrated care is what our patients want, and that means no matter where patients enter our health system, they have access to the same high level of care, a vast network of renowned physicians, and innovative treatments.

Convenient access to Northwestern Medicine is available in over 200 sites across Chicago, including our 11 hospitals

We are proud that Northwestern Medicine hospitals and specialties again achieved impressive regional, state, and national recognition.

Feinberg Investigators Lead First-Ever Millennial Lung Health Study

Northwestern University and the American Lung Association have begun recruitment in Chicago for a first-of-its-kind longitudinal study to track and analyze lung health in millennials at the peak of their lung health.

This national 40-site study, funded with a \$26 million grant from the National Institutes of Health's National Heart, Lung and Blood Institute, will follow 4,000 adults (aged 25–35) for approximately five years after their initial interviews to evaluate how their environment, lifestyle, and physical activity habits affect respiratory health.

The American Lung Association Lung Health Cohort had originally announced the study in June 2019, with plans to examine how exposure to smoking, vaping, alcohol, pollution, and physical activity affect participants' respiratory health, but recruitment was postponed due to the COVID-19 pandemic.

Now, the investigators are uniquely positioned to add COVID-19 exposures to their existing list of study measures, which they

“We are thrilled to be able to engage young adults from around the country as partners in our investigation on how to maintain a long and healthy life.”



MERCEDES CARNETHON, PHD, vice chair and Mary Harris Thompson Professor of Preventive Medicine and principal investigator

believe will provide an even fuller picture of millennial lung health.

“The COVID-19 pandemic is probably one of the greatest exposures these participants will have on their overall health,” said principal study investigator Ravi Kalhan, MD, MS, professor of Medicine in the Division of Pulmonary and Critical Care and of Preventive Medicine in the Division of Epidemiology. “We are determined to gather information about prior infections, vaccinations, and health behaviors throughout the pandemic to better understand the short- and long-term impacts of the COVID-19 pandemic on both respiratory health and overall health in U.S. millennials.”

“What we know about our health and how to promote healthy aging is based on whom we include in our research studies. Lung disease remains a leading cause of death in the U.S., and we identify behaviors and other characteristics that protect or harm our lungs. We are thrilled to be able to engage young adults from around

the country as partners in our investigation on how to maintain a long and healthy life,” said principal investigator Mercedes Carnethon, PhD, vice chair and Mary Harris Thompson Professor of Preventive Medicine.

Leveraging the national infrastructure of the Lung Association's Airways Clinical Research Centers (ACRC), the scientists will recruit study participants from its 17 metropolitan centers across the U.S. Chicago is one of those centers. Northwestern is the primary recipient of the NIH grant, but scientists from Johns Hopkins Medicine, Brigham and Women's Hospital, University of Michigan, University of Alabama-Birmingham, Beth Israel Deaconess Medical Center and more also will be collaborating on the research, along with other institutions from the ACRC.



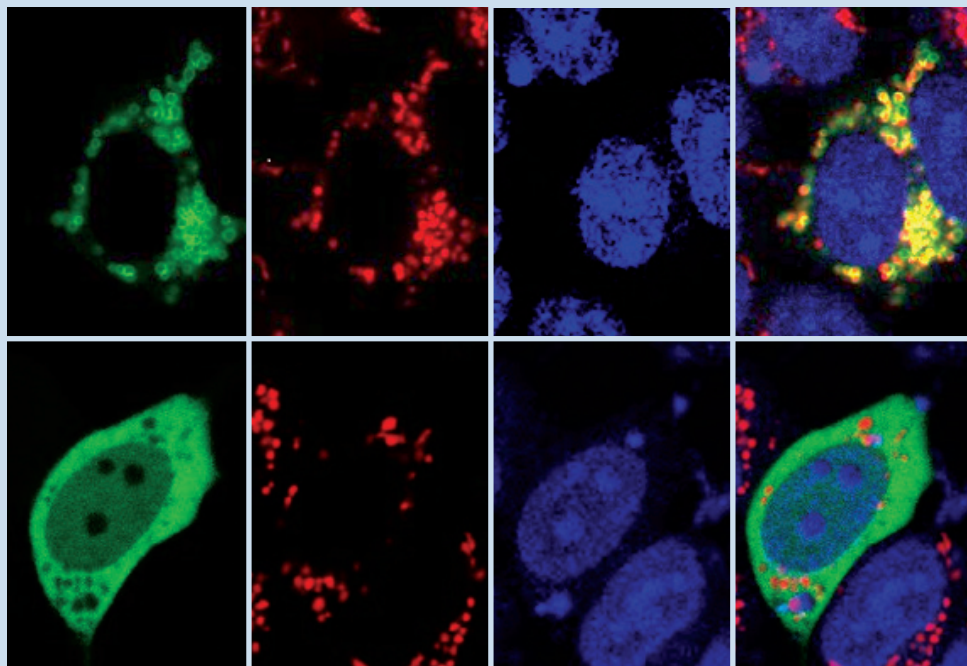
RAVI KALHAN, MD, MS, professor of Medicine in the Division of Pulmonary and Critical Care and of Preventive Medicine in the Division of Epidemiology, and principal investigator



RESEARCH BRIEFS

SCIENTIFIC ADVANCES

NEW FUNCTION FOR GLUCOSE METABOLISM ENZYME



Fluorescent staining of hexokinase, mitochondria, nuclei and a merged image. Top row shows mitochondrial hexokinase 1, bottom row shows cytosolic hexokinase 1. Note that mitochondrial hexokinase is only near mitochondria, while cytosolic hexokinase one is distributed throughout the cell.



The function of the glycolytic enzyme hexokinase 1 differs depending on its location within the cell, according to a Northwestern Medicine study published in *Molecular Cell*.

The enzyme uses different pathways to regulate glucose processing or immune response, determined by whether it's bound to mitochondria or in the cytoplasm.

"The glycolytic function of this enzyme has been known about for decades, but we showed this function is dependent on the cellular localization of this enzyme," said Hossein Ardehali, MD, PhD, the Thomas D. Spies Professor of Cardiac Metabolism, director of the Center for Molecular Cardiology at the Feinberg Cardiovascular and Renal Research Institute and the Medical Scientist Training Program (MSTP), and senior author of the study.

This study was supported by NRSA grant 5F31HL132552-04; the Leducq Foundation; NHLBI HL127646, HL140973 and HL138982; National Institutes of Health grant R01DK104927; and Department of Veterans Affairs Veterans Health Administration Office of Research and Development grant 1I01BX003382.

DISEASE DISCOVERIES

Regulator of Cancer 'Stemness' Discovered



The protein FOXK2 promotes survival of cancer stem cells in ovarian cancer, according to a Northwestern Medicine study published in the *Journal of Clinical Investigation*.

Blocking this protein could reduce recurrence of cancer after initial treatment, according to Daniela Matei, MD, the Diana, Princess of Wales Professor of Cancer Research, chief of Reproductive Science in Medicine in the Department of Obstetrics and Gynecology and senior author of the study.

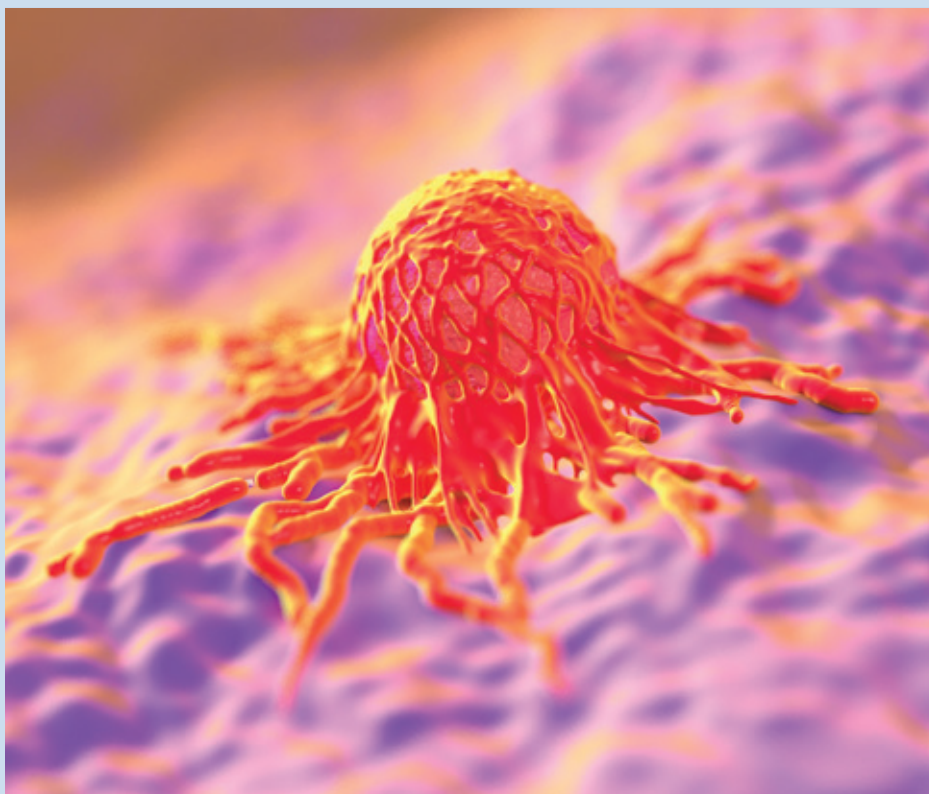
"If you use an inhibitor for this pathway, the cancer stem cells will die instead of regenerating a tumor," said Matei, who is also

a professor of Medicine in the Division of Hematology and Oncology.

When treated early enough, ovarian cancer usually follows a predictable course of remission after chemotherapy and subsequent relapse up to two years later. This long layoff may be caused by cancer stem cells (CSCs) — a small population of cells within tumors capable of self-renewal and differentiation. "Chemotherapy can eliminate most cells, but in some cancers, the stem cells are left behind, waiting until conditions are more favorable," Matei said.

This study was supported by U.S. Department of Veterans Affairs grant BX000792-09A2 and National Cancer Institute grant U54 CA268084-02.





CLINICAL BREAKTHROUGHS

Recurring Brain Tumor Growth is Halted with New Drug



When a specific non-metastatic brain tumor — a meningioma — recurs after surgery and radiation treatment, a patient is normally out of options. No drugs are approved for these aggressive tumors, which occur in up to 20 percent of cases and can lead to patient disability or even death.

But now Northwestern Medicine scientists, in a study published in *Nature Genetics*, as part of an international collaboration with scientists at the University of California, San Francisco and the University of Hong Kong, have identified a drug that inhibits growth of the most aggressive meningiomas and how to most accurately identify which meningiomas will respond to the drug. The drug is a newer cancer treatment called abemaciclib.

The scientists demonstrated the effectiveness of the drug in select patients, mouse models, a 3-D living tissue brain tumor (organoids) and cell cultures.

Investigators discovered meningiomas can be divided into molecular subgroups with different clinical outcomes and recurrence rates. This new method of classifying tumors allows scientists to predict recurrence more accurately than the current method of classifying the tumor.

MENINGIOMA RECURS AFTER SURGERY IN 20% OF CASES AND CAN LEAD TO PATIENT DISABILITY OR EVEN DEATH.

“Our study identifies which patients we should treat with this drug, because their tumor will likely respond to it,” said study leader and corresponding author, Stephen Magill, MD, PhD, assistant professor of Neurological Surgery.

The research was supported by grants 1F32CA213944, 5K08CA212279 and 1R01CA262311 from the National Cancer Institute of the National Institutes of Health, the Linda Wolfe Memorial Meningioma Research Project and the Lou and Jean Malnati Brain Tumor Institute at Northwestern University.

DISEASE DISCOVERIES

NEW TOOL TO CREATE HEARING CELLS LOST IN AGING



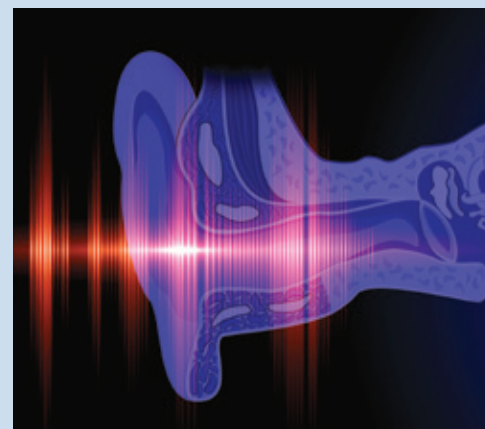
Northwestern Medicine scientists have discovered a single master gene that programs ear hair cells into either outer or inner ones, overcoming a major hurdle that had prevented the development of these cells to restore hearing, according to new research published in *Nature*.

“Our finding gives us the first clear cell switch to make one type versus the other,” said lead study author Jaime García-Añoveros, PhD, professor of Anesthesiology and Neuroscience in the Ken and Ruth Davee Department of Neurology. “It will provide a previously unavailable tool to make an inner or outer hair cell. We have overcome a major hurdle.”

About 8.5 percent of adults aged 55 to 64 in the U.S. have disabling hearing loss. That increases to nearly 25 percent of those aged 65 to 74 and 50 percent of those who are 75 and older, reports the Centers for Disease Control.

Currently, scientists can produce an artificial hair cell, but it does not differentiate into an inner or outer cell, which provide different essential functions to produce hearing. The discovery is a major step towards developing these specific cells.

The study was funded by the National Institute on Deafness and Other Communication Disorders grants R01 DC015903 and R01 DC019834.



DISEASE DISCOVERIES

CAN WEEKLY PREDNISONE TREAT OBESITY?



Obese mice that were fed a high-fat diet and that received prednisone one time per week had improved exercise endurance, got stronger, increased their lean body mass, and lost weight, reports a new Northwestern Medicine study published in *The Journal of Experimental Medicine*.

The once-weekly prednisone promoted nutrient uptake into the muscles, and the mice also had increased muscle metabolism.

Investigators also found these mice had increased adiponectin levels, a fat-derived hormone that appears to play an important role in protecting against diabetes and insulin resistance.

The scientists also showed that mice that were already obese from high-fat diets also benefited from once-weekly prednisone, experiencing increased strength, running capacity and lower blood glucose.

“These studies were done in mice. However, if these same pathways hold true in humans, then once-weekly prednisone could benefit obesity,” said senior author Elizabeth McNally, MD, PhD, the Elizabeth J. Ward Professor of Genetic Medicine and director of the Center for Genetic Medicine.

The study was funded by National Institutes of Health grants DK121875, HL158531, AG049665, AR052646 and HL061322, and the CCHMC Heart Institute Translational Grant.

DISEASE DISCOVERIES

Lower Statin Threshold Shown to be Cost-Effective



Expanding prescription of statin medication to reduce low-density lipoprotein cholesterol could be a cost-effective intervention against cardiovascular disease, according to a Northwestern Medicine study published in the journal *Circulation*.

“Thinking about how we can use our limited healthcare resources cost-effectively is very important for structuring healthcare,” said Ciaran Kohli-Lynch, PhD, a postdoctoral fellow in Health Services and Outcomes Research at the Center for Education in Health Sciences (CEHS) and lead author of the study.

HMG-CoA reductase inhibitors, commonly referred to as statins, help reduce levels of low-density lipoprotein (LDL) cholesterol and are widely used to prevent cardiovascular disease (CVD) in those at

risk. Current Scottish guidelines recommend statin medication for people with more than 20 percent risk of cardiovascular disease within 10 years, a measure determined by the ASSIGN cardiovascular risk score.

