Spring 2014 Volume 01, Number 02

Northwestern Medicine Magazine

A publication for the alumni and friends of
Northwestern University Feinberg School of Medicine

Northwestern Medicine®

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CLASS OF 2014 PRESIDENT MATT HIRE CELEBRATES WITH CLASSMATE NAMITA JAIN ON MATCH DAY. HIRE MATCHED IN ANESTHESIOLOGY AND JAIN IN DERMATOLOGY, BOTH AT MCGAW MEDICAL CENTER OF NORTHWESTERN UNIVERSITY.

Northwestern Medicine

SPRING 2014 **Magazine**

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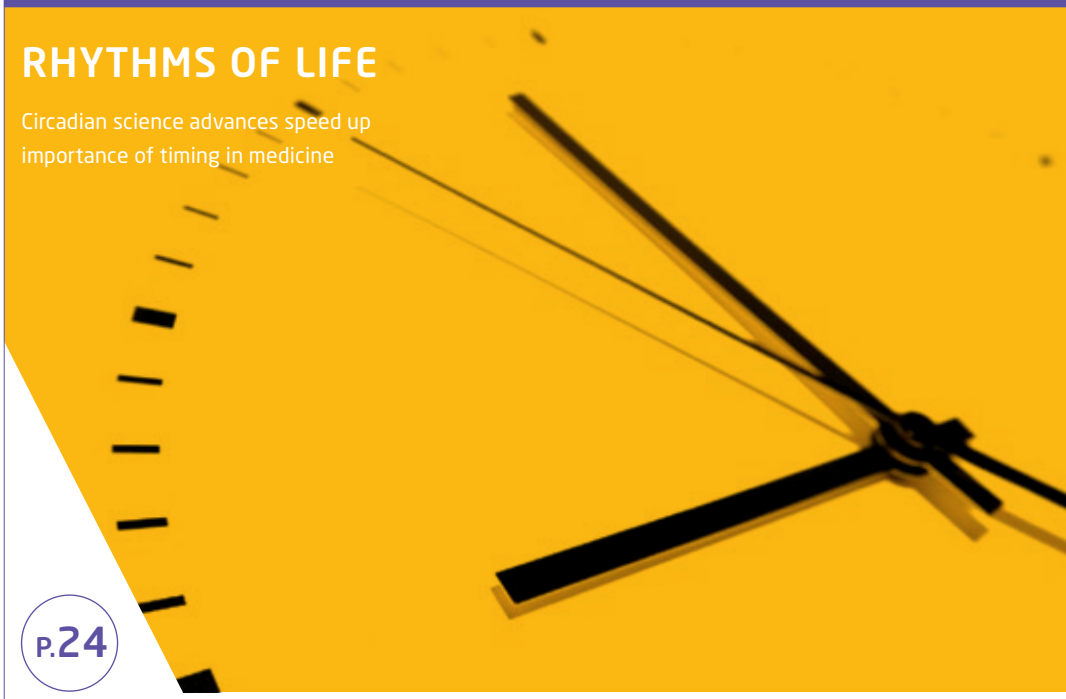
RHYTHMS OF LIFE

Circadian science advances speed up importance of timing in medicine



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REDESIGNING HEALTH CARE

Engineers Apply Unique Skills to Fix Delivery Problems

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KNOCKING OUT ESOPHAGEAL DISORDERS

New gastroenterology chief developing overarching Digestive Disease Center

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ONLINE EXTRAS: *Additional Content Online* *Image Slideshow* *Video*

Northwestern Medicine Leadership

Another national medical school Match Day has passed and the Feinberg Class of 2014 will soon be embarking on new paths for postgraduate training in their chosen medical specialties. For these aspiring medical graduates, all their hard work has afforded them exciting opportunities for the future.

About one-fifth of the Feinberg class will remain at Northwestern for residency, while the rest will soon be departing to other states and institutions. We are proud of the fact that for every year since 2008, more than 50 percent of our medical students have secured residencies at the Top 25 institutions, as ranked by *U.S. News & World Report*. This year was no exception, with 61% of the class (the highest rate ever) going to hospitals that are affiliated with the most elite medical schools. This is even more noteworthy when you consider how competitive the National Resident Matching Program is and how the number of physicians graduating from U.S. medical and osteopathy schools has grown in recent years, while the volume of postgraduate positions to which they can advance has not.

As talented as our medical students are, we are also recruiting equally gifted new physicians for our residencies at the McGaw Medical Center of Northwestern University. In 2014, 43 percent of our PGY-1 and 2 trainees are coming from Top 25 schools, and for the past five years, 30 percent or more of our incoming residents have been members of AOA, the national medical honor society. In addition, we are attracting a more diverse population of trainees. This year, 14% of our new residents are from ethnic backgrounds underrepresented in medicine.

Why are trainees interested in coming to Northwestern Medicine? They seek an environment that will provide them with rigor and challenges, from diverse patient populations and complicated conditions, to learning from accomplished clinicians and scientists who are thought leaders and innovators in their field. They also want to be in an environment where research findings in the laboratory are informing innovations in care delivery at our affiliate hospitals, pre-eminent institutions such as Northwestern Memorial Hospital, Rehabilitation Institute of Chicago, Ann & Robert H. Lurie Children's Hospital of Chicago and the Jesse Brown VA Medical Center. As they hone their clinical skills, our trainees will also have a voice in achieving quality measures that truly impact patient care outcomes, while fine tuning their teamwork and communication skills and their teaching capabilities.

An event such as Match Day also reminds us of the importance of residency training in the overall education of a physician and allows us to reflect upon the quality of the McGaw programs. Internally, we have always known that our residencies are strong, but this year we received external validation when our Internal Medicine training program was rated among the Top 10 in the country, based on a new Doximity survey of physicians conducted by *U.S. News and World Report*. With a commitment to community health, as well as hi-fidelity simulation-based experiences and research opportunities, the McGaw Internal Medicine program is highly sought-after, with nearly 4,000 applicants vying for 120 positions.

This is not to detract from our 23 other residency programs, which also garner great interest from prospective trainees. Dermatology, neurology, radiology, pediatrics, obstetrics and gynecology, physical medicine & rehabilitation, plastic surgery and urology are among some of the most competitive. And one residency that we continue to expand is Family Medicine, which began as a new program in 2010 with eight positions at Norwegian American Hospital, an urban community hospital, and Erie Family Health Center, a Federally Qualified Health Center in Humboldt Park. In July 2015, we will launch another Family Medicine residency program based at suburban Northwestern Lake Forest Hospital (NLFH), which will provide an additional eight positions each year for individuals interested in primary care medicine. NLFH will begin construction this fall on a new three-story, state-of-the-art hospital to open in fall 2017.