Both the United States and England use a much lower 10-year risk threshold for prescribing statins: 7.5 percent and 10 percent, respectively. Further, the patents for major statin drugs expired during the 2010s and generic medication options have reduced the overall cost of statin treatment.

“If it was cost-effective to treat one group of patients at the patented price, we might be able to expand our treatment population as the cost-benefit tradeoff changes,” Kohli-Lynch said.

This study was supported by the Medical Research Council, Swindon grant MR/K501335/1 and the National Institute on Disability, Independent Living, and Rehabilitation Research grant 610-5441030-60057402.

**10-YEAR RISK
THRESHOLD FOR
PRESCRIBING
STATINS:**

**7.5%
UNITED STATES**

**10%
ENGLAND**



DISEASE DISCOVERIES

GENETIC VARIANTS IN EPILEPSY GENE IDENTIFIED



Investigators have discovered a new method to determine whether individual genetic variants in the epilepsy-associated gene *SZT2* cause a neurodevelopmental disorder, according to a Northwestern Medicine study published in the journal *Brain*.

Pathogenic variants in *SZT2* have been associated with the development of different neurodevelopmental disorders, including early-onset epilepsy and developmental delays. Additionally, the *SZT2* protein plays an essential role in the mTORC1 signaling pathway, which helps promote cell growth and proliferation.

Meanwhile, many *SZT2* missense variants — variants where a single amino acid is replaced by another — have been increasingly detected through clinical genetic testing but classified as variants of uncertain significance, or variants that do not have a clear association with disease.

Classifying these variants as either likely benign or pathogenic, however, has remained a challenge due the large size of *SZT2* — it contains more than 3,400 amino acids — as well as its lack of crystal structure and functional domains.

“There are many different amino acids that can be mutated and become missense variants, so it’s very challenging to tell which are pathogenic and which are benign. That’s

why high-throughput studies like this are so important,” said Gemma Carvill, PhD, assistant professor in The Ken and Ruth Davee Department of Neurology Division of Epilepsy and Clinical Neurophysiology and senior author of the study.

This work was supported by National Institute of Neurological Disorders and Stroke grant RO0NS089858, and the Northwestern University Clinical and Translational Sciences (NUCATS) Institute grant TR001423.



CLINICAL BREAKTHROUGHS

Good Outcomes in COVID-19 Lung Transplants



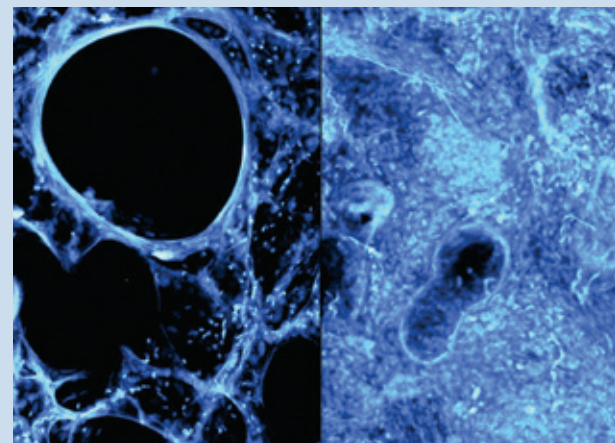
Patients with COVID-19-associated acute respiratory distress syndrome who received lung transplants had similar outcomes, compared to transplant patients without COVID-19, according to a Northwestern Medicine study published in *JAMA*.

The findings demonstrate the viability of lung transplants in patients with COVID-19-associated acute respiratory distress syndrome (ARDS), according to Ankit Bharat, MBBS, the Harold L. and Margaret N. Method Research Professor of Surgery, chief of Thoracic Surgery in the Department of Surgery and senior author of the study.

“Even for the most critically-ill COVID patients, their long-term survival is similar,” said Bharat, who is also a professor of Medicine in the Division of Pulmonary and Critical Care. “You can take these sick patients off of the ventilator, transplant them and still achieve good outcomes.”

The retrospective study included 102 patients who underwent a lung transplant at Northwestern Memorial Hospital between January 2020 and September 2021, including 30 patients who had who had COVID-19-associated ARDS.

This study was supported by the National Institutes of Health grants NIH HL145478, HL147290 and HL147575.



MEDIA SPOTLIGHT

TODAY

Woman's 'Panic Attacks' Were Caused by Tumor Lurking in Her Brain

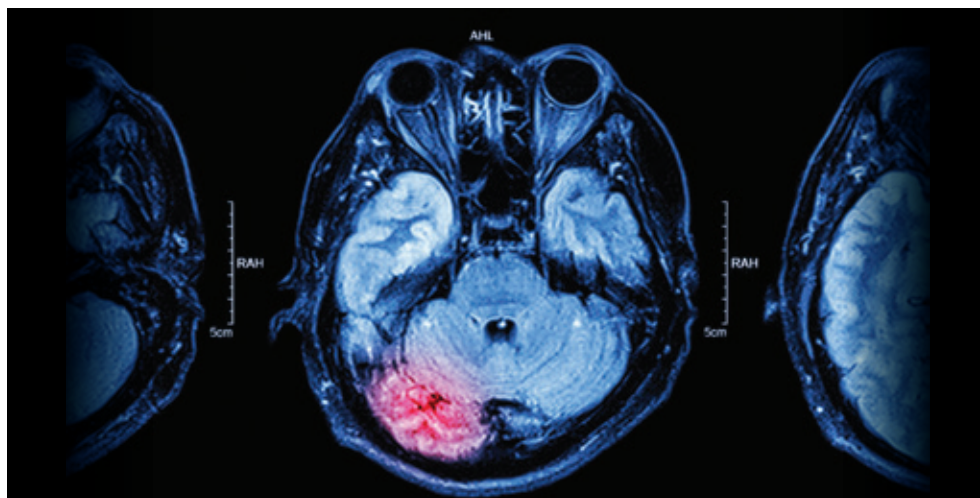
Kim Grau was prescribed Xanax by a psychiatrist who thought her flashbacks, brain fog, and episodes of fear were due to anxiety and panic disorders. The real cause was a dysembryoplastic neuroepithelial tumor — a benign growth that was located deep in the frontal lobe of her brain.

That tumor was causing seizures, which led to the symptoms, according to Matthew Tate, MD, associate professor in the Department of Neurological Surgery and in the Ken and Ruth Davee Department of Neurology, and a neurosurgeon at Northwestern Medicine. Tate was a part of a medical team that removed the tumor, going in between the two halves of the brain to reach the challenging spot, according to *Today*.

The New York Times

Patients Taking Experimental Obesity Drug Lost More Than 50 Pounds, Maker Claims

An experimental drug has enabled people with obesity or who are overweight to lose about 22.5 percent of their body weight, about 52 pounds on average, in a large trial, the drug's makers announced. Robert F. Kushner, MD, professor of Medicine in the Division of Endocrinology, said the new drug can close a so-called treatment gap. Because obesity is a chronic medical condition, patients would need to take tirzepatide for a lifetime.



npr

Concussions Don't Necessarily Hurt Your Ears, But Can Hurt Your Hearing

People who sustain a concussion can develop an unusual hearing problem. Their ears work fine, but their brain struggles to process sounds.

"Making sense of sound is one of the hardest jobs that we ask our brain to do. So you can imagine that a concussion, getting hit in the head, really does disrupt sound-processing," Nina Kraus, PhD, told NPR's "All Things Considered."

The New York Times

Can Virtual Reality Help Ease Chronic Pain?

Chronic pain is generally defined as pain that has lasted three months or longer. It is one of the leading causes of long-term disability in the world. Virtual reality is emerging as an unlikely tool for solving this intractable problem. Research has shown that chronic pain also changes the central nervous system. A. Vania Apkarian, PhD, director of the Center for Translational Pain Research, found that when back pain persists, the activity in the brain shifts from the sensory and motor regions to the areas associated with emotion, which include the amygdala and the hippocampus.

Kraus, director of Northwestern's Auditory Neuroscience Laboratory, Brainvolts, is studying this problem in hundreds of college athletes. She says athletes who sustain a concussion usually have normal hearing when it comes to detecting faint sounds, yet they often fail the speech-in-noise test, in which athletes listen to a sentence embedded in increasingly loud noise.

The Washington Post

Rise in Perinatal and Postpartum Depression Needs to Be Tackled

People suffering from perinatal and postpartum depression need support, and coping strategies that go beyond medications, experts say. Research, including a new study at Northwestern, shows that medications are not always effective in treating postpartum depression. Researchers involved in this study include faculty members Jody Ciolino, PhD, Catherine Stika, MD, Dorothy Sit, MD, Sheehan Fisher, PhD, Crystal Clark, MD, Sheehan Fisher, PhD, Alfred L. George, MD, Michael Avram, PhD, Laura Rasmussen-Torvik, PhD, Katherine Wisner, MD, and Jacqueline Gollan, PhD.

FACULTY AWARDS & HONORS



Ike Okwuosa, MD, '13 GME, assistant dean of Medical Education and assistant professor of Medicine in the Division of Cardiology, is the recipient of the Impact Educator of the Year award from the I Am Abel Foundation.

John Pandolfino, MD, '94, '96 GME, chief of Gastroenterology and Hepatology and the Hans Popper Professor of Medicine in the Division of Gastroenterology and Hepatology, is the recipient of the Hero in Healthcare Angel award from the I Am Abel Foundation.

Kimbra A. Bell, MD, clinical associate professor of Medicine in the Division of General Internal Medicine, has been named medical director of one of Northwestern Medicine's latest ambulatory expansion projects, located in Chicago's Bronzeville neighborhood.



Sara A. Solla, PhD, professor of Neuroscience, was elected as a member of the American Academy of Arts and Sciences, one of the nation's oldest and most prestigious honorary societies. [📷 1](#)

Leah C. Neubauer, EdD, MA, associate professor of Preventive Medicine in the Division of Public Health Practice, has been awarded the 2022 Association for Prevention Teaching and Research (APTR) F. Marian Bishop Educator Award. [📷 2](#)

Ashti A. Doobay-Persaud, MD, co-director of the Robert J. Havey, MD Institute for Global Health - Center for Global Health Education, and associate professor of Medical Education and Medicine in the Division of Hospital Medicine, was awarded the Dr. Thomas Hall-Dr. Nelson Sewankambo Mid-Career Leadership Award



from the Consortium of Universities for Global Health. [📷 3](#)

Karin B. Ulstrup, MD, '04 GME, clinical assistant professor of Medicine in the Division of General Internal Medicine, received the Velji Faculty Leader in Global Health Innovation Award.

Andrea Graham, PhD, assistant professor of Medical Social Sciences and Preventive Medicine, received the annual Society of Behavioral Medicine Early Career Investigator Award from the Society of Behavioral Medicine. [📷 4](#)

Emilie Johnson, MD, MPH, FACS, professor of Urology in the division of Pediatric Urology and a member of IPHAM's Center for Health Services and Outcomes Research, was selected as a USMART Mentee through the American Urological Association. [📷 5](#)



Harris R. Perlman, PhD, the Mabel Greene Myers Professor of Medicine in the Division of Rheumatology, and **Katherine L. Wisner, MD**, the Norman and Helen Asher Professor of Psychiatry and Behavioral Sciences in the Division of General Psychiatry and of Obstetrics and Gynecology, received the Medical Faculty Council Faculty (MFC) Mentor of the Year Award.

Farzaneh Sorond, MD, PhD, vice chair for Faculty Development and Education, chief of Stroke and Vascular Neurology in the Department of Neurology, and the Dean Richard H. Young and Ellen Stearns Young Professor, was named the new vice dean for Academic Affairs, effective September 1, 2022. She will fill the former role of William Lowe, Jr., MD, who served as vice dean for Academic Affairs for 14 years. [📷 6](#)



Melissa Simon, MD, MPH, the George H. Gardner, MD, professor of Clinical Gynecology and vice chair for research in the Department of Obstetrics and Gynecology, has been elected to the Association of American Physicians (AAP).

Grant Barish, MD, the Martha Leland Sherwin Professor of Medicine in the Division of Endocrinology, Metabolism and Molecular Medicine, has been elected to the American Society for Clinical Investigation, which seeks to support the scientific efforts, educational needs, and clinical aspirations of physician-scientists to improve the health of all people.

William J. Gradishar, MD, chief of Hematology and Oncology and the Betsy Bramsen Professor of Breast Oncology, received



the 2022 Rodger Winn Award from the National Comprehensive Cancer Network for his contributions in the development of clinical breast cancer practice guidelines, commitment to excellence, and dedication to multidisciplinary care. [📷 7](#)

Evan Scott, PhD, the Kay Davis professor of Biomedical Engineering and Microbiology-Immunology, was inducted into the American Institute for Medical and Biological Engineering (AIMBE). AIMBE Fellows represent the top 2 percent of medical and biological engineers.

Darby Morhardt, PhD, LCSW, research professor in the Mesulam Center for Cognitive Neurology and Alzheimer's Disease and of Preventive Medicine, was appointed to the Illinois Supreme Court Commission on Elder Law.

Celebrating the Class of 2022

From an early age, Sam Bowers, '22 MD, '22 PhD, says he knew he wanted to become a physician and in college he fell in love with basic benchside research. Now a graduate of Feinberg's Medical Scientist Training Program (MSTP), Bowers said he is looking forward to combining his passions for patient care and research as he embarks on the next stage of his career as a physician-scientist.

"I realized the best way to apply this incredibly interesting science and physiology that I was learning about was to use it to help people," Bowers said.

Bowers, who will begin his residency this fall in anesthesiology at the University of Michigan, said he is grateful for how Feinberg has prepared him and his classmates to be well-rounded physicians.

"Feinberg didn't just prepare us to do well on the board exams and do well on all our written tests and clinical rotations. They prepared us to be complete physicians by having us go out in the community as early as our first year and look at what the healthcare needs were in the different communities in Chicago. Having ties outside the normal science of medicine I think really helps us take care of the entire patient and their families," Bowers said.

Feinberg honored the MD Class of 2022 during the medical school's 163rd commencement ceremony in the Aon Grand Ballroom at Navy Pier on May 23.

Eric G. Neilson, MD, vice president for Medical Affairs and Lewis Landsberg Dean, welcomed graduating medical students, faculty, family, and friends to the first in-person ceremony the medical school has held in three years.

"You're entering a brave new world of managing priorities, a world where keeping people from all walks of life as healthy as we can becomes a collective responsibility of science and the medical profession," Neilson said.

Neilson then introduced Kathleen Hagerty, MBA, PhD, provost of Northwestern University, who encouraged students to apply the lessons they've learned throughout their medical school career to their future careers as physicians.

"During this era, against the backdrop of a global pandemic, we have witnessed the critical importance of both scientific discovery and compassionate care around the world, and especially here in Chicago, home to Feinberg and Northwestern Medicine. You chose the very best place to learn health and the most critical aspects of medicine, and I hope you carry them forward through a lifetime of service and to your patients," Hagerty said.

Mary E. Klotman, MD, the R.J. Reynolds Distinguished Professor of Medicine and dean of the Duke University School of Medicine, delivered this year's commencement address. "The challenges, losses, and disruptions in all our lives have been daunting. This experience will be part of each of our narratives going forward, and this is uniquely true for you, medical school graduates, having experienced this enormous disruption in healthcare in the middle of your dream," Klotman said. "But history tells us that this type of massive disruption can be a catalyst for positive change, so I encourage you to ask yourselves how your experience during this pandemic helped define who you are."

Sandy Sanguino, MD, MPH, senior associate dean for Medical Education, presented the members of the class of 2022, who crossed the stage to receive their diplomas and doctoral hoods, either from a faculty mentor or physician family member.

1 Ramael Ohimoba, '22 MD, addressed her classmates about how learning to listen and speak up as medical students has prepared them to be capable and confident physicians. **2** Mary E. Klotman, MD, the R.J. Reynolds Distinguished Professor of Medicine and dean of the Duke University School of Medicine, delivering this year's commencement address.





Left: Members of Feinberg's Physician Assistant Program were honored during their commencement ceremony on May 6. Commencement for the Doctor of Physical Therapy Program was held April 14.

Ramael Ohiomoba, '22 MD, addressed her classmates about how learning to listen and speak up as medical students has prepared them to be capable and confident physicians. Ohiomoba will begin her internal medicine residency at Brigham and Women's Hospital in Boston this fall.

"As physicians, it will always be our duty to speak up, especially when it feels the most uncomfortable. What does this mean? It means admitting that you don't know the answer while maintaining confidence in your abilities as a capable clinician. It means learning to overcome our inner self doubts and speak up in the best interests of our patients no matter the consequences, and, most importantly, envisioning yourself as part of a team," Ohiomoba said.

At the conclusion of the ceremony, Neilson led the graduates in reciting the Declaration of Geneva, the modern declaration of the physician's oath, and the same they took as first-year medical students at Founders' Day.

Thirty-five graduating students were inducted into the Alpha Omega Alpha medical honor society. Seven students received Magna Cum Laude in Scientia Experimentalis, and six received Cum Laude in Scientia Experimentalis. Eight students graduated Summa Cum Laude, eight graduated Magna Cum Laude, and eight graduated Cum Laude.

Many also took advantage of Feinberg's dual-degree programs; 11 graduates received a Master's Degree in Business Administration, one earned a Master's Degree in Medical Humanities and Bioethics, seven received a Master's Degree in Public Health and 12 completed a PhD in the Medical Scientist Training Program. Following the ceremony, graduates, family and friends attended a reception at Navy Pier.

DUAL DEGREE RECIPIENTS

11

Master's Degree
in Business
Administration

1

Master's Degree
in Medical Humanities
and Bioethics

7

Master's Degree
in Public
Health

12

PhD in the Medical
Scientist Training
Program

McGaw Holds Second Annual Health Equity Week

The McGaw Medical Center of Northwestern University hosted the second annual Health Equity Week, a series of seven panel discussions highlighting the roots of healthcare disparities and how clinicians and scientists are working to find solutions.

Co-directors included Linda Suleiman, MD, '17 GME, assistant dean of Medical Education, assistant professor of Orthopaedic Surgery, and director of diversity and inclusion at McGaw Medical Center, and Oluwateniola Brown, MD, assistant professor of Obstetrics and Gynecology in the Division of Female Pelvic Medicine and Reconstructive Surgery.

A range of topics were covered. Utibe Essien, MD, assistant professor of Medicine at the University of Pittsburgh, spoke about ensuring access to medications for patients regardless of race or socioeconomic status, which he calls "pharmacoequity."

Oluwaferanmi Okanlami, MD, MS, assistant professor of Family Medicine at the University of Michigan, who is disabled, explained how the U.S. health system is not



**LINDA SULEIMAN,
MD, GME**



**OLUWATENIOLA
BROWN, MD**



**NIA HEARD-GARRIS,
MD, MSc**

built to care for people with disabilities. "We need to identify the barriers that exist and then provide that equitable access, whether that's a disability health curriculum that we have in our medical school [or training for] how to care for patients with disabilities and how to view disability," Okanlami said.

Nia Heard-Garris, MD, MSc, assistant professor of Pediatrics in the Division of Advanced General Pediatrics and Primary Care, spoke about how adverse childhood experiences (ACEs) are a major source of health

disparities in children and adults — yet, she stresses, describing ACEs and their associations with later health outcomes is not enough. Structures such as ableism, sexism, ageism, and racism deserve more dedicated study in how they contribute to ACEs, such as childhood abuse, neglect, and household circumstances.

"How we collect and accurately document this information will allow us to act on those disparities," Heard-Garris said.



Women in Medicine Conference

The fourth annual Women in Medicine conference was held on April 22 — in person for the first time in three years — at Northwestern Memorial Hospital.

The theme was "Celebrating Our Voices," and featured presentations that shed light on gender disparities in medicine and offered opportunities for attendees to share experiences and tools to overcome these barriers.

The event co-organizers were: Sarah Friedewald, MD, chief of Breast Imaging in the Department of Radiology; and Angira Patel, MD, MPH, '10, '11 GME, associate professor of Pediatrics in the Division of Cardiology and of Medical Education.

Kathleen Hagerty, MBA, PhD, provost of Northwestern University, delivered opening remarks "Gender equity in medicine, or in any field for that matter, is not a woman's issue; it's a societal issue," she said.



The scientific poster session showcased dozens of projects, with topics ranging from fundamental mechanisms of neurons to new modalities of speech therapy tailored for an increasingly online world. Photo by Teresa Crawford.

One Division Becomes Two

The Department of Medicine's Division of General Internal Medicine and Geriatrics has been separated into two divisions: the Division of Geriatrics and the Division of General Internal Medicine.

"With the growth of the Geriatric program in the critical domains of clinical activity, research, and training, it is clear that it deserves full Divisional status," said Douglas Vaughan, MD, chair and the Irving S. Cutter Professor of Medicine and director of the Potocsnak Longevity Institute.

Lee Lindquist, '00 MD, '05 MPH, MBA, '03 GME, the George M. Eisenberg Research Professor of Geriatric Medicine and current section chief of Geriatric Medicine in the Department of Medicine, will lead as chief of the Division of Geriatrics.

Lindquist's patient-centered research focuses on helping older adults age-in-place when they develop Alzheimer's disease through home and community-based resources and supporting caregivers. She also provides clinical care for older adults in her geriatrics clinic and is the medical director of the Clare at Watertown in Chicago, a continuing care retirement community.

"With the recent creation of both the NIH-funded Northwestern Pepper Center and the Potocsnak Longevity Institute, innovative geriatrics research and training has a solid home at Northwestern. I am extremely proud of our strong all-female faculty team of geriatricians — they are truly an amazing group of physicians," Lindquist said.

Jeffrey A. Linder, '97 MD, MPH, the Michael A. Gertz Professor of Medicine, who has served as chief of General Internal Medicine and Geriatrics in the Department of Medicine, will continue his leadership as chief of the Division of General Internal Medicine.



Lee Lindquist, '00 MD, '05 MPH, MBA, '03 GME, the George M. Eisenberg Research Professor of Geriatric Medicine, will lead the Feinberg's new Division of Geriatric Medicine.

Alzheimer Day Returns

The Mesulam Center for Cognitive Neurology and Alzheimer's Disease held the 28th annual Alzheimer Day on May 5, returning to campus for the first time in three years.

M. Marsel Mesulam, MD, chief of Behavioral Neurology, the Ruth Dunbar Davee Professor of Neuroscience, and director of the center, welcomed attendees, highlighted recent renewals of several large grants, and thanked research participants and their families.

The keynote Mendelson Lecture was delivered by Lisa Barnes, PhD, professor of Neurological Sciences at Rush Medical College, who launched the Minority Aging Research Study with the goal of examining

how aging may differ in a racial minority cohort. Barnes discovered that a gene variant thought to have no impact on Alzheimer's risk was actually protective in Black people, a finding that had been obscured by the low inclusion of Black patients in genetic studies.

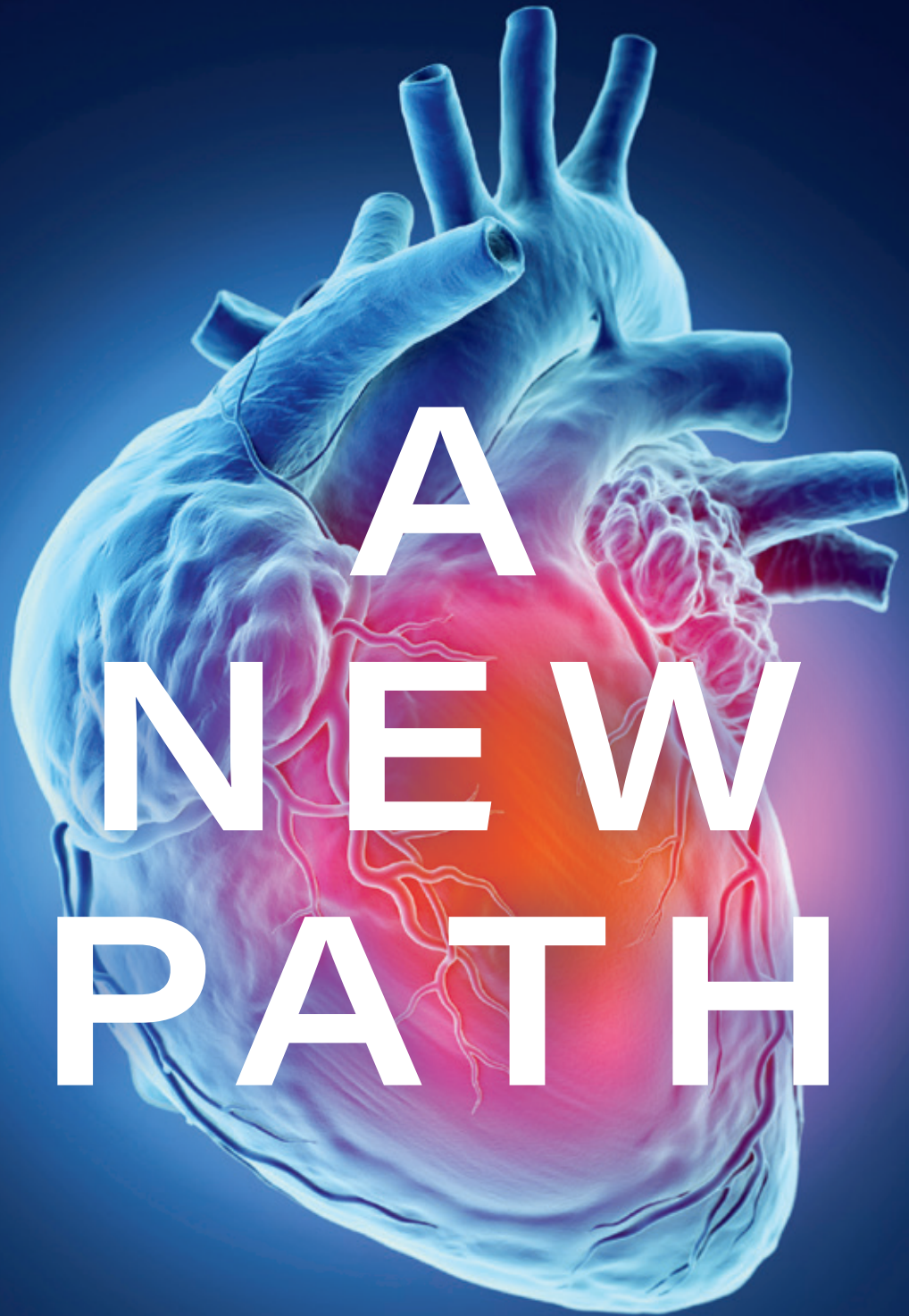
The event also included a scientific poster session that showcased dozens of projects, with topics ranging from fundamental mechanisms of neurons to new modalities of speech therapy tailored for an increasingly online world.

Finally, the gathering marked 25 years of the Glen and Wendy Miller Family Buddy Program, which matches first-year medical students with patients diagnosed with early Alzheimer's disease or related illnesses.

Program director Darby Morhardt, PhD, research professor at the Mesulam Center, of Preventive Medicine in the Division of Public Health Practice, welcomed Jim Butler, a mentor who has participated in the program for four years. "The Buddy Program has brought me more joy than I ever would have imagined," he said.



Jim Butler, a mentor who has participated in the Glen and Wendy Miller Family Buddy Program for four years. Photo by Teresa Crawford.



A NEW PATH

BY MELISSA ROHMAN

Northwestern scientists tackle a common — yet elusive — type of heart disease with novel approaches and a new urgency.

While completing his cardiology fellowships in the mid 2000s, Sanjiv Shah, '00 MD, often lamented the lack of specialized research programs for an increasingly recognized type of heart disease — heart failure with preserved ejection fraction (HFpEF), which is strikingly different from the traditional heart failure condition driven by a weak heart muscle. Moreover, he was struck by the shortage of medical attention provided to these patients.

“I was thinking to myself, ‘No one is really focusing on the care of these patients.’ Clinical trial enrollment was dismal,” says Shah, who is the Neil J. Stone, MD, Professor of Medicine in the Division of Cardiology and director of research at the Bluhm Cardiovascular Institute.

Formerly known as diastolic heart failure, but now appreciated as a much more complex perturbation effectively limiting the performance of the heart despite an apparent intact muscle, HFpEF occurs when the heart is unable to relax and fill with enough blood during each heartbeat. To compensate, pressure increases in the heart so it can properly fill with blood and support heart performance. Typically, this mechanism fails. Consequently, fluid builds in the lungs, leading to shortness of breath, fatigue, irregular heartbeat, and, ultimately, heart failure.

Of the estimated six million patients in the U.S. living with heart failure, over half have HFpEF. Currently, HFpEF accounts for most heart failure-related hospitalizations in the U.S. for people over the age of 65.

Yet, HFpEF has been historically misunderstood, resulting in misdiagnosis and limited

treatments. When he was training, Shah says he remembers many in the field thought HFpEF simply equated to a stiff heart muscle that couldn't relax properly. While this was in part true, in reality, there was more to the condition.

“When these patients exercise, their heart typically doesn't squeeze as well as it should, so it's not simply a problem of a stiff heart unable to fill. And HFpEF affects several other organs besides the heart,” Shah says. “It involves the skeletal muscles, the lungs, the kidney, the adipose tissue, even the liver.”

This revelation prompted Shah to establish the world's first dedicated HFpEF clinical program, which found a home at Northwestern in 2007. The program aims to improve HFpEF prevention, diagnosis, treatment, and prognosis through pioneering research and expert clinical care.

“When I first started at Northwestern, I thought that this syndrome is much more complex than most realized, and I think anyone who takes care of a lot of these patients recognizes that HFpEF is heterogeneous. Therefore, one of my main goals when starting the HFpEF program at Northwestern was to improve classification of HFpEF subtypes in order to guide treatment approaches,” Shah says.

Now, Shah and other Feinberg investigators including Sadiya Khan, '09 MD, '14 MSc, '10, '12 GME, assistant professor of Medicine in the Division of Cardiology and of Preventive Medicine in the Division of Epidemiology, are continuing to study the underlying mechanisms of HFpEF with the hope of better preventing the disease and identifying novel therapeutic targets and strategies. ▶



Sanjiv Shah, MD



Sadiya Khan, MD, MSc



Clyde Yancy, MD, MSc

“It’s really exciting to say we’re getting more and more precise, that the work we’re doing is really seeming to make a benefit, and that we’re really getting close, hopefully to not just one class of drugs for this patient population, but a whole host of drugs and devices to improve this disorder,” Shah says.

INVESTIGATING HFpEF

There are currently no simple diagnostic tests for HFpEF, leaving providers to rely on interpreting patient signs and symptoms or cardiac imaging results.

The lack of clear definitions for HFpEF subtypes has also contributed to confusion and misdiagnosis and, therefore, not all HFpEF patients respond favorably to the same treatment. A one-size-fits-all approach has been tried numerous times in HFpEF clinical trials with little success. Recently, a few proven treatments tested in trials co-led by Shah and colleagues have been FDA-approved and are now available; however, even with these treatments, HFpEF patients still have high morbidity and mortality.