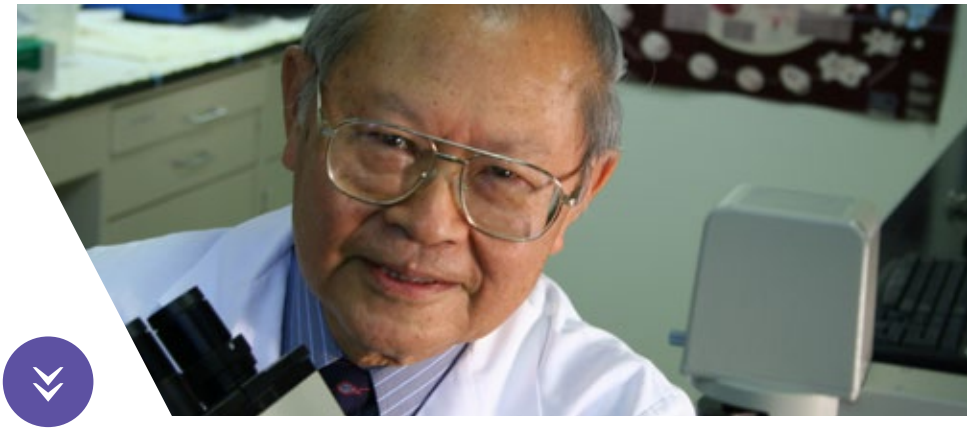
Of course, there is more work to be done as we maintain our focus on quality and patient safety, discovery and global health opportunities, and leadership skills for our residents and other clinical trainees. And by continuing to effectively utilize our world-class resources across Northwestern Medicine, we look forward to future advancement and success.

With warm regards,

Eric G. Neilson, MD
Vice President for Medical Affairs and Lewis Landsberg Dean, Northwestern University Feinberg School of Medicine

Dean M. Harrison
President and CEO
Northwestern Memorial HealthCare

Campus News



HAU KWAAN, MD, PHD, AND THE KWAAN FAMILY FOUNDATION MADE A $2 MILLION GIFT FOR A THROMBOSIS WORKING GROUP AT FEINBERG.

Kwaan Family Foundation Donates $2 Million

In December, Hau Kwaan, MD, PhD, professor of Medicine-Hematology/Oncology, and the Kwaan Family Foundation made a $2 million gift to support the formation of a thrombosis working group within the Department of Medicine at the Feinberg School of Medicine.

"This support is aimed at helping to establish a firm place for Northwestern in the international arena of thrombosis research," says Dr. Kwaan, the Marjorie C. Barnett Professor in Hematology-Oncology.

"This is an especially impactful gift because it supports a relatively underserved area that may not get adequate support without such directed philanthropy," says Alan Krensky, MD, Northwestern Medicine executive for Development and vice dean for Development and Alumni Relations. "Dr. Kwaan has been focused on blood clotting and thrombosis throughout his career and this generous gift to Northwestern will ensure ongoing support for groundbreaking research."

Dr. Kwaan joined the faculty in 1966 after being recruited by then-chair of Medicine David Earle, MD. In the 47 years since, he has made a host of major contributions. The author of more than 370 scientific articles and editor of three books, Kwaan is a part of many prestigious scientific societies and was a founding member of the International Society of Thrombosis and Hemostasis.

"I have had the great opportunity of experiencing the enormous scientific advancements made here throughout the decades," he says. "I want to help carry that momentum further, and I hope other people who share the same views might also contribute to make Feinberg one of the nation's truly prestigious medical schools."

Faculty Donors Honored with Nameplates in Hughes

For John J. Grayhack, MD, associate professor in Orthopaedic Surgery, the brass nameplate bearing his late father's name seems fitting tribute to a man committed to medical education.

"My dad earned countless awards, but the thing he talked about most was being named Teacher of the Year; that was the one plaque he displayed in his office," Dr. Grayhack says of the former chair of Urology. "It really meant a lot for him to teach, so it's remarkable to see his name now displayed in an educational auditorium."

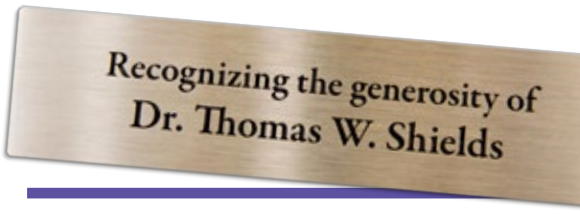
To celebrate their philanthropy, members of the faculty who've made lifetime contributions of at least $35,000 were honored Feb. 25 with the unveiling of engraved nameplates in Hughes Auditorium.

"This room was chosen because it is a vital educational space used by our students, faculty and the Northwestern Medicine community," says Feinberg Dean Eric G. Neilson, MD. "I want all to see and appreciate your commitment to our medical school and what you are making possible here at Feinberg."

Dr. Neilson recognized deceased faculty members who were represented at the event by their children. He recalled how the late James Eckenhoff, Howard Traisman, John Grayhack Sr. and others set an incredible example as exceptional physicians, academic leaders and gracious philanthropists.

"Everyone in this room has demonstrated exceptional and impactful lifetime giving that is greatly appreciated," Dr. Neilson says. "As we proceed with our campaign and encourage additional Feinberg faculty members to participate, we hope they will be as generous as you have been. The goal is to place a name in front of all 250 seats in Hughes and continue this recognition in our other auditoriums."

Roger Anderson



92 NAMEPLATES WERE INSTALLED IN HUGHES AUDITORIUM TO COMMEMORATE SIGNIFICANT PHILANTHROPIC CONTRIBUTIONS BY CURRENT AND FORMER FEINBERG FACULTY.

Students Celebrate Match Day 2014

WRITTEN BY: Sarah Plumridge
PHOTOGRAPHY BY: Randy Belice

See the Match Day 2014 video and slideshow online at *magazine.northwesternmedicine.org*

By the Numbers

% OF TOP SPECIALTIES CHOSEN BY FEINBERG STUDENTS

% OF TOP STATES FOR TRAINING CHOSEN BY FEINBERG STUDENTS

Travis Sims, a fourth-year medical student at Feinberg, waited anxiously on the morning of March 21 to open his envelope at Match Day. The paper inside would reveal where he would spend the next phase of his medical training.

"I'm ready to know what my next steps will be," says Sims. "I've spent the last four years in medical school and built great relationships with my classmates. It is nice to have us all together to share in this one last experience before graduation."

Along with 162 peers in the Class of 2014, Sims tore open his envelope at 11:30 am. He learned he will be attending University of Texas Southwestern Medical School in Dallas to train in obstetrics and gynecology.

"I'm excited for the opportunity to put into practice what we've all worked so hard learning for the past four years, and I'm looking forward to the challenges I'll face in residency," Sims says.

Fourth-year medical student Laura Boitano explains, "The feeling of being handed my destiny in an envelope was unlike anything I've experienced before, and I'm so thankful I could share it with my classmates."

> "The feeling of being handed my destiny in an envelope was unlike anything I've experienced."

Boitano will start a vascular surgery residency at Massachusetts General Hospital. Typically, trainees complete a general surgery residency before specializing, but she is excited to enter her area of interest immediately.

"I'm looking forward to starting my career and treating patients both medically and surgically. Vascular surgery allows me to do this while also having long standing relationships with my patients," she notes. "Plus, the surgical procedures are just so intricate and cool; being able to start training in this specialty during year one of residency was very appealing."

ANNUAL RITUAL

Conducted by the National Residents Matching Program (NRMP), matches are made by using a computerized mathematical algorithm to align the preferences of applicants with the preferences of residency program directors to fill the training positions available in U.S. teaching hospitals.

Match Day is held at medical schools throughout the country at the same time every year. More than 90 percent of U.S. medical school seniors matched to residency positions, and for the second year in a row, the total number of match registrants topped 40,000, according to the NRMP.

"It is nice to celebrate with everyone because to get to this point in our medical careers was a class effort. Today is what we've all been waiting four years for," says Jasmine Rassiwala.

An Honors Program in Medical Education student, Rassiwala has spent the past seven years at Northwestern University and is excited to have matched in internal medicine at University of California at San Francisco.