But the future looks bright. In just the last 15 years, Northwestern investigators have discovered more about the underlying biological basis of HFpEF than ever before. For example, they have provided evidence, published in *Circulation*, that risk factors such as obesity, metabolic stress, hypertension, and physical inactivity are associated with a distinct protein “signature” in the blood that results in abnormalities in heart function in patients with HFpEF. In addition, Shah and colleagues pioneered the use of machine-learning techniques to classify complex clinical syndromes such as HFpEF; in 2015, they published the first study on a data-driven technique they called “phenomapping” to classify HFpEF patients into novel, distinct subtypes, also published in *Circulation*.

Most recently, Shah’s team discovered that some patients with HFpEF might benefit from an intentional communication between the upper chambers of the heart, or, an atrial shunt, according to findings published in *The Lancet*. The novel, minimally invasive device, which is

inserted through a catheter, could potentially lower pressure in the heart’s left atrium and reduce HFpEF symptoms.

Feinberg investigators have also made significant contributions to the advancement of HFpEF treatments and identifying at-risk patient groups. In a study published in *Nature Medicine*, a team of investigators including Shah and Khan found that dapagliflozin — a drug commonly used to treat type 2 diabetes — improved symptoms and physical limitations in patients with HFpEF.

“It’s really phenomenal. Finally, we are able to tell patients we have a drug that will make them feel better, do more, and stay out of the hospital,” Shah says.

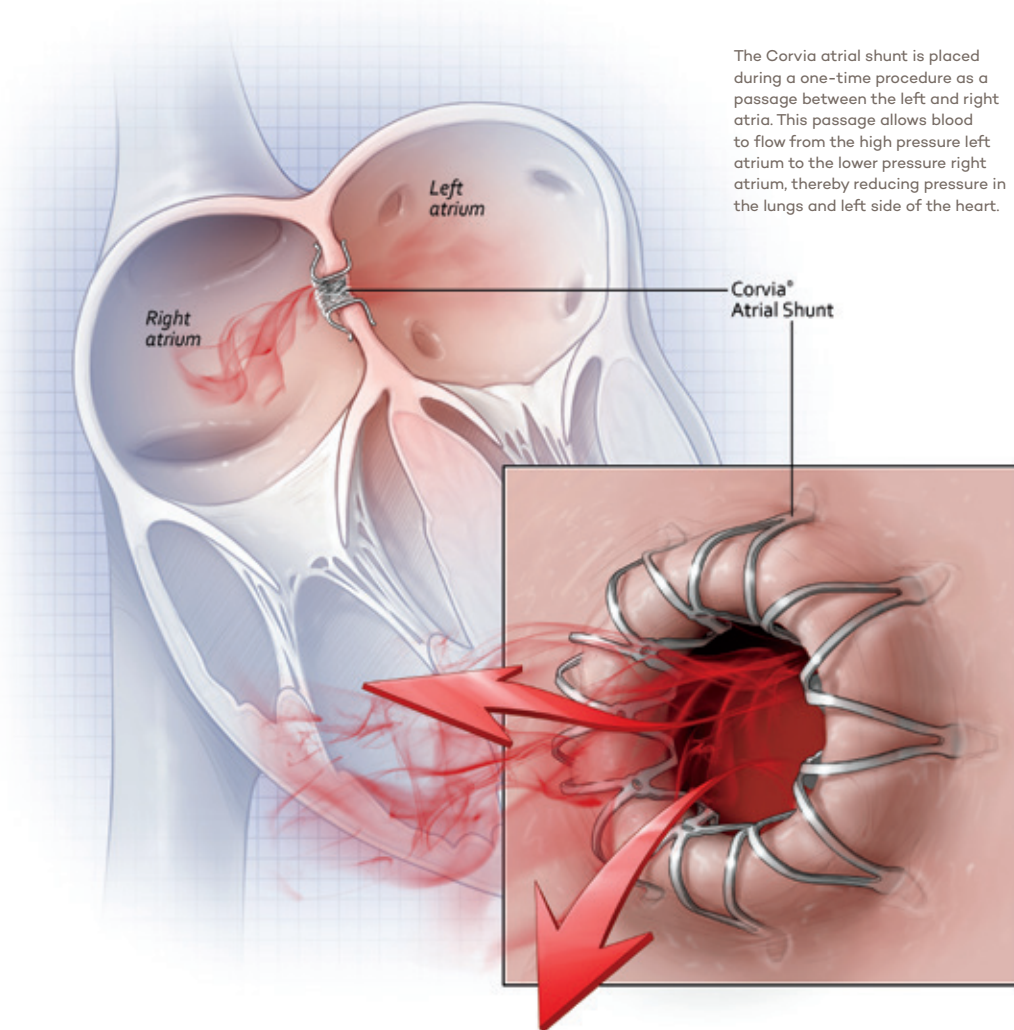
But the battle isn’t over, according to Shah. In order to pinpoint poorly differentiated diseases such as HFpEF and identify effective treatments, Shah said the field

needs to move away from large clinical trials and instead leverage clinical data that’s readily available.

“I think that’s really the goal of precision medicine,” Shah says. “It’s not perfect and we have a long way to go, but we really have to think about leveraging all the data we have now to come to a future where we’re more precisely identifying and defining these clinical syndromes.”

IMPROVING DIAGNOSIS AND TREATMENT

In addition to the work in Shah’s clinic, Feinberg investigators were recently awarded an \$18.1 million grant from the National Institutes of Health (NIH) to study the underlying pathophysiology of HFpEF. The grant is part of the NIH HeartShare program, a multi-institutional research effort with the



“It’s really phenomenal. Finally, we are able to tell patients we have a drug that will make them feel better, do more, and stay out of the hospital.”

– Sanjiv Shah, MD

goal of characterizing the mechanisms driving HFpEF and identifying new therapies.

Shah leads the HeartShare Data Translation Center at Northwestern, the central hub of the program. Shah’s center coordinates all aspects of the HeartShare program, including the collection of data, images, and molecular data on thousands of patients from numerous previously conducted studies; the center is also directing a prospective study of 1,000 patients recruited at all six HeartShare program sites across the U.S.

Investigators in the program will perform exercise testing, imaging of the heart and

other organs, and phenotyping of blood and other tissues. Machine learning simultaneously applied to electronic health records, echocardiograms (heart ultrasounds), heart MRIs, CT scans, EKGs, and molecular analyses from the blood will enable improved determination of heart failure subtypes, with the goal of unraveling novel biological mechanisms underlying HFpEF.

“The HeartShare grant from the NIH is a phenomenal opportunity to continue our research to improve the classification of the heterogeneous HFpEF syndrome, understand the biological basis of HFpEF phenotypes, and set the stage for precision medicine clinical trials for HFpEF,” says Shah, who is also director of the Institute for Augmented Intelligence in Medicine’s Center for Deep Phenotyping and Precision Therapeutics.

Northwestern will also be home to one of HeartShare’s six clinical centers. Khan will lead the center, along with Laura Rasmussen-Torvik, PhD, chief of Epidemiology in the Department of Preventive Medicine. The center at Northwestern intends on leading the six sites in recruitment and enrollment of patients with HFpEF.

“HeartShare is a unique program that will catalyze the discovery of novel prevention and therapeutic options for patients living with or at risk for HFpEF,” Khan said. “It is an incredible honor to be part of the program, which will redefine the paradigm for defining HFpEF and fundamentally shift our approach to caring for these patients.”

The time is right for a paradigm shift, agrees Clyde Yancy, MD, MSc, the Magerstadt Professor and vice dean for Diversity and Inclusion, chief of Cardiology in the Department of Medicine and a professor of Medical Social Sciences.

“Collectively, the study of heart failure has come far; we have multiple new effective therapies, updated national treatment algorithms and new hope to restore quality of life and longevity in patients with traditional heart failure. But we have not sufficiently addressed a critical need: HFpEF,” he says. “Uniquely here at Northwestern, we have the talent and now the resources to allow further study of the pathophysiology and future treatment of this challenging iteration of heart failure.” ❖

The Role of Exercise

The *Lancet* study that found patients with HFpEF could benefit from an atrial shunt also offers new insight into the role exercise plays in understanding, diagnosing, and treating this type of heart failure.

“While the overall trial was neutral, in our pre-specified subgroup analyses we found that what happens in the heart and lungs during exercise is of prime importance in this type of heart failure,” Shah says. “The normal response to exercise is relaxation of the blood vessels in the lungs. Patients with HFpEF who are able to relax the blood vessels in their lungs appear to do well with the device, whereas those whose blood vessels can’t relax appear to do worse when an atrial shunt is implanted.”

While cardiovascular conditions such as coronary artery disease are routinely diagnosed with exercise testing, clinical assessment for HFpEF is done at rest — something that Shah says he hopes will change following this trial.

“This has potential to change the way we evaluate patients with this condition and should guide how future clinical trials are conducted and the criteria for enrollment,” Shah says. “If future trials validate what we found, the potential is enormous. This subgroup comprises two-thirds of people with this type of heart failure — that is 2 million people who could benefit from this innovative therapy.”



The Corvia REDUCE LAP-HF II pivotal trial is the largest device study ever conducted in HFpEF and the first pivotal trial of interatrial shunts completed. The results were also presented at the Cardiology Research Foundation (CRF)’s Technology and Heart Failure Therapeutics meeting earlier this year. Funding for the study was provided by Corvia Medical.

AI MEETS BASIC SCIENCE

Northwestern basic scientists are leveraging artificial intelligence and machine learning to untangle complex intracellular processes.

Human bodies are intricate networks of systems, and those networks become even more complex as we try to understand what happens when things go awry at the cellular level — when genetic mutations cause cancer, for example, or when viruses hijack cells.

Fortunately, as medical imaging and genomic data sets grow, so do the abilities of powerful new tools in the scientist's toolbox: namely, artificial intelligence (AI) and machine learning. These quickly evolving technologies have enhanced medicine at the clinical level — whether it's being used to diagnose disease or enhance electronic health record systems. Now, basic science research, too, is poised to benefit from these pattern-finding methodologies.

Feinberg scientists have begun to explore the possibilities, including using AI and machine learning to understand how viruses affect a cell's nucleus, discover new genetic mutations that cause cancer, and help define a subset of autism.

The potential is tremendous. But since the field is still relatively new, many faculty

aren't proficient in AI systems, and many AI investigators don't fully understand which biological questions could potentially be answered.

Several Feinberg faculty members act as bridges between these two fields, and through Feinberg's new Institute for Augmented Intelligence in Medicine (IAIM), faculty are training the next generation of investigators how to harness the power of AI.

"Machine learning has become really powerful as a tool to understand human disease and cancer at the cellular level," says Feng Yue, PhD, the Duane and Susan Burnham Professor of Molecular Medicine and director of IAIM's Center for Advanced Molecular Analysis. "The possibilities are unlimited, and I can't wait to see what happens."

ANALYZING INFECTED CELLS

To use artificial intelligence in basic science research, investigators often train machine learning systems to sift through datasets, find patterns, and ultimately

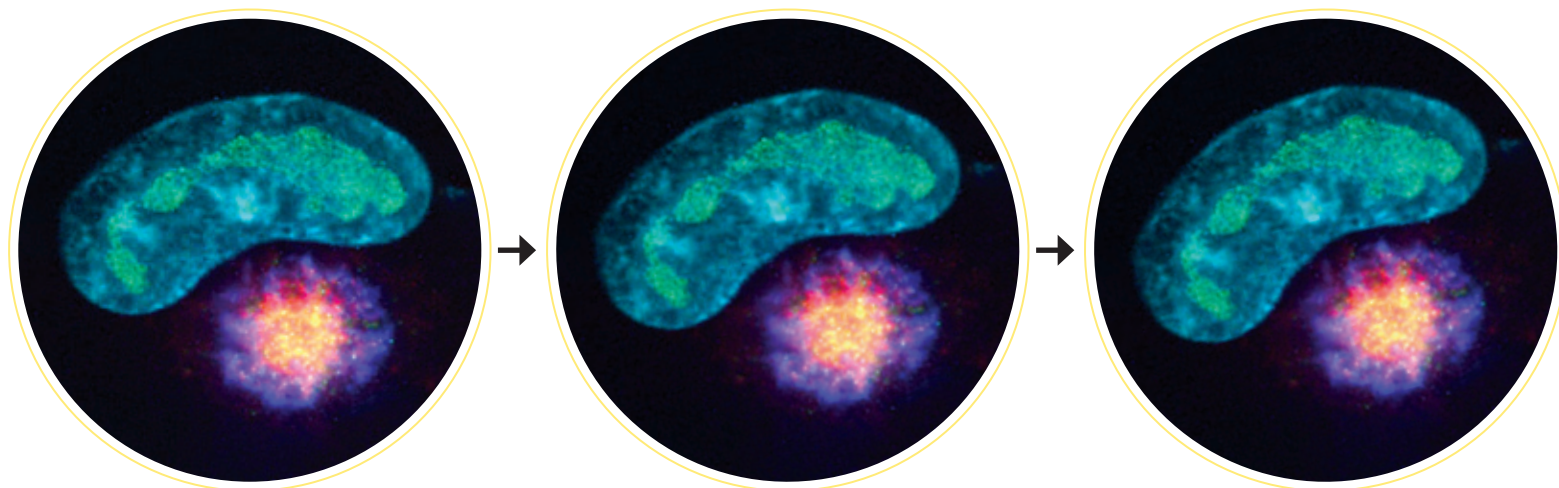


Revealing Images

Walsh and his team used a dataset of images of individual cells and developed automated cell imaging systems that use AI-based networks to identify and analyze virus-infected cells. Shown here:

By forming an unusual microtubule-organizing center (red/yellow/purple), the cytomegalovirus rotates the host nucleus as it organizes where viral DNA (green) and host DNA (turquoise) are located.

AI (simulated here by the rotation of one image) was central to understanding the complexity within the spatial organization of DNA and DNA-binding proteins within the nucleus during infection.



Previously, Yue and his collaborators showed that structural variants in cancer genomes can be detected by genomic analysis tools.

In this study, published in *Science Advances*, Yue and his collaborators collected a set of curated high-confidence structural variations of different types from eight cancer cell lines. These were used to train a deep learning model — named EagleC — to learn the hidden patterns buried in these signals.

EagleC found hundreds of fusion events in different types of cancers that were missed by current genome sequencing techniques. Gene fusion is a chromosomal rearrangement event that can play a significant role in cancers. This knowledge could be especially useful in studying cancer with a high frequency of fusion events, such as brain tumor and breast cancer.

“We can use AI for basic science research, but we want to find the actionable item in the data,” Yue says. “How can we use this information on mutations to classify patients and make predictions on how they will respond to drugs? The ultimate goal is to find the genetic variations that are most important to human disease, so we can learn how to manipulate regulators and make a breakthrough in treatment.”

UNDERSTANDING AUTISM

In some cases, using machine learning on cellular-level datasets combined with clinical data sets can lead to groundbreaking discoveries on hard-to-pin-down diseases.

Autism, for example, has no one defined cause, but it affects an estimated 1 in 44 children in the United States. Yuan Luo, PhD, associate professor of Preventive Medicine in the Division of Health and Biomedical Informatics, used artificial intelligence to find a previously unknown biomarker for a subset of the disease.

With access to huge amounts of genetic mutation data, sexually dimorphic gene expression patterns, animal model data, electronic health record data, and health insurance claims data, he and his collaborators were able to cross-compare potential patterns.