"Chicago and Northwestern have been my home," she explains. "I'm ecstatic that I'll be moving away to California because I will be able to broaden my horizons and experience medicine in a new environment."

This year, 925 couples participated in the match and 843 of them received their residency program preferences. Participants

61% Percentage of Feinberg students who matched residency programs at the Top 25 *U.S. News*-ranked medical schools in 2014

28%	10.4%	9.8%	8%	6%	5.5%
Internal Medicine	Pediatrics	Medicine Preliminary	Obstetrics/ Gynecology	Anesthesiology, Surgery Preliminary	General Surgery

43%	18%	9.8%	6%	5.5%
Illinois	California	New York	Massachusetts	Minnesota

LEFT: TRAVIS SIMS IS ALL SMILES AFTER FINDING OUT THAT HE WILL SOON BE TRAINING IN OBSTETRICS AND GYNECOLOGY AT UNIVERSITY OF TEXAS SOUTHWESTERN MEDICAL SCHOOL IN DALLAS. **CENTER:** XIN PENG WAITS TO OPEN HER ENVELOPE AND DISCOVER WHERE SHE'LL BE SPENDING HER RESIDENCY. SHE MATCHED IN GENERAL SURGERY AT THE MAYO SCHOOL OF GRADUATE MEDICAL EDUCATION. **RIGHT:** PETER SMITH WILL BE TRAINING AT PROVIDENCE ST. VINCENT HOSPITAL IN OREGON IN MEDICINE-PRELIMINARY BEFORE TRANSITIONING TO SANTA CLARA VALLEY MEDICAL CENTER IN CALIFORNIA FOR DIAGNOSTIC RADIOLOGY.

who enter the match as a couple agree to have their lists of preferred residency programs linked so they can try to match to a pair of programs that suits their needs.

Adam Haag and Caitlin MacGregor entered the match as a couple and understood that it would be a demanding process.

"We went into it knowing that at the end of interviews we were going to have to create our rank list together," says MacGregor. "We were also able to help the other person remember what they liked best about specific programs, or how excited we felt afterwards compared to other programs. We made our rank list in about 20 minutes, submitted it to the website and didn't look back."

They both matched at Brown University, Haag in emergency medicine and MacGregor in obstetrics and gynecology.

"We could not be happier to match at Brown," she enthuses. "This has been the perfect ending to the whole process and we are thrilled to be spending the next four years together in Providence. We are not just happy for ourselves, but for our friends and peers who matched, as well."

Faculty Awards and Honors

Earl Cheng, MD, was appointed division head of urology at Ann & Robert H. Lurie Children's Hospital of Chicago, after serving as the interim division head since July 2013. Dr. Cheng, a professor of urology at the Feinberg School of Medicine, is a national expert in complex reconstructive urology and co-directs a basic science laboratory with Arun Sharma, PhD, that focuses on tissue engineering techniques for the urinary tract. Cheng will be overseeing the largest pediatric urology department in the region, ranked 6th in the nation by *U.S. News & World Report.*

Ritu Nayar, MD, professor of pathology at the Feinberg School of Medicine and director of the Division of Cytopathology and the cytopathology fellowship at Northwestern Memorial Hospital, was inducted as president of the American Society of Cytopathology in Nov. 2013. She also received the ASC President's Award for outstanding contributions to the field for her work on the Bethesda Atlas and website.

M. Marsel Mesulam, MD, director of the Cognitive Neurology and Alzheimer's Disease Center and the Ruth Dunbar Davee Professor in Neuroscience at the Feinberg School of Medicine, received the Potamkin Prize of the American Academy of Neurology. This prestigious award recognizes Dr. Mesulam's research work on Alzheimer's disease and related disorders. He is credited with devising a method that precisely maps connections in the monkey brain, introducing the basis of spatial attention in the human brain and discovering the neurological syndrome progressive primary aphasia (PPA). Mesulam's papers on those topics have been cited more than 45,000 times.

Christine Park, MD, associate professor in anesthesiology and director of Simulation Technology and Immersive Learning (STIL) at the Feinberg School of Medicine, was elected to a three-year term on the board of directors for the Society for Simulation in Healthcare.

Diane B. Wayne, '91 MD, vice chair of the Department of Medicine and associate chief medical officer for Medicine, Women's Health and Psychiatry at Northwestern Memorial Hospital, has been named vice dean for education at Northwestern University Feinberg School of Medicine. As a former internal medicine residency program director at Northwestern, she enhanced the program's national reputation, co-directed a physician-scientist training program and dramatically increased resident diversity, resulting in the program being listed in the Top 10 on a nationwide survey of physicians published by *U.S. News & World Report*. She has been a recipient of numerous awards and honors, including the 2010 Parker Palmer Courage to Teach National Program Director Award from the Accreditation Council of Graduate Medical Education and the 2013 Leader in General Internal Medicine Award from the Midwest Society of General Internal Medicine.

Feinberg School of Medicine faculty Honorio T. Benzon, MD, professor in anesthesiology, David R. Gius, MD, PhD, Zell Family Scholar and Professor in Microbiology and radiation oncology, Jacqueline S. Jeruss, MD, PhD, associate professor in surgery, and John

JACQUELINE JERUSS, MD, PHD; HONORIO BENZON, MD; JOHN PANDOLFINO, MD, MS; AND DAVID GIUS, MD, PHD, WERE RECENTLY INDUCTED INTO AOA.

E. Pandolfino, MD, MS, chief of Medicine-Gastroenterology and Hepatology were inducted into the Alpha Omega Alpha (AOA) medical honor society at a ceremony in March. AOA recognizes scholarly achievement and qualities such as leadership, professionalism and community service.

Robert Goldman, PhD, Stephen Walter Ranson Professor of Cell Biology and chair of Cell and Molecular Biology at the Feinberg School of Medicine, was honored for outstanding scientific achievement by Charles University in Prague, Czech Republic, and was recognized for his work in the area of the molecular architecture of the cell's nucleus. Dr. Goldman's basic research on lamins has led to the discovery that they are critical factors in DNA replication, gene transcription, nuclear assembly and chromatin organization. His recent work has focused on the mutations of the lamins that give rise to diseases such as Hutchison Gilford Progeria Syndrome.

Leonidas Platanias, MD, PhD, the Jesse, Sara, Andrew, Abigail, Benjamin and Elizabeth Lurie Professor of Oncology, has been named interim director of the Robert H. Lurie Comprehensive Cancer Center of Northwestern University. He received the 2013 Seymour & Vivian Milstein Award for Excellence in Interferon and Cytokine Research and served as president of the International Society for Interferon and Cytokine Research in 2010-2011. He currently sits on the editorial boards of the *Journal of Biological Chemistry, Leukemia and Lymphoma* and the *Journal of Interferon and Cytokine Research*, where he serves as an associate editor. He is currently a member of the Cancer Immunopathobiology and Immunotherapy study section at NIH and has completed terms in the Cancer Molecular Pathobiology study section and the Molecular Oncogenesis study section, where he was one of the founding members.

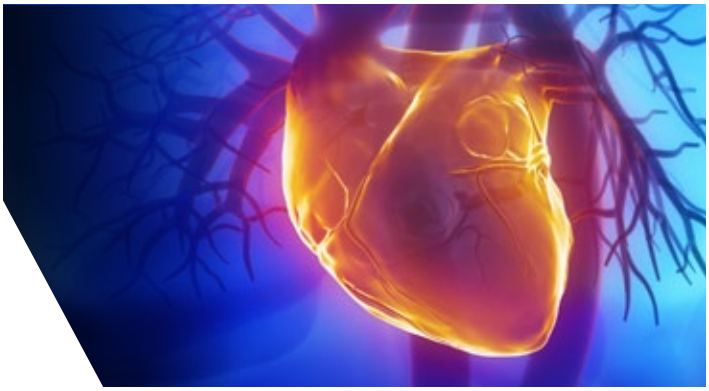
PT

Sally Edelsberg, MS '72, emerita associate professor, has been honored with membership in the Service Circle by the Nathan Smith Davis Recognition Program at Feinberg for her alumni volunteer activities. Since her retirement in 2003 after leading programs in physical therapy for 27 years, she has worked with the Northwestern University Physical Therapy Alumni Board, hosted a scholarship brunch at her home during the 2013 Alumni Weekend, and helps provide links to clinical opportunities for PT alumni.

Alice Salzman, EdD, received the 2014 Ronnie Leavitt Award for Leadership in the Promotion of Social Responsibility in Physical Therapy from the American Physical Therapy Association. The award recognizes a member of the Global Health Special Interest Group whose contributions and actions have demonstrated leadership in the promotion of social responsibility, locally and/or globally, through service, scholarship and/or advocacy.

Kristin Krosschell, DPT, received the *Journal of Pediatric Physical Therapy's* Toby Long Award for her article "Reliability and Validity of the TIMPSI for Infants with Spinal Muscular Atrophy Type I." The award is given annually for the best journal manuscript and the winner is announced at the annual business meeting of the Pediatric Section of the American Physical Therapy Association.

Research Briefs



Heart Attack Damage Slashed with Microparticle Therapy

After a heart attack, much of the damage to the heart muscle is caused by inflammatory cells that rush to the scene of the oxygen-starved tissue. But that inflammatory damage is slashed in half when microparticles (1/200th the size of a hair) are injected into the blood stream within 24 hours, according to new preclinical research from Northwestern Medicine and the University of Sydney in Australia.

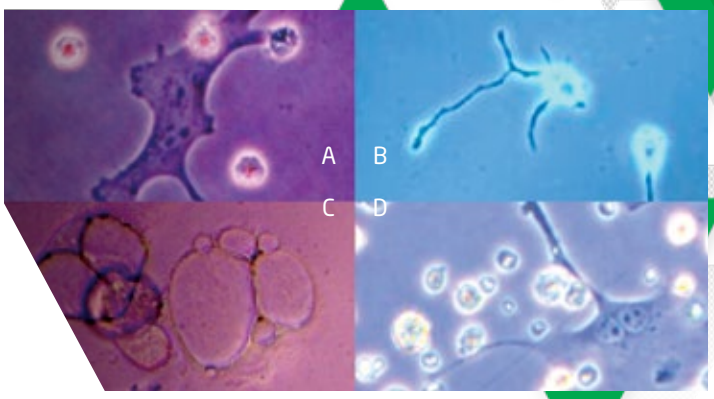
"This is the first therapy that specifically targets a key driver of the damage that occurs after a heart attack," says investigator Daniel Getts, a visiting scholar in Microbiology-Immunology at Northwestern University Feinberg School of Medicine. "There is no other therapy on the horizon that can do this. It has the potential to transform the way heart attacks and cardiovascular disease is treated."

The microparticles bind to the damaging cells—inflammatory monocytes—and divert them to the spleen where they die. The particles are made of poly (lactic-co-glycolic) acid, a biocompatible and biodegradable substance approved by the Food and Drug Administration for use in re-absorbable sutures.

The study also showed that the microparticles reduced damage and repaired tissue in many other inflammatory diseases, including models of West Nile virus, colitis, inflammatory bowel disease, multiple sclerosis, peritonitis and kidney transplant.

The study was published January 15 in *Science Translational Medicine.*

The research was supported by grants NS-026543 from the National Institute of Neurological Diseases and Stroke and EB-013198 from the National Institute of Biomedical Imaging and Bioengineering of the National Institutes of Health, and the National Health and Medical Research Council in Australia.



A Potential New Approach to Killing Cancer Cells

Northwestern Medicine scientists have demonstrated that cancer cells—and not normal cells—can be killed by eliminating either the FAS receptor, also known as CD95, or its binding component, CD95 ligand.

"The discovery seems counterintuitive because CD95 has previously been defined as a tumor suppressor," says lead investigator Marcus Peter, PhD, professor in Medicine-Hematology/Oncology. "But when we removed it from cancer cells, rather than proliferate, they died."

The findings were published March 20 in *Cell Reports*.

The self-destruction of cells, known as apoptosis, is a necessary process that helps the body rid itself of unwanted and potentially harmful cells. Under normal circumstances, when CD95 is activated, apoptosis is triggered. Seen as a keeper of homeostasis in the immune system, it's been long-considered vital for the prevention of uncontrolled, cancerous cell growth.

Peter and his team tested cancer cells from nine different tissue origins. Instead of multiplying, the cells increased their size and the production of harmful reactive oxygen species, resulting in DNA damage. In their first attempt to divide, they died.

Peter determined that the "cell death induced by CD95 receptor or ligand elimination (DICE)," comprises multiple death pathways. A cancer cell would have to mutate components of each to defend against DICE, a highly unlikely scenario.

"DICE killed every cancer cell we put it up against and we found nothing that could prevent its destruction," Peter explains. "The fact that none of the more than 1,000 drugs, nor the knockdown of any single gene was found to counteract DICE, makes it a very promising new way to kill cancer cells."

The work was supported by National Cancer Institute grant R01 CA112240.

How Memory Rewrites the Past

The memory rewrites the past with current information, updating your recollections with new experiences, reports a new Northwestern Medicine study.

"When you think back to when you met your current partner, you may recall this feeling of love and euphoria," says lead author Donna Jo Bridge, a postdoctoral fellow in Medical Social Sciences at the Feinberg School of Medicine. "But you may be projecting your current feelings back to the original encounter with this person."

The study, the first to show specifically how memory is faulty, was published Feb. 5 in the *Journal of Neuroscience*.

To help us survive, Bridge says, our memories adapt to an ever-changing environment and help us deal with what's important now. All that editing happens in the hippocampus.

The notion of a perfect memory is a myth, says Joel Voss, PhD, senior author of the paper and an assistant professor of Medical Social Sciences and of Neurology at Feinberg.

"Everyone likes to think of memory as this thing that lets us vividly remember our childhoods or what we did last week," Voss explains. "But memory is designed to help us make good decisions in the moment and, therefore, memory has to stay up-to-date. The information that is relevant right now can overwrite what was there to begin with."

The research was supported by the National Institute of Neurological Disorders and Stroke grant R00-NS069788 and the National Institute on Aging grant T32AG20506, both of the National Institutes of Health.

Heart Disease Warning Signs Appear as Early as 18

Elevated blood pressure as young as age 18 is a warning sign of cardiovascular disease developing later in life and the time to begin prevention, according to a large national Northwestern Medicine study. That's decades earlier than clinicians and patients generally start thinking about heart disease risk.

The study also found distinct blood pressure patterns from ages 18 to 55 that reveal people at high risk for calcification of coronary arteries—a marker for heart disease—by middle age. Also known as hardening of the arteries, these calcium deposits can narrow coronary arteries and increase heart attack risk.

Published Feb. 4 in the *Journal of the American Medical Association*, the 25-year study is the first to identify different long-term patterns of blood pressure levels and resulting cardiovascular risk.