For a study published in *Nature Medicine*, the team identified clusters of gene exons —

“THE INTERSECTION OF AI AND CELL BIOLOGY IS STILL A RELATIVELY NEW BUT RAPIDLY GROWING AREA, AS PEOPLE HAVE BEGUN TO REALIZE ITS POWER AND IT BECOMES MORE ACCESSIBLE OR AVAILABLE.”

— Derek Walsh, PhD

parts of genes that contain information coding for a protein — that function together during brain development. They then used a state-of-the-art AI algorithm, graph clustering, on gene expression data.

They ultimately found that a certain autism subtype — known as dyslipidemia-associated autism, which represents about 7 percent of all diagnosed autism spectrum disorders in the United States — was characterized by abnormal lipid levels. This could lead to the first biomedical screening and intervention tool for this autism subtype.

“That will allow early intervention in treatment,” says Luo, who is also chief AI officer at the Northwestern University Clinical

and Translational Sciences (NUCATS) Institute and IAIM. “Only when we integrate different modalities of healthcare data can we actually develop profound insights of the disease etiology and come up with novel target interventions.

In the next five to ten years, we're going to see more and more studies that include multi-modal data. That will really stoke the fire of multimodal machine learning."

TEACHING THE NEXT GENERATION

Gathering the efforts of AI research at Feinberg is an important focus for IAIM, whose mission is to bridge computational methods with human expertise to advance medical science and improve human health.

Launched in 2020, the institute partners with investigators in the community to connect them with AI experts, help write grants, and educate the next generation of both clinical and basic science investigators on how to best use the tools of AI.

The institute launched the Health Data Gymnasium, a website that teaches students the basics of how to use data science and machine learning methods to find new insights. In 2021, the institute also hosted the first annual Big Ten Augmented Intelligence Bowl, bringing together multi-disciplinary teams of investigators from institutions representing the Big Ten Academic Alliance to discover new ways that AI could address health disparities.

"One of the biggest challenges in this space is that we don't have enough people in academic health who understand augmented intelligence and its possibilities," says Abel Kho, MD, professor of Medicine and Preventative Medicine and director of the institute. "We want to cross-train as many people as we can to help build that pipeline."

At NUCATS, Luo — who is also a trained computer scientist — helped launch the first AI class in the medical school and is helping to bring clinicians, basic scientists, and computer scientists together to expose them to the possibilities of AI in health care.

"There can sometimes be a lack of trust between the clinicians and AI scientists," he says. "We have witnessed AI proponents boasting that AI could displace radiologists

and pathologists, and clinicians feeling cynicism towards AI scientists throwing models at data. We really need to train them to work together and learn from each other in creative ways."

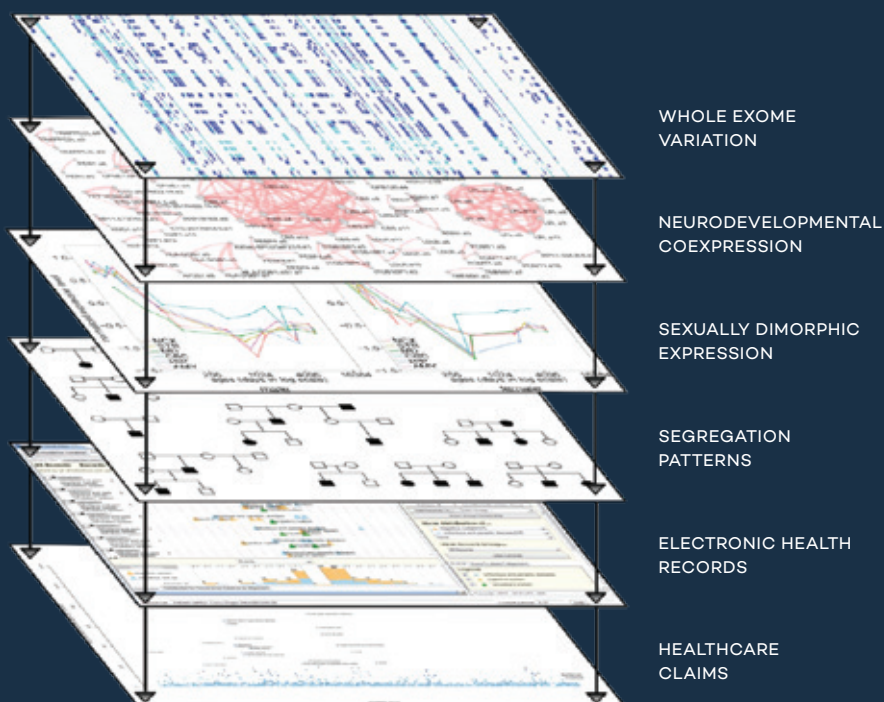
To that end, Luo launched the AI for Health (AI4H) clinic in 2019, which is open to all practicing Northwestern Medicine physicians. According to Luo, in this clinic physicians discuss a clinical problem which could benefit from AI, while AI scientists and trainees help brainstorm ideas,


iterate solutions, and deploy implementations.

"The clinic serves as a new arena to train clinicians and AI scientists, where they learn from each other through real-world case studies," Luo says. "For example, AI and machine learning can help prioritize scientific hypotheses for investigators — helping them focus their energies on the most promising candidate instead of searching for the needle in the haystack." ❖

Using Data Sets to Identify Autism Subtype

By integrating massive genomic, transcriptomic, EHR and claims data, the AI-driven precision medicine method identified a previously unrecognized risk factor for autism spectrum disorder (ASD) which was verified in large clinical cohorts. This study, conducted by Yuan Luo, PhD, opens avenues for early detection, intervention, and better outcomes for individuals with ASD and their family members.





World-class care
attracts patients to
Northwestern Medicine
from across the globe.

BY AIDAN MARKEY
PHOTOGRAPHY BY
LAURA BROWN

Khalifa Al-Ali needed a lung transplant.

The 29-year-old from the United Arab Emirates has cystic fibrosis, which was causing a serious decline in his lung capacity and performance. By the end of 2019, his care team in the UAE determined he needed new lungs. But cadaveric transplants are less common in Al-Ali's home country, and its organ donation program is fairly new. His case was further complicated by a colonization with *Pandoraea*, an antibiotic-resistant bacteria in his lungs that his care team did not have experience treating.

Al-Ali applied for treatment abroad through the UAE, but multiple hospitals declined his case. Finally, one Chicago hospital agreed to see him. In October 2020, seven months into the pandemic, Al-Ali traveled to Chicago and began two months of consultations with physicians at the hospital while staying in an apartment in Chicago with his brother and brother-in-law. The team ultimately declined to do the transplant because of the bacteria in Al-Ali's lungs.

That's when Northwestern Medicine stepped in. Al-Ali's family had pleaded with the UAE government's International Patient Care Division to contact Northwestern Memorial Hospital for another opinion. The UAE team had Al-Ali's medical records transferred to the Northwestern Medicine Transplant team to see if he was a candidate for transplant. In January 2021, Al-Ali met with infectious disease specialist Michael D. Ison, MD, who assured him the bacteria would not complicate his transplant surgery.

After consultations and assessments with a variety of Northwestern Medicine specialists, including Northwestern Medical Group pulmonologists Rade Tomic, MD, and Ambalavanan Arunachalam, MD, Al-Ali heard the words he needed to hear: "They said yes," recalls Al-Ali, "and it was one of the greatest moments of my life."

On September 3, 2021, Al-Ali got his wish: two new, healthy lungs. ▶

Beyond Borders



Meeting Individual Needs

Patients who travel to Northwestern Medicine receive personal support and assistance throughout their healthcare journey. Typical services may include:

- Coordination of medical records transfer and appointments
- Translation services
- Help with financial information
- Concierge services for patient and travel companions
- Assistance with dietary requirements
- Connection with places of worship
- Necessary accommodations for COVID-19

“The International Health team has done far more than required of their job. Without the team, my journey would be much harder.”

– Khalifa Al-Ali, Patient from the United Arab Emirates

GROWING CONNECTIONS

Since the International Health program launched at Northwestern Medicine in 2012, it has seen a 1,938 percent increase in patients, many of them seeking care from experts in Neurosciences, Transplant, Fertility and Reproductive Medicine, Urology, and Oncology. The growth in International Health is partly due to the system’s growing global name-recognition and worldwide reputation for excellence, but it also is partly due to the excellence of the International Health program itself.

“Beyond a comprehensive list of services, we have a multicultural International Health team as well as a diverse physician and nursing population,” explains Daniel Derman, MD, senior vice president, Administration, Northwestern Memorial HealthCare. “Patients appreciate seeing people who look like them or can speak their language when they are receiving care.”

While the International Health program benefits patients, it also makes the health system stronger, Derman says. First, satisfied patients grow the system’s reputation when they return to their local communities. “Patients who come here or physicians who refer their patients to Northwestern Medicine bring the message of Northwestern Medicine excellence back to their home country,” he explains.

And the type of care itself enhances the care experience for physicians. “This type of care can increase satisfaction for physicians who have a passion about international health, or connections to different countries,” Derman says. “It helps them build a legacy of care for their native country.”

In addition, International Health expands diversity of patients in clinical trials, allowing for more robust research.

A BETTER FUTURE

Al-Ali will continue to live in Chicago for his first post-op year. His family members take turns traveling from the UAE to live with him. And International Health continues to support him daily, providing emotional, psychological and medical support as needed. They help manage medication refills, coordinate follow-up appointments, send reminders for upcoming labs, and contact the Transplant team if Al-Ali has any acute events, questions, or concerns. They also handle logistical needs, such as arranging transportation for medical appointments and helping with visa extensions.

Patients from more than 100 countries have traveled to Northwestern Medicine for care.

At the one-year mark in September 2022, if cleared by the Transplant team, Al-Ali will be able to return home to the UAE. He will need to return to Northwestern Memorial Hospital just once a year for follow-up care.

"I'm really grateful to the International Health team," he says. "I'm doing great so far, and they've been with me all the time. They've done far more than required of their job. Without the team, my journey would be much harder."

Al-Ali's experience is just part of the commitment at Northwestern Medicine to offer access to better care to every patient.

"Prioritizing better health care means eliminating barriers to care," Derman says. "That includes offering individualized, personal support and assistance for everyone who seeks care at Northwestern Medicine, regardless of who and where they are." ❖

Will Travel For Exceptional Care

International patients are not the only ones traveling across borders for care at Northwestern Medicine. Patients from across the U.S. are crossing state lines to do the same. Through the last three fiscal years, the system has cared for more than 90,000 out-of-state patients.

Following extensive national exposure for its first-in-the-nation double-lung transplant on a patient with lung damage from COVID-19, the newly created Northwestern Medicine Canning Thoracic Institute has a growing out-of-state patient base. The team has now completed more than 40 double-lung transplants on patients who had COVID-19 — more than any health system in the world; 16 of those patients traveled to Northwestern Medicine from outside Illinois.

"Our team leads the nation in finding new ways to fight deadly respiratory conditions such as COVID-19, with the best clinical outcomes worldwide," says Ankit Bharat, MD, chief of Thoracic Surgery and executive director of the Canning Thoracic Institute.

Other specialties also continue to attract out-of-state patients due to their high level of expertise and reputation for excellence. Northwestern Medicine Bluhm Cardiovascular Institute has treated patients from all 50 states and five continents, and the Northwestern Medicine Center for Complex Gynecology also treats out-of-state patients.

One of those patients is Phoenix, Arizona resident Melanie Parker, 32, who has been treated by Northwestern Medicine since she was a 19-year-old Chicago college student, suffering from severe pelvic pain. Parker, who has had multiple ovarian surgeries over the years at Northwestern Medicine, still returns to gynecological surgeon Magdy P. Milad, MD, for follow-ups.

"Dr. Milad took so much interest in my case and was extremely compassionate,"



Parker says. "He told me I reminded him of his daughter, and I was his priority."

The long-distance care relationship has been sustained partly through telehealth to optimize perioperative care and ongoing monitoring, says Milad, who calls telehealth visits a "game-changer" for patients.

"We reduce cost and inconvenience of travel," he says. "The key is to obtain records and imaging prior to the telehealth visit to facilitate the shared decision-making at the initial visit. Patients are noticeably more at ease, given that they are in familiar surroundings, and often have their support team on the call to help get their questions answered."

IMMUNOLOGY INNOVATOR

AS THE DIRECTOR OF NORTHWESTERN'S NEW CENTER FOR HUMAN IMMUNOBIOLOGY AND INCOMING CHIEF OF ALLERGY AND IMMUNOLOGY, STEPHANIE EISENBARTH, MD, PHD, HOPES TO UNLOCK THE SECRETS OF THE IMMUNE SYSTEM AND SOLVE THE MYSTERY OF ALLERGIES.

After making the surprising discovery this past fall that mice with a leaky gut are more likely to develop an anaphylactic reaction to peanuts, Stephanie Eisenbarth, MD, PhD, is eager to start translating this new finding (published in *The Journal of Allergy and Clinical Immunology*) into treatments for patients. It's just one of the many projects on Eisenbarth's full agenda as she settles into her new role of chief of the Division of Allergy and Immunology and director of Feinberg's new Center for Human Immunobiology (CHI).

A FIELD IN NEED OF ANSWERS

"Allergy remains one of the biggest mysteries in immunology," says Eisenbarth, who previously served as the associate chair of research in the Department of Laboratory Medicine and co-director of the Program in Translational Biomedicine at Yale University. "We still don't understand the basic rules of why and how allergy happens."

According to a study by Northwestern investigators, food allergies affect as many as one in 10 U.S. adults and are on the rise. The U.S. Centers for Disease Control and Prevention says one in 13

children (or about two children per school classroom) have food allergies, some of which can cause life-threatening reactions. Yet the toolbox for treating them is limited. Epinephrine shots can help stop anaphylaxis if administered quickly, but options to prevent such severe reactions are missing.

Nevertheless, Eisenbarth believes the tide is turning. An explosion of discoveries in immunology in recent years has led to significant advances in treating cancer, understanding the origins of autoimmune diseases, and improvements in organ transplant success. Now, immunology is poised to crack the case of food allergies.

"The field as a whole is making great strides in reversing rising rates of allergy," she says. "We will have cures down the pike, but we must tackle it from multiple angles."

That brings her back to the possibility that a leaky gut is one piece of the puzzle explaining why some children have symptomatic food allergies. She and her lab are set to test whether their findings have the potential to one day translate into a treatment that would prevent



anaphylactic food reactions in children.

“We may not be able to reverse the antibodies a child has already made to a food,” she explains. “But if we can prevent a severe reaction to that food, it’s a very important first step in getting them to a state of security.”

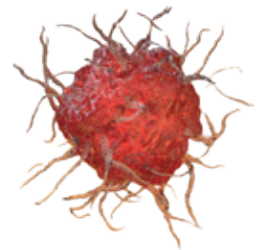
The Eisenbarth laboratory will also continue to explore the role of dendritic cells, T-cells and B-cells in allergy. Dendritic cells orchestrate immune responses; they play a crucial role in responding to infections, inducing immunity in response to vaccination, and sometimes triggering inappropriate immune reactions like those to allergens.

“Dendritic cells are the generals of the immune system,” she says. “They are the cells that kick things off, interpret what’s going on

in the body, and tailor the right type of immune response. Sometimes they get it wrong and trigger an allergic reaction.”