"If we see someone who is 25 or 30 and they fall into one of these patterns, we can predict where they'll be later in middle age," explains Norrina Allen, PhD, lead study author and assistant professor of Preventive Medicine at the Feinberg School of Medicine. "Then we can prescribe lifestyle changes such as increased physical activity or a better diet that can prevent them from developing hypertension and a higher risk of disease."

"Although blood pressure can be quickly lowered with medication, the damage to the heart and blood vessels that is caused by time spent with elevated blood pressure tends to remain," notes senior author Donald Lloyd-Jones, MD, chair of Preventive Medicine at Feinberg and a cardiologist at Northwestern Memorial Hospital. "We can't put the horse all the way back in the barn."

Groups with elevated or increasing blood pressure were at the highest risk for developing calcification of coronary arteries. The study also found African Americans and smokers were more likely to experience rapid increases in blood pressure during middle age, placing them at higher risk of heart disease.

The research was supported by grants from the National Heart, Lung and Blood Institute at the National Institutes of Health: HHSN268201300025C, HHSN268201300026C, HHSN268201300027C, HHSN268201300028C, HHSN268201300029C, HHSN268200900041C.

Improving Care Delivery While Lowering Costs

NORTHWESTERN MEDICINE® PHYSICIANS ARE DESIGNING HEALTHCARE MODELS TO DELIVER HIGHER VALUE

WRITTEN BY: Martha O'Connell
PHOTOGRAPHY BY: Laura Brown

THE VALUE BASED DELIVERY TEAM INCLUDES ALANNA LAZAROWICH, MBA, KIRK STAPLETON, CONSULTANT, BRIAN WALSH, CPA, MICHAEL ABECASSIS, MD, MBA, AND (NOT PICTURED) HANNAH ALPHS JACKSON, MD, MHSA.

As consumers, we all want more for our money. That's easier said than done in the healthcare reform era where creating value is a complicated and inadequately defined goal that requires medical professionals to re-examine how they can enhance patient care and measure treatment success.

The recent clinical alignment allows Northwestern Medicine physicians and hospitals to respond to the new healthcare market by leveraging clinical and academic strengths to create value-based delivery systems for high-volume specialty procedures. These systems will offer "bundled" care, packaging groups of multifaceted services to treat a medical condition.

Historically, an insurance company or health plan has been the purchaser of bundled care. However, as the healthcare landscape shifts due mainly to the Affordable Care Act, large employers, particularly those that are self-insured, have started to pursue this care for their employees. They seek the best treatment at the best price. And Northwestern Medicine is beginning to respond to employers' formal requests for these packages of services.

A team of clinicians and administrators who make up the Value Based Delivery Formation Core Team is paving the way, including co-chairs Michael Abecassis, MD, MBA, director of the Comprehensive Transplant Center at the Feinberg School of Medicine, and Brian Walsh, CPA, vice president of managed care, as well as Alanna Lazarowich, MBA, manager of business development and strategic planning, and Hannah Alphs Jackson, MD, MHSA, administrative fellow, all at Northwestern Memorial Hospital.

Dr. Abecassis, the J. Roscoe Miller Distinguished Professor of Surgery and Microbiology/Immunology, is well-versed in these tenets of healthcare reform because transplant care has been organized into bundled services and payments for two decades. He has worked with the American Medical Association and American College of Surgeons for several years on care delivery and payment re-design.

"We now have an opportunity to get everyone around the table and reach consensus about what are best practices and what constitutes best care. By standardizing care, and minimizing variability in cost, we can deliver high-quality, high-value care," Abecassis says.

BUNDLE UP

Care delivery includes patient services provided by different physicians in various care settings. Rather than viewing each patient encounter separately, these services are tied together for care and billing purposes. Using best practices, variability in patient treatment decreases, costs become more predictable and services can be priced more accurately.

Terrance Peabody, MD, chair of the Department of Orthopaedic Surgery, is working with David Manning, MD, to create the first clinical bundle program at Northwestern. Manning is director of the Joint Replacement and Implant Service group, an internal team of nurses, surgeons and data analysts who reassess patient outcomes to improve care. With input from other members of the Northwestern Medicine orthopaedic care team, they are examining every step in total joint replacement for knees and hips.

For example, a bundle for hip replacement and rehabilitation can cover hospital and physician expenses for up to 90 days following the procedure, barring extenuating circumstances. Decisions must be made about the best choices in patient education, joint prostheses, anesthesia, mobilization, and prevention of infection and post-operative blood clots.

> This is about reducing variability in costs, and if you can do that, you will improve quality—and that's what value means.

One thing the team and Peabody are emphatic about is that bundled care is not "cheap" medicine. It is better medicine through careful planning and consistent, reliable care that improves patient outcomes. This, in turn, reduces costs for the hospital and employers.

"This is about reducing variability in costs, and if you can do that, you will improve quality—and that's what value means," Abecassis explains.

To help master the learning curve, Northwestern began in January as one of the first 25 health organizations selected internationally to participate in the year-long Institute of Healthcare Improvement (IHI) learning collaborative on joint replacement, based in Boston. Faculty from Harvard Business School and IHI teach organizations how to measure their cost of care and patient outcomes, and how to continuously improve.

"Surgeons pay most attention to what happens during surgery and whether the patient recovers well, but there are so many other steps involving all disciplines during the entire course of care," Dr. Peabody says. "Our involvement with IHI made me aware that a team approach is necessary to make significant improvements to care."

Driven by IHI, the Value Based Delivery team is examining the role and the time each employee—physicians, nurses, physical therapists, anesthetists, transportation aides, etc.—spends in a patient's care and how to increase efficiency.

RESPONDING TO A CHANGING MARKET

The first major victory for value-based delivery at Northwestern occurred early in 2014 when a Fortune 20 company entered into negotiations to potentially have NMH serve as its second national Joint Replacement Center of Excellence. The Value Based team is optimistic that a partnership will be announced in the next few months, and that an agreement will set Northwestern up favorably for similar contracts in the future.

Abecassis emphasizes that all value-based initiatives are driven by clinical departments. The Value Based team assists departments to develop care models and products by engaging clinicians, assessing the market, and providing clinical and financial analyses.

Designing a care plan for total joint replacement will be among the first instances at Northwestern where traditional fee-for-service payments are converted to one bill covering all services. That fee will be distributed internally to the groups responsible for that patient's care.

Walsh says this extensive self-evaluation about how care is provided and billed is more than talk. It is hard data about the time and cost to do a particular task, and when clinicians see the numbers, it's very impactful.

"Physicians realize that with their input, we can do better, and we are moving ahead carefully to make sure we do bundles the right way," he says. "This positions us to work well with employers. If we do this right, we can become a regional and even national provider of certain services."

1 CAN HEAVIER PEOPLE REALLY BE HEALTHIER?

THE NEW YORK TIMES - JAN. 15, 2014

Mercedes Carnethon, PhD, a diabetes researcher at Northwestern University Feinberg School of Medicine, said she was skeptical of an obesity paradox. But in study after study on diabetic patients, she has found evidence of it, which she outlined in a recent report.

2 AGENUS' PROPHAGE VACCINE FOR GLIOMA HAILED AS A 'VERY PROMISING THERAPY' IN AN EDITORIAL PUBLISHED IN THE JOURNAL NEURO-ONCOLOGY

MARKET WATCH - JAN. 21, 2014

"We are excited about these results and the enthusiasm of our colleagues," said **Andrew Parsa, MD, PhD**, corresponding author of the study and chair of Neurological Surgery at Northwestern Memorial Hospital and the Michael J. Marchese Professor at the Feinberg School of Medicine.

3 PATIENTS MAY HAVE TO COMPETE WITH COMPUTERS FOR DOCTORS' ATTENTION

U.S. NEWS & WORLD REPORT - JAN. 30, 2014

"When doctors spend that much time looking at the computer, it can be difficult for patients to get their attention," study first author **Enid Montague, PhD**, an assistant professor in medicine, general internal medicine and geriatrics at the Feinberg School of Medicine, said.

4 AS PEANUT ALLERGIES RISE, TRYING TO DETERMINE A CAUSE

THE NEW YORK TIMES - FEB. 3, 2014

According to an accompanying editorial by **Ruchi Gupta, MD**, an associate professor of pediatrics at Northwestern University, "some studies actually showed that avoiding peanuts during pregnancy increased the risk of a child developing peanut sensitization."

5 SEX MATTERS: DRUGS CAN AFFECT SEXES DIFFERENTLY

60 MINUTES - FEB. 9, 2014

"One of the reasons we haven't learned more about women goes all the way back to the beginning of the scientific pipeline, to research on animals," said **Dr. Melina Kibbe**, a vascular surgeon who also runs a lab at Feinberg, where she evaluates new therapies in mice and rats.

6 STUDY SHOWS IMPROVED DETECTION OF ATRIAL FIBRILLATION

BLOOMBERG BUSINESSWEEK - FEB. 15, 2014

"Finding atrial fibrillation allows a more specific, tailored therapy to prevent a second stroke," said **Dr. Richard Bernstein**, author of the new study and a professor of neurology at Northwestern University Feinberg School of Medicine.

Northwestern Memorial HealthCare and Cadence Health Pursue Merger

WRITTEN BY: Kris Lathan

Cadence Health® and Northwestern Memorial HealthCare (NMHC) announced in March that they have signed a Letter of Intent to enter a period of exclusive discussions to form an integrated academic healthcare delivery system. Cadence Health is corporate parent to Central DuPage Hospital and Delnor Hospital, and NMHC is parent to Northwestern Memorial Hospital and Northwestern Lake Forest Hospital.

"Cadence Health is one of Illinois' premier healthcare systems serving patients throughout Chicago's surrounding communities," says Dean M. Harrison, NMHC president and CEO, who would continue to lead the combined health system. "A merger of our health systems would combine Cadence Health's strong portfolio of primary and specialty care with our strength as one of the nation's leading academic medical centers, to create a preeminent integrated academic health system that benefits all residents, regardless of their ability to pay..." The new health system will operate under the Northwestern Medicine® brand name and its governance will include equal representation from Cadence Health and NMHC.

"We believe this merger will create a multi-regional health system focused on the singular vision of providing high-quality care with an unwavering patient focus," says Mike Vivoda, president and chief executive officer, Cadence Health, who will become the regional president for NMHC.

NMHC and Cadence share a patient-centered culture with a commitment to excellence, quality and transparency that includes:

» Northwestern Memorial Hospital distinguished by its Nurse Magnet® designation, its standing as the most preferred hospital in Chicago, and 6th spot ranking on the *U.S. News & World Report* Honor Roll of America's Best Hospitals, with 12 nationally ranked specialties, and its ranking as No.1 in Illinois and No.1 in the Chicago metro;

7 EVERY EXTRA HOUR SITTING ON COUCH DOUBLES SENIORS' DISABILITY RISK, STUDY FINDS

CBS NEWS - FEB. 19, 2014

"This is the first time we've shown sedentary behavior was related to increased disability regardless of the amount of moderate exercise," lead researcher **Dr. Dorothy Dunlop**, a professor of medicine at Northwestern University Feinberg School of Medicine in Chicago, said in a press release.

8 AMERICAN HEART ASSOCIATION LAUNCHES ACCELERATOR TO FIND INTERNAL GAME CHANGERS

FORBES - FEB. 27, 2014

According to **Dr. Donald Lloyd-Jones**, senior associate dean for Clinical and Translational Research at Northwestern University, "When the prevalence of atrial fibrillation is presently estimated between 2.5-6 million Americans, but also estimated to be 6-16 million by the end of 2015, we know invention and innovation are needed."

9 QUITTING SMOKING LINKED TO IMPROVED MOOD

THE NEW YORK TIMES - MARCH 12, 2014

The current review serves as a reminder that tobacco withdrawal symptoms like anxiety can easily be confused with mental health problems, said **Brian Hitsman, PhD**, assistant professor in preventitive medicine-behavioral medicine and psychiatry and behavioral sciences at the Feinberg School of Medicine.

10 UH OH, UNSATURATED FATS MAY NOT BE AS 'GOOD' AS WE THOUGHT

TIME MAGAZINE - MARCH 17, 2014

Dr. Linda Van Horn, professor of preventive medicine at Northwestern University and a member of the nutrition committee of the American Heart Association, admits that the findings, particularly about saturated fat, raise some potentially valid questions that the committee will address at its next meeting.

11 DO YOU TAKE STATINS? IF NOT, YOU MAY HAVE TO

THE WALL STREET JOURNAL - MARCH 27, 2014

"There are very few medications that have been studied as carefully as this class of drugs," said **Dr. Neil Stone**, Bonow Professor of Medicine-Cardiology at Northwestern University Feinberg School of Medicine, who chaired the writing committee for the new guidelines on statins .

9 10 11

MARCH

- Central DuPage Hospital distinguished as one of the "100 Top Hospitals," as ranked by Truven Health Analytics and by its Nurse Magnet designation;
- Delnor Hospital distinguished by its Nurse Magnet designation and exceptional reputation for providing excellent and compassionate services;
- Northwestern Lake Forest Hospital distinguished for its *U.S. News* ranking as No. 21 in Illinois, No. 19 in the Chicago metro and distinguished by its Nurse Magnet designation; and
- Northwestern Medical Group, the practice plan for faculty of Northwestern University Feinberg School of Medicine; Northwestern Memorial Physicians Group; and Cadence Physician Group.