Eisenbarth wants to learn more about how dendritic cells work and how they can travel throughout the body. “If we can understand what dendritic cells are doing to dictate immune responses, we have a much better chance of figuring out how to induce the immune responses we want and turn off the ones we don’t,” she says.

In addition, the lab will continue their work on identifying what makes the “foot soldiers” of allergic responses, the T and B lymphocytes, produce the pathology underlying allergy. This includes discovering how the peculiar type of antibody made to allergens, IgE, is induced. ▶



1 in 13 children have food allergies, some of which can cause life-threatening reactions according to the U.S. Centers for Disease Control and Prevention.

BUILDING ON A TRADITION OF EXCELLENCE

The opportunity to build upon the Division of Allergy and Immunology's already stellar national reputation made coming to Northwestern "too good to refuse" according to Eisenbarth.

"The division has amazing clinicians, a top-level fellowship, and an incredible research enterprise," she says, adding that advancing the careers of existing faculty and trainees will be a critical objective. She'll also be recruiting new faculty to grow both the division as well as helping to usher in a new cadre of leaders in the field of immunology and allergy.

Already, she's recruited M. Cecilia Berin, PhD, formerly the Endowed Chair and Hugh A. Sampson Professor of Food Allergy Research at Mount Sinai in New York. Berin joined Northwestern in August as the inaugural Bunning Professor of Food Allergy Research. Leading food allergy advocates and philanthropists Denise and Dave Bunning, parents of two sons who grew up with life-threatening food allergies, generously supported this endowed position. The Bunning's Sunshine Charity Foundation also supported the launch of the Center for Food Allergy & Asthma Research, which brings together experts from Feinberg and Ann & Robert H. Lurie Children's Hospital. Together, this growing group of researchers is aiming to tackle fundamental questions about the etiology of food allergy and how to help children and families dealing with this disease.

A NEW CENTER

In addition to leading her division, Eisenbarth will be the inaugural director of Feinberg's new Center for Human Immunobiology (CHI).

"ONE OF MY FIRST GOALS IS TO BRING TOGETHER THE COMMUNITY OF RESEARCHERS FOCUSED ON IMMUNOLOGY SO WE CAN HELP EACH OTHER'S SCIENCE GROW."

— Stephanie Eisenbarth, MD, PhD

This center — which will have a website, renovated research space, and scientific forums by this fall — is launching at a critical time: Understanding how the immune system fights new viruses, controls the growth of cancer, or inappropriately targets the body's own tissues has direct impact on health.

Currently, Eisenbarth is building the teams necessary to tackle these challenges.

The new center will unite trainees, clinicians, and basic scientists across disciplines and in numerous departments and divisions at Feinberg, on Northwestern's Evanston campus, and at Lurie Children's. The goal, she said, is to stimulate innovative new approaches to treat diseases caused or amplified by the immune system and rapidly translate them into practice.

"One of my first goals is to bring together the community of researchers focused on

immunology so we can help each other's science grow," she says.

Another focus of the new center will be expanding the number of clinical trials underway at Northwestern in a wide range of areas, including allergies, emerging infectious diseases, autoimmune diseases, and neuro-immune diseases.

"Ultimately, we aim to translate new and innovative discoveries in basic science

into therapies for all immune-regulated disease," Eisenbarth says.

A FAMILY AFFAIR

Eisenbarth will jointly run a lab with her husband, Adam Williams, PhD, who joined Feinberg as an associate professor of Medicine in the Division of Allergy and Immunology.

"Northwestern offered the opportunity for both of us to grow," Eisenbarth says. Along with their sons Xavier, 12, and Austin, 15, they are looking forward to fully embracing Chicago — especially winters. They all love snow, snowboarding, and skiing.

"My passion outside of work is my family," Eisenbarth says.

Now, bringing the two together will be easier. Eisenbarth frequently collaborates with Williams, who specializes in long noncoding RNAs and understanding the molecular mechanisms that control type 2 immune responses, which drive allergies. He was previously an assistant professor at the Jackson Laboratory for Genomic Medicine in Farmington, Connecticut. But in Connecticut the distance between their laboratories—about an hour drive—made collaborating more challenging.

"He thinks about molecular and genetic pathways inside cells, and I think about how those cells interact. Together, we can think more holistically about immunology," Eisenbarth says. "We've always talked about one day having a lab together, and I'm excited it is finally happening." ❖



Eisenbarth will jointly run a lab with her husband, Adam Williams, PhD, who joined Feinberg as an associate professor of Medicine in the Division of Allergy and Immunology. Below: Eisenbarth with her family.





We Need You to Engage in Volunteerism!

A letter from Edward S. Kim, '92 BS, '96 MD (HPME)

To everyone who has read my prior articles, I have really enjoyed sharing personal insights and family stories. This commentary will have a different theme: Help wanted!

The Medical Alumni Association has made significant progress, despite the recent challenging times. Our biannual meetings are a source of fellowship, engagement, and satisfaction as we work together to provide a balanced experience for our students. The board was thrilled to be back in person in April during Alumni Weekend, where we had more than 850 attendees and 328 at our scholarship luncheon.

As alumni, we are not always aware of the latest facts and figures about our esteemed alma mater, so here are some fun facts about Northwestern University Feinberg School of Medicine:

- Since 2013, we have raised more than \$122 million, doubling our scholarship funding.
- Our endowment goal is \$800+ million, with \$235 million raised to date through outright and estate gifts.
- More than 67 percent (or 440 out of 747 medical students) receive some financial support from Feinberg.
- We have 206 total endowed and immediate-use scholarships. Of those, 19 are endowed class scholarships (1955, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1966, 1967, 1968, 1969, 1970, 1971, 1973, 1974, 1987, and 1991).
- Feinberg scholarships are a mix of both merit and need scholarships, with the majority being need-based. The medical school

also has separate scholarships for Physical Therapy and Physician Assistant students.

- The graduate debt load for private institutions nationally is \$188,324 and \$205,283 for Feinberg, according to the AAMC Graduate Medical School Indebtedness Report for 2021. It is suspected that the rise in debt for Feinberg was related to interest rates set at 0% on all federal student loans as of March 13, 2020. Students who generally do not borrow funds may have taken this opportunity for a gap year to do research, which would have meant an extra year of living expenses. This is assuming they borrowed to cover that expense.
- Feinberg is ranked #17 nationwide by *U.S. News & World Report*.
- Students choose Feinberg because of our national ranking, innovative curriculum, early clinical experiences, strong mentorship, and scholarship support.

The Medical Alumni Association Board continues to engage alumni in several areas of focus. The following committees are making great strides in helping prepare our future medical providers and leaders: Women in Medicine, Inclusion and Allyship, Business of Medicine, Mentoring, Engagement, and Strategic Initiatives.

Over the years, Larry Kuhn and Babette Henderson have been dedicated leaders who have continued to support and bring our alumni together.

But we also need your help to continue our efforts to develop interesting opportunities for our students, mentor the next generation,

COME JOIN THE FUN!

Please consider joining or supporting our Medical Alumni Association, hosting an event in your city, and sharing your career and family updates through Progress Notes or online via our newsletter!

➔ HOW TO CONNECT

- Visit our website for more information: feinberg.northwestern.edu/alumni
- Submit to our newsletter: medalum@northwestern.edu
- Submit a class note: medcommunications@northwestern.edu



Over the years, Larry Kuhn and Babette Henderson have been dedicated leaders who have continued to support and bring our alumni together.

and engage and build our medical alumni communities nationally and internationally. Please consider joining or supporting our alumni association, hosting an event in your city, and sharing your career and family updates through Progress Notes (see page 34 of this magazine) or online via our Medical Alumni Association Newsletter (send news to medalum@northwestern.edu). We welcome your input as we continue our momentum. Come join the fun!

Steven Fishman, MD, '86 has leveraged an unusual perspective to provide relief for children and adults with rare vascular anomalies.

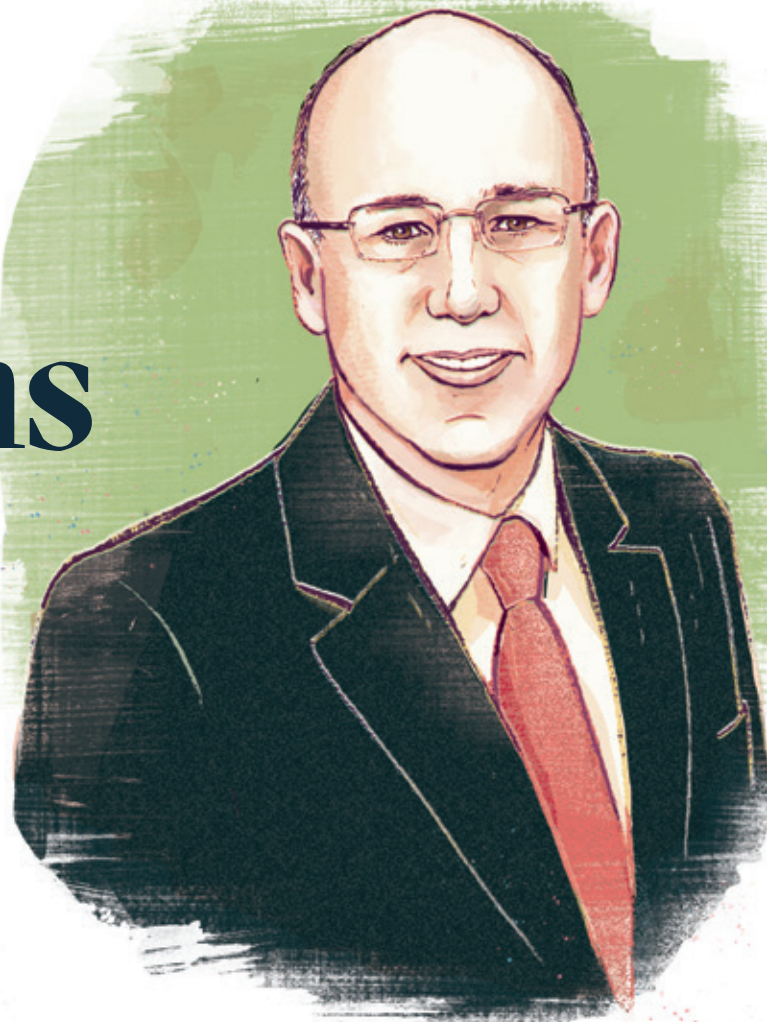
Surgical Strengths

When he started medical school at the Feinberg School of Medicine, Steven Fishman, '86, MD, thought he would be a family practitioner, but his surgical rotations changed his mind.

"I probably gravitated towards surgery because it played to my strengths," says Fishman, the Stuart and Jane Weitzman Family Chair and Chief of Surgery at Boston Children's Hospital and Professor of Surgery at Harvard Medical School.

Those strengths may be connected to a learning disorder — dyslexia — that, at the time, Fishman didn't even know he had. The condition makes reading more difficult but enhances people's ability to think in three dimensions. Fishman discovered he had it when his second child was diagnosed. He's since learned that the condition is common among surgeons and radiologists.

Fishman's unique view of the world has helped him become an internationally recognized leader in surgical repair of vascular anomalies, which occur when abnormal blood vessel growth leads to cosmetic or functional problems in or outside the body. He also co-directs the Vascular Anomalies Center at Boston Children's Hospital, which cares for about 1,700 patients yearly with hemangiomas or rare vascular tumors and malformations, and is past president of the International Society for the Study of Vascular Anomalies.



HYPERSPECIALIZED

Fishman's interest in pursuing an academic career led him to choose pediatric surgery, a specialty that would still allow him to generalize. But an opportunity arose early in his fellowship in pediatric surgery at Boston Children's Hospital that redirected him toward "hyperspecialization."

During his first week, he received a letter from the previous fellow asking if he would partner with John Mulliken, MD, a plastic surgeon at Boston Children's Hospital who helped create the field of vascular anomaly surgery. Fishman had never heard of vascular anomalies. But Mulliken, who co-directs the Vascular Anomalies Center and leads the

The team that Fishman helped build has characterized numerous rare conditions and their genetic basis and developed innovative surgical and medical approaches to treat them.

Craniofacial Surgery Center at Boston Children's, urged him to consider the field.

"He said: 'if you focus on this, I promise that you will have a meaningful career, and you'll make a difference,'" Fishman says.

Career Milestones

The team they've built has characterized numerous rare conditions and their genetic basis and developed innovative surgical and medical approaches to treat them.

"It's been a very gratifying experience," Fishman said. "We've created one-stop shopping for these patients who come from around the world," he said.

Fishman has also served in several leadership roles at his institution, including President of the Physician's Organization, and most recently Chief of Surgery and Surgeon-in-Chief.

"I've realized in the later stages of my career that effective leadership can magnify your contributions," he says. "I can only help one patient at a time clinically, but I believe I'm helping many more by helping colleagues be more able to get their dreams fulfilled and advance their field."

He said that one of the proudest accomplishments of his career has been helping to foster an interdepartmental and interdisciplinary team-based environment throughout Boston Children's Hospital. Often, he explained, one specialist is insufficient to solve the complex problems facing children with rare diseases, so they've created a "hub and spoke" model. At the team's center are nurses, nurse practitioners, coordinators, and social workers who organize patient care and connect each patient with all the specialist services they need. Fishman credits his time in the Honors Program for Medical Education at Northwestern and his brilliant classmates there with helping him to value others' skills and perspectives.

"I was taught to keep my mind open and respect expertise wherever you find it," he says.

OUTSIDE THE BOX

Fishman's unique way of thinking and stubbornness led him to develop a surgical technique to stop gastrointestinal bleeding in patients with a rare condition called Blue Rubber Bleb Nevus Syndrome. Patients with the disease may have hundreds of mulberry-shaped vein malformations in their intestines that can cause bleeding or blockages. As a young surgeon, he defied the conventional wisdom that the malformations were tumors and couldn't be successfully removed and developed a procedure to do so.

Fishman has removed up to 544 of the malformations in a single surgery.

"It's not a difficult operation," he says. "It's just a very tedious one."

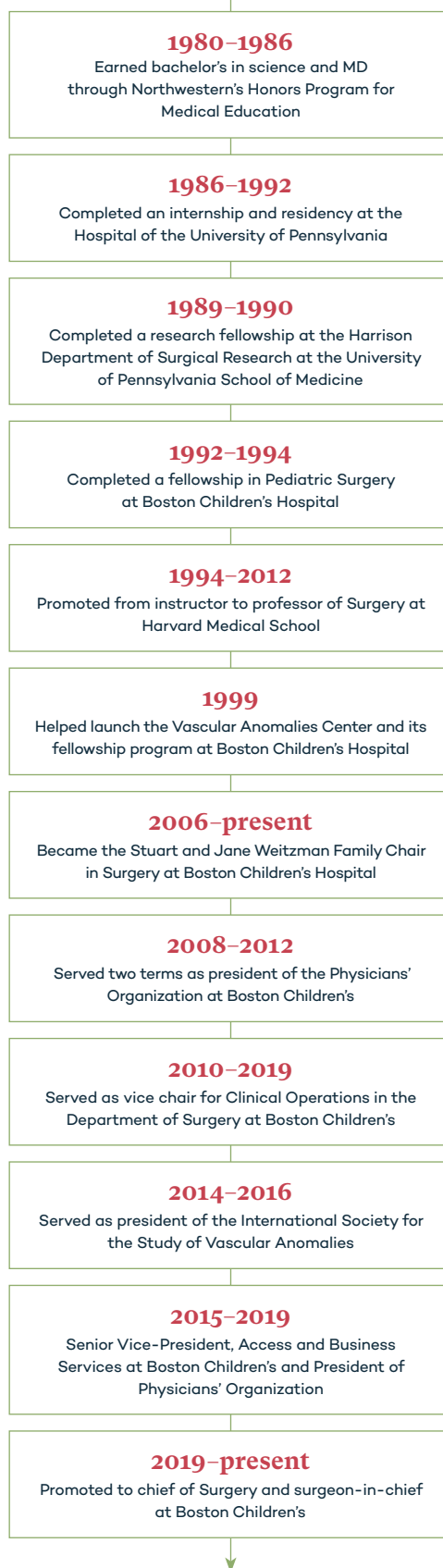
Because so few people specialize in treating such vascular anomalies, Fishman also treats adult patients. One was a 38-year-old woman with Blue Rubber Bleb Nevus Syndrome who required weekly blood transfusions for decades to make up for all the blood she lost. She initially didn't believe Fishman's assurances that surgery could cure the condition. But a former adult patient of Fishman's who had undergone the procedure agreed to talk with her and her family. The man, a postal worker, paid his way to fly to Boston with his wife to meet the woman and her family in person.