CENTRAL DUPAGE HOSPITAL

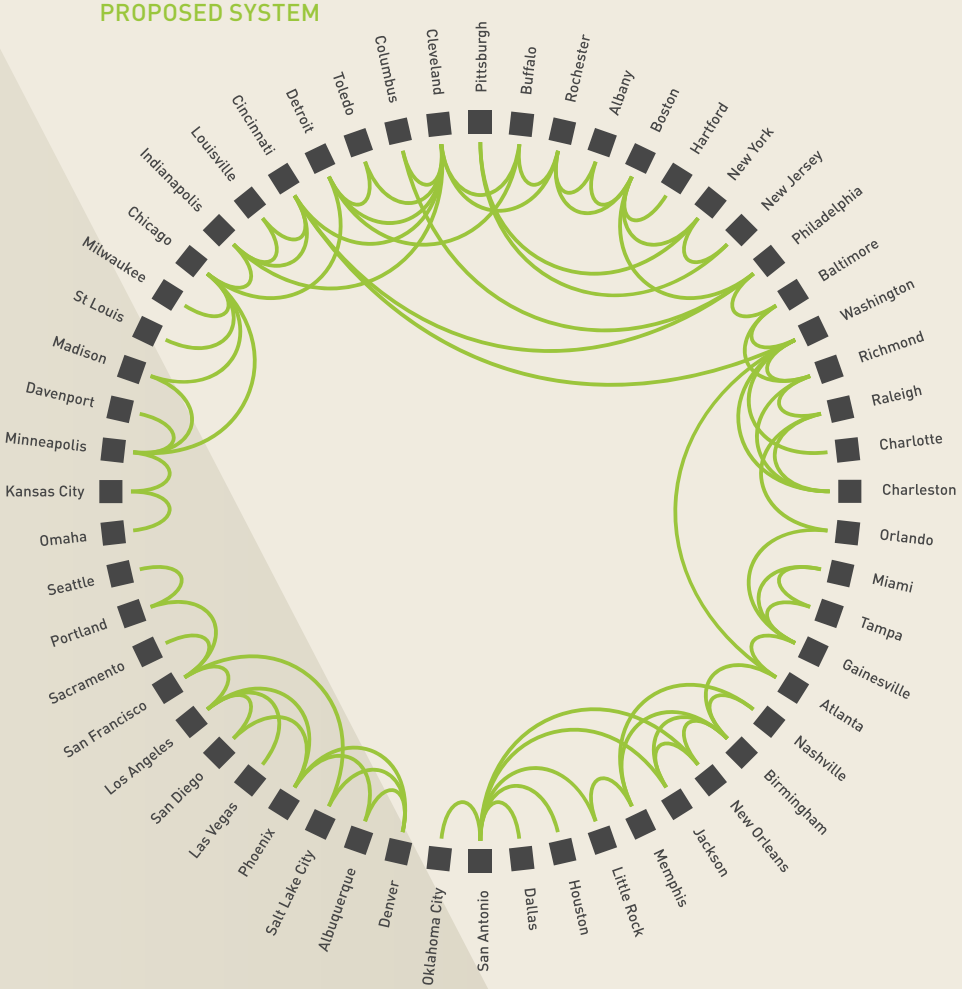
Engineers Apply Unique Skills to Fix Delivery Problems

WRITTEN BY: Jody Oesterreicher
PHOTOGRAPHY BY: Emily Ayshford, Bruce Powell

REDESIG HEALTH

CURRENT SYSTEM

PROPOSED SYSTEM



Read about additional redesign projects online at
magazine.northwesternmedicine.org

GNING CARE

SANJAY MEHROTRA, PHD

FIG. 1

REDUCING GEOGRAPHIC DISPARITY IN KIDNEY ALLOCATION

	CURRENT	PROPOSED
AVERAGE TRAVEL DISTANCE	733 mi.	428 mi.
LOCAL RETENTION	81%	87%
SHARING PARTNERSHIPS	14	≤3
TRANSPLANTATION RATE RANGE	3-27%	5-16%

There is a stark contrast between the dazzling array of medical technologies used to diagnose and treat patients and the antiquated systems used to deliver health care. The former is characterized by advanced imaging, breakthrough drug therapies, and innovative surgical interventions. The latter is often plagued by poor coordination, resource management, and communication. The new Center for Engineering and Health in the Feinberg School of Medicine's Institute for Public Health and Medicine (IPHAM) aims to improve this picture by developing data-driven engineering solutions to a range of healthcare delivery problems.

It is becoming the go-to place for a growing cadre of Northwestern Medicine medical practitioners and administrators who recognize the potential. Among the problems they are working on are emergency department overcrowding, geographic disparity in kidney allocation, and low continuity of care between surgical residents and patients. In addition to facilitating collaborative research, the Center is training professionals who are conversant in both medicine and engineering.

IT'S PERSONAL

The director of the Center is Sanjay Mehrotra, PhD, professor of industrial engineering and management science at Northwestern's Robert R. McCormick School of Engineering and Applied Science. He works closely with David Mohr, PhD, CEH deputy director, who also directs the Center for Behavioral Intervention Technologies and is a professor of preventive medicine-behavioral medicine at Feinberg. The seeds for the Center were planted in an emergency department, where in 2004, the then 40-year-old Mehrotra nearly died.

The father of two was recovering from quintuple bypass surgery when he made an emergency trip to his local hospital in the suburbs late on a Saturday night. Over the ensuing hours, there were a number of missteps by medical staff, and 11 hours later following heart failure, a cardiologist performed a lifesaving, critical procedure without proper preparation.

MAN ON A MISSION

Following this episode, Mehrotra analyzed the sequence of events and recognized that there was a systems problem. The failures were numerous: No one educated him about potential problems and what to do in case of an emergency post-surgery. The cardiologist on call made clinical decisions with limited information. And the emergency department lacked the proper personnel, equipment and space.

For more than a decade, Mehrotra had been teaching industrial engineering and management science at McCormick and researching optimization methodologies to solve problems in energy systems, transportation and business management. "I had never even thought about healthcare engineering," he says, "but now it was a problem that God had given to me on a platter."

He spent the next four years studying the U.S. healthcare system. Then he began contacting people at the medical school he thought might be interested in collaborating with engineers. He developed and began teaching undergraduate and graduate courses in healthcare systems engineering and management science.

"I knew we had to begin training the next generation of engineers and sensitizing them to the needs of the healthcare system," he explains.

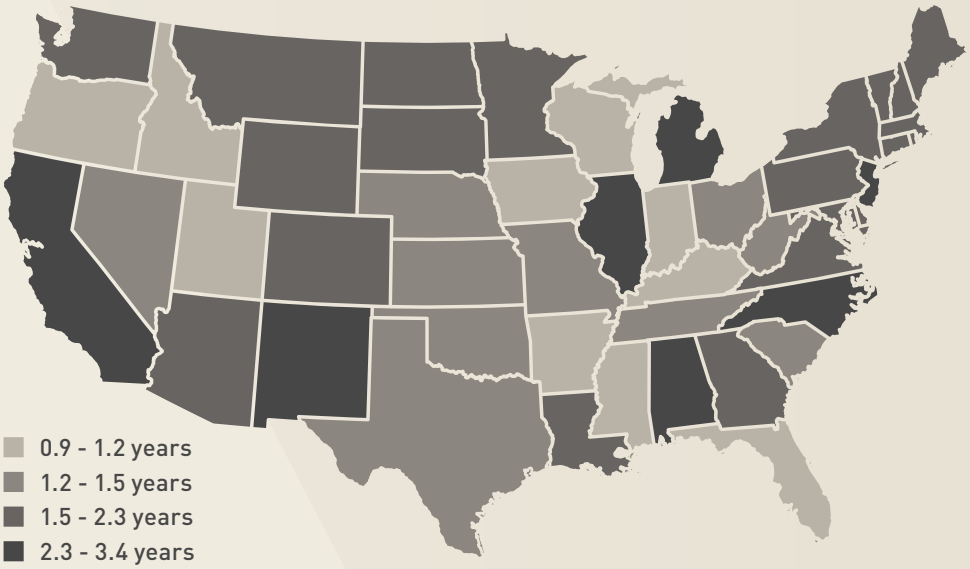
As the number of Northwestern Medicine collaborative research projects grew, Mehrotra developed his vision for the Center for Engineering and Health. At its heart would be the desire to transform the quality and delivery of patient care on a national level. The Center opened in October 2012, and today Mehrotra describes it as a "next generation research, education and technology eco-system that builds on the strengths and knowledge base of major engineering disciplines."

Started with seed money from the medical school and Northwestern Memorial Hospital, nearly $500,000 in grants to the Center has been recommended through National Science Foundation programs. CEH has also facilitated close to $7 million in funding to other researchers through NIH.