The woman agreed and underwent a 30-hour procedure. When Fishman went to update the family about the procedure's success, he was surprised and touched to see his former patient, the postal worker, waiting with them. The woman is now approaching 60 and has never needed another transfusion.

When he is not working, Fishman said his primary hobby has been spending time with his wife and three children. All three children graduated from Northwestern and have burgeoning careers. Now he also builds replica race cars. It all started when his son with dyslexia decided to make one from a kit the summer before starting college. When his son didn't finish before he had to leave for college in the fall, he convinced Fishman to pick up where he left off with the help of a more experienced car builder named Rich.

The duo finished the car, and instead of selling it as planned to cover the costs, Fishman bought a house with a larger garage so he could keep it. Fishman's son now works as an engineer designing cars for Tesla in California. Fishman and Rich still meet once a week to build cars together. He said he enjoys having a similarly creative but more relaxing pastime than surgery.

"It's a bit like surgery," he said. "Nobody can appreciate what went into your effort because when the car is done, all they see is the shiny paint job. It is like when you operate on someone, and all they see is the scar. They never see the craftsmanship inside." ❖





Reunited at Last: Alumni Weekend 2022

In the fall of 1983, Jennifer Ho, '88 MD, visited Feinberg for the first time for her medical school interview. Ho recalled that she was impressed by the medical school's research and clinical training opportunities and having grown up in Southern California, she said that seeing snow for the first time in Chicago was a memory she'll never forget.

"Feinberg provided me with excellent medical training, allowing me to pursue my career of interest: ophthalmology. My education at Feinberg prepared me well so that I was able to transition onto my next phase of medical training easily and successfully. I credit Feinberg for laying the groundwork for my successful medical career," Ho said.

At Feinberg is also where she met her husband George Ho, '88 MD, who has practiced urology for more than 30 years. Together, they attended this year's Alumni Weekend celebration to revisit where their love story and medical careers began and also reunite with former classmates. They have three children who are and will soon be Feinberg alumni: Alex, class of 2022; Alisha, class of 2024; and Austin, class of 2026.

"Perhaps the most life-changing event in my life was meeting my wonderful wife at Feinberg. Through a 30-plus-year journey in medicine, I have come to appreciate the special-ness that is Feinberg. I would characterize Feinberg as a world-class education provided in a family atmosphere of caring," Ho said.

The Hos were among more than 700 alumni and guests who returned to Feinberg on



Feinberg alumni and current students gather during Alumni Weekend for a mentoring lunch in the Simpson Querrey Biomedical Research Center.

April 29 and 30 to reconnect and reminisce with former classmates about their time at Feinberg and learn about the medical school's latest advancements. This year's Alumni Weekend also welcomed back the reunion classes scheduled to celebrate in 2021 and 2020, which were postponed due to the COVID-19 pandemic.

During the weekend, alumni attended different social and educational events, including class dinners, tours of Chicago attractions, and tours of campus facilities, including the Northwestern Simulation Center and the Louis A. Simpson and Kimberly K. Querrey Biomedical Research Center.

On Friday afternoon, alumni and current Feinberg students gathered for a mentoring lunch, which was organized based on medical specialties.

"Coming back to Northwestern is always a great opportunity to see what's going on at the medical school and catch up with old classmates. I think it's going to be important for all of us in the Northwestern family to have the chance to come together and process what we've gone through in the last two years with the treatment of patients with COVID," said Paul Bonucci, '96 MD, who celebrated his 25th reunion at this year's Alumni



1 Alumnae gathered for the annual Women in Medicine Tea at Chicago's historic Drake Hotel, which featured a panel discussion about career advancement, mentorship and work-life balance. **2** Eric G. Neilson, MD, vice president for Medical Affairs and Lewis Landsberg Dean, gave an overview of the state of the medical school, highlighting Feinberg's research enterprise, diversity and inclusion initiatives and future plans. **3** Feinberg alumni and their families toured Northwestern's Simulation Center, led by David Salzman, '05 MD, MED, '09 GME, associate professor of Emergency Medicine and of Medical Education.

"To not only love going to Northwestern for undergraduate and medical school but also use what I learned to have had such a rewarding career and life is just amazing."



DAVID M. HOLTZMAN,
'85 MD

Weekend and shared details about his career path in emergency medicine with current Feinberg students during the mentoring lunch.

The lunch was followed by "Conversations With the Dean," hosted by Eric G. Neilson, MD, vice president for Medical Affairs and Lewis Landsberg Dean, who gave an overview of the state of the medical school, highlighting Feinberg's research enterprise, diversity and inclusion initiatives, and future plans.

"It's been a couple of years since we've been able to be in person, so it's exciting to have so many old familiar friends and family back on campus. A lot has happened in the last three years," Neilson said.

The weekend also offered alumni the opportunity to attend a host of educational forums led by Feinberg faculty who discussed various topics, including permanent lung damage by COVID-19, the future of digital health, and new advances in cardiovascular medicine.

At Chicago's historic Drake Hotel, alumnae gathered for the annual Women in Medicine Tea, which included a panel discussion featuring alumnae from different class years who spoke about their own professional journeys and shared advice about career advancement, mentorship, and work-life balance.

The session was moderated by Kavitha Gandhi, '98 MD, clinical instructor of Dermatology, who discussed her experience balancing motherhood and being a dermatologist, and how being connected and supported by other women in medicine helped her overcome different challenges.

"As a mother in medicine, I've felt the seesaw of guilt of feeling not quite good enough as a mother and not quite good enough as a physician; I call it double imposter syndrome. It helps to have a community to support you

through those times, and sometimes it just takes just one supportive voice to realize that it's alright not to be perfect and, more importantly, to help you overcome that double imposter syndrome to help you do your best," Gandhi said.

On Friday evening, attendees gathered for an all-alumni reception and dinner, which included a salute to the milestone reunion classes, ranging from the class of 1955 to 2017. During the dinner, this year's Distinguished Alumni Award was presented to David M. Holtzman, '85 MD, an accomplished neurologist and neuroscientist who has dedicated his career to exploring the biological mechanisms underlying neurodegeneration, specifically Alzheimer's disease.

Holtzman is currently scientific director of the Hope Center for Neurological Disorders and associate director of the Knight Alzheimer's Disease Research Center at the Washington University School of Medicine in St. Louis.

"To not only love going to Northwestern for undergraduate and medical school but also use what I learned to have had such a rewarding career and life is just amazing," Holtzman said.

PROGRESS NOTES

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



Send your updates and
high-resolution photos to

medcommunications@northwestern.edu.

We will publish them in an upcoming
issue of the magazine.

1960s

Maynard D. Poland, '61 MD, recently shared a memory from his medical school years. He wrote, "As a senior student several weeks before graduation, I was alone, about to doze off in the house staff lounge at Wesley Hospital when the phone rang. I answered and a frantic-sounding nurse said, "Come quickly, there's a post-surgical patient here who is having uncontrolled muscle jerking, like a seizure, but he's awake!" She hung up before I could explain I was a student, alone. I sprinted the one floor up to the nurses' station and was escorted into the room. The patient was awake, but just about every part of his body was jerking. I had just read an article in *The New England Journal of Medicine* about neuromuscular reaction to phenothiazines, and after asking questions of the nurse about information on the chart, I asked if the patient had been nauseated after surgery and been given Compazine. The nurse, ignoring my student status, answered, "Why yes, Doctor." I told her to



Aaron R. Quarles, MD, '19 GME (left) and **Quentin R. Youmans, '15 MD, '18 GME, '21 MS** were among 14 physicians invited by the White House Office of Public Engagement to participate in the Health Equity Leaders Roundtable Series based on their previous work and research in the field. Quarles is assistant professor of Emergency Medicine and Youmans is a fellow in the Department of Cardiology.

draw up 50 mg of IV Benadryl while I went to the phone and called the patient's doctor, explained the situation, who I was, and what I thought was the appropriate emergency treatment. He agreed, and I turned the phone over to the nurse so she could take the order. After the IV Benadryl, the uncontrolled movements stopped, the patient sat up and lit a cigarette, and the wife, who had witnessed the unfolding drama, stood

immobile trying to digest what had happened. The nurse was temporarily in a similar state, but soon broke into a wide smile."

Louis E. Fazen, III, '65, '69 MD, MPH, has been awarded the Henry Ingersoll Bowditch Award for Public Health by the Massachusetts Medical Society (MMS). The Ingersoll Bowditch Award is "bestowed annually to a Massachusetts physician

who demonstrates creativity, commendable citizenship, initiative, innovation, and leadership in the public health and advocacy fields.” Committed to advocating for public health, Fazen is a pediatrician, founder of the Global Health Committee at the MMS, and four-decade faculty member at the University of Massachusetts Chan Medical School. He previously served as chair of the MMS Public Health Committee and currently serves on the Old Sturbridge Village Public Charter School Board of Directors and as secretary of the Board of the Public Health Museum in Tewksbury, Massachusetts. 📖 1

Elenuté Nicola, '67 MD, recently authored a new book of poetry, *The Villanelle Book: Love Poems*. The book description says, “The language of love and longing speaks to the soul. The classic villanelle form is the perfect vehicle for such sentiments. The word villanelle comes from the Italian villanella, which was a rustic song or dance. In France in the late 16th century, the villanelle evolved into poetry... The theme is still often pastoral or related to love.” As Nicola shares, “I wrote my first one, the first in this book, after reading about the villanelle form. It so perfectly allowed me to express what

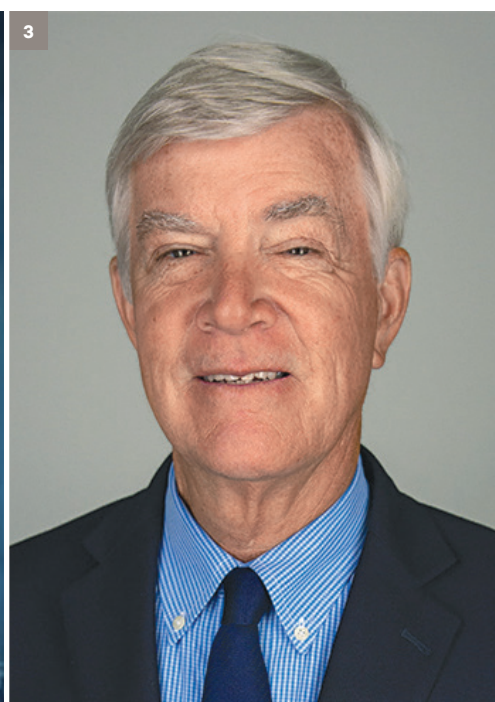
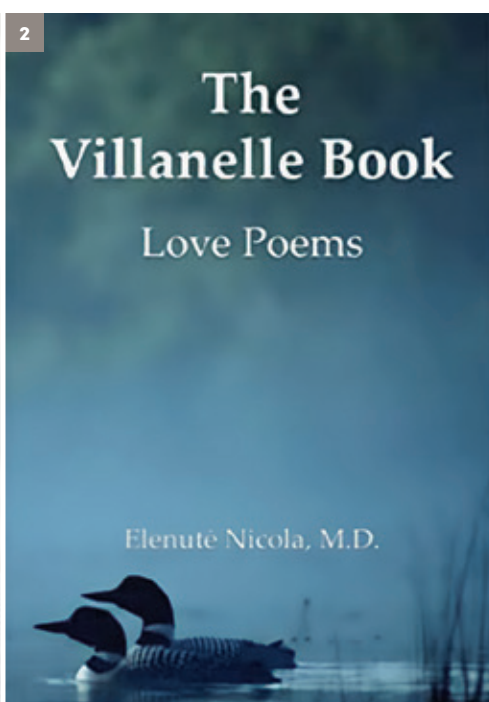
I wanted to say that I was hooked. The ideas for many of them came to me at night, when I logically thought I'd like to sleep, but the musical, repetitive villanelle was waiting for me to find those last few words.” The book is available for purchase at Amazon. 📖 2

1970s

Valerie Bengal, '76 MD, wrote, in a letter to the editor, “I marvel at all the high-tech and innovative research at Northwestern since my days as a student there. Recent issues have included other types of articles that resonate with my career, such as global health, equity, diversity, and justice in medicine.” Bengal, a former associate clinical professor of Family and Community Medicine at University of California, San Francisco/Natividad Medical Center, also discussed the unique qualifications of family medicine practitioners, making them excellent sources for consultations and collaboration for subspecialists and interns, writing, “We are trained to use a broad, inclusive approach and to coordinate care among many specialists.”

COMMITTED TO ADVOCATING FOR PUBLIC HEALTH, LOUIS E. FAZEN, III, '65, '69 MD, MPH, IS A PEDIATRICIAN, FOUNDER OF THE GLOBAL HEALTH COMMITTEE AT THE MMS, AND FOUR-DECADE FACULTY MEMBER AT THE UNIVERSITY OF MASSACHUSETTS CHAN MEDICAL SCHOOL.

Timothy A. Sanborn, '77 MD, recently authored “Passing the Stethoscope,” published in the *Journal of the American Medical Association (JAMA) Cardiology*. The article is a short story recollection from Sanborn's first year at Northwestern University Medical School on how he, using the skills that he had recently gained as an M1, was able to examine and diagnose the breathing problem that his own father



(a surgeon) was experiencing. The article may be read on the *JAMA Cardiology* website. 📖 3

Christopher Shearer, '79 BSM, '81 MD, has been chief medical officer for Sound Physicians, Advisory Services since February 2020. He also welcomed grandchildren #7 and #8.



1980s

Dennis R. Durbin, '87 MD, MSCE, has been named president of the Abigail Wexner Research Institute at Nationwide Children's Hospital. Durbin also serves as professor and vice chair for Research in the Department of Pediatrics at The Ohio State University College of Medicine. Durbin was recruited to Nationwide Children's to serve as the initial chief scientific officer in 2018, supporting the recruitment of more than 40 new research-intensive faculty, creating the hospital's first chief clinical research officer position, overseeing the construction of the hospital's fourth dedicated research building, and contributing to the formation of Andelyn Biosciences, a spin-off contract development and manufacturing organization for cell and gene therapies. An internationally recognized injury epidemiologist with more than two decades of experience in traffic safety research, he has received awards from the Governor's Highway Safety Association, the Association for the Advancement of Automotive Medicine, Advocates for Highway and Auto Safety, the Maternal and Child Health Bureau, and the American Academy of Pediatrics. 📖 4

1990s

Arthur Ollendorff, '93 MD, '97 GME, was installed as president of the Association of Professors of Gynecology and Obstetrics in March 2022.

2000s

Christina L. Jenkins, '00 MD, was recently named to the board of Help at Home, one of the nation's largest homecare providers with more than 30,000 caregivers. Jenkins is a venture investor and adviser who uses technology and trusted relationships to improve health at scale, with focus on evidence-based technologies that better meet the health needs of women, the aging, and other underserved populations.

She is a board member of venture-backed companies Xandar Kardan, FIGUR8, and Madorra, and an advisory board member of multiple value-generating healthcare companies, including Independence Health Group (parent of Independence Blue Cross and AmeriHealth Caritas) and MDisrupt. She also is a former Bloomberg appointee to the board of NYC Health + Hospitals and chair of its Quality and Performance Committee. Jenkins actively leads venture investments in seed and early-stage digital health and hardware-enabled companies for Phoenix Venture Partners. Separately, Jenkins is a national advisor to Manatt Health, a division of Manatt Phelps and Phillips. 📖 5

CHRISTINA L. JENKINS, '00 MD, WAS RECENTLY NAMED TO THE BOARD OF HELP AT HOME, ONE OF THE NATION'S LARGEST HOMECARE PROVIDERS, WITH MORE THAN 30,000 CAREGIVERS.

Paul Chung, '02 MD, was awarded the 2022 American Pediatric Association Miller-Sarkin Mentoring Award.

Tiffany I. Leung, '04, '08 MD, MPH, FACP, FAMIA, FEFIM, has been named scientific editor for JMIR Publications, an open access publisher of research in the field of digital health, including innovations in healthcare technologies, patient and caregiver education, participatory medicine, biomedical engineering, and medical informatics. Leung is a practicing telemedicine physician with U.S. board certifications in Internal Medicine and Clinical Informatics. She also is a registered physician in the Netherlands. Leung is editor-in-chief of the Society of General Internal Medicine's (SGIM) monthly newsletter, SGIM Forum, co-chair of the Women in American Medical Informatics Association Steering Committee, and past chair of the American College of Physicians' Council of Early Career Physicians.

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 2022.

ALUMNI

George W. Crane, Jr. '46 MD
Durham, NC
APRIL 30

Juanita J. Jones, '49 BSDH
Decatur, IL
APRIL 23

Carl J. Olson '50 MD
Palm Harbor, FL
MARCH 17

Douglas E. Williamson, '53 MD
Venice, FL
MARCH 24

Grandon E. Tolstedt, '53 MD
Rockford, IL
MAY 5

Russell H. Watt, '53 MD
Marshalltown, IA
MARCH 25

William F. King, '55 MD, '56 GME
Denton, TX
FEBRUARY 18

George S. Kendrick, '55 DEN
Dallas, TX
MARCH 25

Harry Koenig, '56 GME
Ishpeming, MI
APRIL 1

Marianne Johnson, '57 BSN
Vero Beach, FL
FEBRUARY 23

Mary J. Rutherford, '57 BSM
Tupelo, MS
MARCH 9

Kenning M. Anderson, '58 MD
Evanston, IL
MARCH 1

Amos Paul Brown, '59 DDS
Lewiston, UT
MARCH 12

James L. Padgett, '59 MS
Monroe, LA
MARCH 12

Paul Bennett, '60 MD
Whitewater, WI
MARCH 27

Fred A. Shiraki, '61 MD
Santa Clara, CA
APRIL 11

Christopher T. Drake, '65 GME
Sarasota, FL
MARCH 8

James W. Strickland, '68 GME
Indianapolis, IN
APRIL 13

Jagger F. Lawrence, '72 DDS
Colorado Springs, CO
APRIL 1

John M. Wieland, '73 GME, '75 GME
Winnetka, IL
FEBRUARY 26

John R. Hughes, '75 MD
Wilmette, IL
FEBRUARY 25

Thomas Chih Cheng Peng, '83 MD
Moseley, VA
MARCH 30

Mark S. Regan, '93 GME
Middleton, WI
MARCH 11



She also is co-executive producer of “The DEI Shift,” a podcast to promote diversity, equity, and inclusion in medicine, and is the 2022 recipient of the American College of Physicians’ Walter J. McDonald Award for Early Career Physicians. 📺 6

2020s

Alliah Turner '22 MPO, is the first-ever recipient of the Ken Harris Diversity, Equity, & Inclusion Scholarship at Northwestern University Prosthetics-Orthotics Center. The scholarship was established by an anonymous donor to honor the 30+ year career, service, and dedication of Ken Harris and to provide support for students from marginalized backgrounds who are committed to advancing diversity, equity, and inclusion. 📺 7

CHRISTOPHER SHEARER, '79 BSM, '81 MD, CHIEF MEDICAL OFFICER FOR SOUND PHYSICIANS ADVISORY SERVICES, WELCOMED GRAND-CHILDREN #7 AND #8.

Scholarships Support the Next Generation in Medicine

This spring, Feinberg hosted donors at a special Commitment to Scholarships luncheon at the Ritz-Carlton, Chicago, where medical school students and leadership thanked these generous alumni and friends for their life-changing support to future clinicians.

Two scholarship recipients, first-year medical students Daniel Camp and Fabiola Moreno Echevarria, spoke about their unique paths — around the world — to Northwestern and the field of medicine. Camp spent time in the Peace Corps teaching in Mozambique, then traveled to Mexico City to conduct HIV research. Moreno Echevarria grew up in Puerto Rico, where she saw family members with health conditions struggle without the specialized care they needed.

“You may not know all our stories, but each person here is a culmination of years of hard work, passion, self-reckoning, and an unwillingness to give up,” shared Camp, the Dr. Howard S. and Regina G. Traisman Scholar.

“This scholarship gift has allowed me to enter medical school confident in both my ability and my financial situation,” said Moreno Echevarria, the Lenke Family Scholar. “Thanks to your contribution, I can explore the field and feel the freedom to pursue any specialty of interest no matter its potential for financial compensation. I hope to someday return to Puerto Rico and provide the care my island needs.”



“Thanks to your contribution, I can explore the field and feel the freedom to pursue any specialty of interest no matter its potential for financial compensation.”

FABIOLA MORENO ECHEVARRIA

Today, the Feinberg scholarship endowment is approximately \$235 million, with 67 percent of medical students receiving scholarship assistance thanks to thousands of donors who have made outright and estate gifts. The medical school hopes to someday provide full tuition support to all of its medical students, which will require quadrupling the current endowment.

“On behalf of all of us at the medical school, I want to thank you all again for joining us at this very special celebration and, especially, for your inspiring and high-impact support of scholarships for our students,” said Marianne Green, MD, vice dean for Education and the Raymond H. Curry, MD Professor and chair of Medical Education.

“We are so proud of our student scholars and the great promise they hold for the future of medicine.”

For more information about scholarships, please contact Larry Kuhn at larry-kuhn@northwestern.edu or 312-503-1717.



Above: Jack Snarr, '67 PhD (right), former associate dean of Student Programs at the medical school for nearly 30 years, attended the scholarship luncheon with his family. Dr. Snarr's legacy has motivated alumni, faculty, family, and friends to establish the Jack Snarr Scholarship.

NEWLY ESTABLISHED SCHOLARSHIPS*

- Alpha Omega Alpha Scholarship
- Robert Babbs Jr. PT Diversity Scholarship
- Richard A. Brickley, MD Scholarship
- Lawrence H. Caplan, MD & Dorene V. Kaplan Scholarship
- Dr. Margaret Gerber Scholarship
- Hanger Foundation Diversity Scholarship
- George and Marguerite Irwin Scholarship
- Dr. Philip W. and Sally Marin Scholarship
- D. Muralidhar Family Scholarship
- Emma Reynolds Scholarship
- David R. and Evelyn L. Sanderson Endowed Scholarship

*Since April 2021

Investiture Ceremony Honors Most Accomplished Faculty



Feinberg's newest endowed professorship holders, with medical school leadership.

On May 24, Feinberg celebrated 25 faculty recently appointed with endowed professorships during a group investiture ceremony at The Peninsula Hotel in downtown Chicago.

"Endowed professorships are one of the highest honors bestowed on our faculty," said Eric G. Neilson, MD, vice president for Medical Affairs and Lewis Landsberg Dean, during his opening remarks. "We are grateful to the forward-thinking donors who help us establish these precious endowments, which support excellence and creativity at our school of medicine."

These academic accolades help Feinberg to recognize its most distinguished and productive physicians and scientists, and to recruit and retain leaders in medicine. The medical school currently has 216 endowed professorship positions — all made possible by donor support.

"The IDP Foundation, Inc. is proud to invest in the leading-edge scientists and physicians at Northwestern who are making a bold impact in their respective fields," shared Irene Pritzker,

chair and co-founder of the foundation, which generously supports several areas at Northwestern, including professorships.

During the ceremony, Pedram Gerami, MD, professor of Dermatology, Pathology, and Pediatrics and director of the Skin Cancer Institute of Northwestern Medical Group (SCIN-Med), was installed as the IDP Foundation, Inc., Professor of Skin Cancer Research. "We are continually impressed by the advances Dr. Gerami and his team have made in changing the way dermatologists diagnose and treat melanomas," Pritzker said.

Endowments established by committed philanthropists create reliable, long-term support for faculty to initiate pioneering research, develop stronger teaching programs, invest in new technologies, and maintain laboratories and other physical assets. In addition to supporting these efforts, some donors choose to give to professorships in gratitude for their care by a Northwestern Medicine physician or in memory of a loved one.

HONOREES

- Ronald T. Ackermann, MD, MPH
- James G. Adams, MD
- Norrina Bai Allen, PhD
- Rajeshwar Awatramani, PhD
- Grant D. Barish, MD
- Jeffrey H. Barsuk, MD, MS
- Qi Cao, PhD
- Jaehyuk Choi, MD, PhD
- Nicolae Valentin David, PhD
- Aashish K. Didwania, MD
- Stephanie C. Eisenbarth, MD, PhD
- Pedram Gerami, MD
- Kimberly S. Kenton, MD
- Yvonne C. Lee, MD, MMSc
- Joshua J. Meeks, MD, PhD
- Hidayatullah G. Munshi, MD
- Satish N. Nadig, MD, PhD
- Sachin Patel, MD, PhD
- Erik P. Pioro, MD, PhD
- Rosalind Ramsey-Goldman, MD, DrPH
- Emily J. Rogalski, PhD
- Karla Fullner Satchell, PhD
- Edward M. Schaeffer, MD, PhD
- Emily J. Rogalski, PhD
- Benjamin D. Singer, MD



Right: Pedram Gerami, MD, received a medallion at the ceremony from Amy Paller, MD, chair and the Walter J. Hamlin Professor of Dermatology, commemorating Gerami's investiture as the IDP Foundation, Inc., Professor of Skin Cancer Research.

IMPROVING OUTCOMES FOR COLON CANCER

Rachel Issaka, MD, MAS, '13, '14 GME, a gastroenterologist and clinical investigator at the Fred Hutchinson Cancer Center in Seattle, works to prevent colorectal cancer deaths — and increase health equity — by developing novel ways to reach, screen, and ensure follow-up for at-risk people. Issaka holds the Kathryn Surace-Smith Endowed Chair in Health Equity Research.

When did you know you would go into medicine? My mom says that when I was 5 years old, I picked up a newspaper and there was a story in there about a doctor, and I announced that I was going to be a doctor. My answer stayed consistent.

What kept you focused? I'm first generation African-American; my parents are from Ghana. And even though I was born in Chicago, I lived in Ghana on and off for 10 years. Seeing the differences in who received care and their outcomes — or even advice provided — based

on socio-economic status really propelled my decision. As a college student, I got ill and didn't have health insurance. Navigating the health system in the U.S. as a Black, uninsured woman gave me unique insights into the varied healthcare experiences in this country.

a Black woman without insurance gave me unique insights into the varied healthcare experiences in this country. This motivated me to change how people interacted with healthcare.

Have things gotten better in the U.S. since you were in college? Unfortunately, they have not. In the U.S., Black women are three times more likely to die in childbirth. I gave birth to my son three years ago, and this fact was front

and center for me because we know that those disparities don't change by level of education or socioeconomic class. Black people also have poorer outcomes in many diseases, including in my field. Black people are 20 percent more likely to get colon cancer, and 40 percent more likely to die from it once diagnosed.

Why did you decide to specialize in colon cancer? During my internal medicine residency at McGaw, I saw patients in downtown and at a federally qualified health center on the South Side. I noticed that my patients on the South Side, who were predominantly Black and Latino and of lower socioeconomic status, routinely declined colon cancer screening. Whereas my patients in downtown, who were mostly white and affluent, almost always accepted. I became curious as to why and that led me to apply for my first grant during my chief resident year. I used the grant to create gatherings for patients at the South Side clinic and talk to them.

What did you learn? People were afraid of a cancer diagnosis, and there were logistical barriers, such as not having a ride home after the procedure. I realized that to achieve the impact I wanted, I needed more rigorous research training. This led me to the University of California, San Francisco, where I completed a gastroenterology fellowship and earned a master's in clinical research. Those early experiences continue to fuel and motivate the work I do today.

Have you been able to implement some new practices? We are piloting interventions now! A prior study found that Black and Latino patients preferred choices in colon-cancer screening, including using stool-based tests that can be mailed and completed at home.



In a follow-up study, I reported that only about 50 percent of those who had abnormal results were coming back for a colonoscopy within one year as recommended. These lessons were useful when I joined the faculty at the University of Washington. Between 2017 and 2019, we implemented a mailed outreach program and increased screening participation from 55 percent to 71 percent. I am now the inaugural director of the Fred Hutch/UW Medicine Population Health Colorectal Cancer Program created in 2022 to sustain organizational efforts to reach, screen, and ensure follow-up for at-risk groups, including minority and low-income populations.

What is the future potential of this work? What we learn from colon cancer prevention could be applied to other cancers that require follow-up of abnormal screening tests.

1897

Occupational Health Pioneer

A NORTHWESTERN PATHOLOGIST WHO PROFOUNDLY IMPACTED PUBLIC HEALTH.

With the dawning of the Industrial Revolution in the late 19th century, a new type of ailment — occupational illness — was born. And the first scientist to shed light on it in the United States was Alice Hamilton. Having earned her MD at the University of Michigan Medical School and spent time studying bacteriology and pathology at universities in Munich and Leipzig, Hamilton moved to Chicago in 1897 to become a professor of pathology at the Woman's Medical School of Northwestern University. That's when she became aware of a troubling trend.

Hamilton was a resident of social reformer Jane Addams' Hull House and, living among the poor residents in the community in the late 1890s, she began to notice pervasive health problems workers faced: carbon-monoxide poisoning in the steel mills, pneumonia and rheumatism in the stockyards, and lead palsy among painters. Industrial medicine was not yet a field of study in the U.S. at the time, so she set out to make sure it was. In 1908, she published the first paper on the topic, and in 1910 she was appointed to the newly formed Occupational Diseases Commission of Illinois, the first entity of its kind in the U.S. She went on to investigate public health issues and industrial diseases for the U.S. Department of Commerce and the League of Nations.

Not only was Hamilton a trailblazer in the public sector, in 1919, she became the first woman appointed to the faculty of Harvard Medical School in its newly formed Department of Industrial Medicine (though she was still excluded from social activities and the all-male graduation processions). In 1946, she received the Lasker-Bloomberg Public Service Award. In 1995, her extensive contributions to public health were recognized with a U.S. Postal Service's commemorative stamp.

Right: Commemorative stamp featuring Alice Hamilton.



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