"This is an exciting time for Northwestern Medicine, as our collaborations with the Feinberg School are transforming our medical campus into a global destination for academic medicine," says Jay Anderson, CIO and senior vice president, Performance Improvement, Northwestern Memorial HealthCare. "A clear example of this progress is the hospital's partnership with the brilliant minds of the Center for Engineering and Health, where some of the world's best engineers and clinical researchers are working side-by-side with our hospital operations leaders. By evaluating our processes and work flows, and adjusting where needed, together, they are driving efficiencies that are improving the care experience for the patients we are so privileged to serve."

FIG. 2

MEDIAN KIDNEY WAITING TIMES



GEOGRAPHIC DISPARITY IN KIDNEY ALLOCATION

The goal of one of the Center's most ambitious collaborations is to develop a data-driven national policy to reduce geographic disparity in kidney allocation. It

> "I knew we had to begin training the next generation of engineers and sensitizing them to the needs of the healthcare system."

draws on some of Northwestern Medicine's greatest strengths. Northwestern Memorial Hospital is home to the Kovler Organ Transplantation Center, where surgeons transplant more than 400 organs annually.

SANJAY MEHROTRA, PHD, DIRECTOR OF THE CENTER FOR ENGINEERING AND HEALTH, WITH ASHLEY DAVIS, PHD, AT HER GRADUATION.

Feinberg houses the Northwestern University Transplant Outcomes Research Collaborative (NUTORC), which has a broad array of investigators focused on transplant-related research. One of these investigators is John J. Friedewald, MD, associate professor of medicine-nephrology and surgery-organ transplantation, who from 2011-2013 served as chair of the United Network for Organ Sharing (UNOS) Kidney Transplantation Committee. UNOS manages the nation's organ donor system.

In 2010, Mehrotra and Ashley Davis entered this rich matrix at the behest of Michael Abecassis, MD, MBA, director of the Comprehensive Transplant Center. Mehrotra had recently completed a mini-sabbatical at Feinberg, and word was spreading about his work. Davis was a McCormick doctoral student who came to Northwestern intent on "doing an applied dissertation in health care." The researchers obtained a grant from the National Science Foundation and agreed that Davis should spend a

CAN THE HEALTHCARE SYSTEM BE OPTIMIZED?

Ron Rardin, PhD, the recently retired John and Mary Lib White Systems Integration Chair and Distinguished Professor of Industrial Engineering at the University of Arkansas - Fayetteville, believes it can.

When it comes to developing large-scale optimization modeling and algorithms to transform healthcare delivery systems, the award-winning author, teacher, and researcher is a leader in the field. As founding head of the University's Center on Innovation in Healthcare Logistics, Rardin collaborates with Wal-Mart, BlueCross BlueShield, the VHA hospital network, and other partners to develop innovations in supply chain and material flow aspects of healthcare operations.

Here he shares his views about the challenges and opportunities that exist for engineers to help address deficiencies in the way health care is delivered.

Q WHAT ARE THE OBSTACLES TO ENGINEERING THE U.S. HEALTHCARE DELIVERY SYSTEM?

A One of the greatest barriers has been the low level of investment in health information technology. Just six or seven years ago, more than 80 percent of all patient records were paper. If any other industry operated that way, it would go bankrupt.

There also has been very little cross-knowledge and training among engineers and medical professionals. Medical personnel have no understanding of what systems and industrial engineers do and how engineering tools can be applied to healthcare delivery. Most engineers don't know about the challenges of healthcare or what it means to do engineering in a real operating environment.

Fragmentation is another problem. Many physicians practice individually or in small groups. Until 20 years ago, most hospitals were singletons. Today there are more large hospital health systems. But the overall healthcare delivery system never was designed with common operating standards and goals.

Q WHAT DO ENGINEERS BRING TO THE TABLE?

A Engineering is disciplined problem-solving. Scheduling is a common healthcare industry challenge. Engineers try to understand the problem operationally, in terms of numbers and processes. We use computers, mathematics, and statistics, but it's not just tools and techniques, it's a way of thinking. We're different than management professionals, who think more broadly about strategy and vision.

Q ARE THERE ANY SUCCESS STORIES IN HEALTHCARE SYSTEM ENGINEERING?

A Scheduling hospital nurses is a well-studied problem. Nurses are needed around the clock and are an expensive resource. Figuring out how to organize their shifts is complicated. The right people have to be on duty at the right time. Hospitals have to balance minimizing costs with providing nurses with good working conditions. Engineers have developed flexible data-driven solutions that leave room for hospitals to make judgment calls.

Full interview online at magazine.northwesternmedicine.org

quarter at NUTORC immersing herself in transplantation.

There is a chronic shortage of kidneys for transplant and a dramatic variance in wait times (one to four years) among the states. There were 96,645 patients waiting for kidney transplants in June 2013, according to the National Kidney Foundation, and of the 16,812 kidneys transplanted in 2012, only 11,043 came from deceased donors. Annually, thousands of patients die while waiting. The only treatments for terminal end-stage renal disease are dialysis and transplantation. Maintenance on dialysis is expensive, time-consuming and hard on patients, but transplantation can return a patient to full health.

Trying to balance fairness and efficiency, UNOS divides the country into 11 geographical regions and 58 donor service areas that roughly correspond to the 51 states. They offer donor kidneys first to the local donor service area, then to the region and, finally, to the nation. Most kidneys are procured and transplanted in the same geographic zone.

Organs removed from the body begin to deteriorate after 38 to 48 hours, but geographic restrictions often lead to suboptimal matches. With all else being equal, a patient who can survive on dialysis for two or three more years may receive a donor kidney before a patient one state over who can survive on dialysis for only one more year.

Balancing efficiency with fairness is complicated, but so too are the analytical tools that industrial engineers and operations researchers have developed over the last 50 years. They often employ simulation models that can both illustrate a complex system and predict what will happen if a variable is changed. But their successful creation hinges on access to accurate data.

Despite recent improvements, the healthcare industry lags far behind most other industries in the use of information technology to gather, analyze and use data. The transplant community, however, had lots of information—nearly 15 gigabytes. For two decades, UNOS has collected exhaustive details about both registered kidney patients and deceased donors.

FIG. 3

INCREASING HIGH KDPI KIDNEY ALLOCATION EFFICIENCY

CURRENT

AVERAGE TRAVEL DISTANCE
173 mi.

LOCAL RETENTION
77%

SHARING PARTNERSHIPS
14

PROPOSED

AVERAGE TRAVEL DISTANCE
118 mi.

LOCAL RETENTION
78%

SHARING PARTNERSHIPS
≤2

RESULTS

DECREASE IN KIDNEY TRAVEL DISTANCE
31%

EMBEDDING THE EXPERTS

Beyond data, the Feinberg and McCormick researchers also had each other. However, these medical and engineering professionals agree that the learning curve presents a major challenge. "The biggest hurdle," says Dr. Abecassis, James Roscoe Miller Distinguished Professor of Medicine, "is to get people out of their comfort zones, to convince busy professionals that it is important to learn and become conversant in another discipline when they have a million other things to do."

Davis played a pivotal role in the learning exchange process by participating in UNOS and NUTORC meetings, and even going on hospital rounds. She explains, "For medicine, you have to see and be part of what practitioners do. Your math can't help them if you don't understand how and why they make their decisions." By the end of her internship, the team had outlined six research projects.

Although computers can churn through mountains of real and simulated data with unbelievable speed, mathematical modeling and simulation programming can be painstakingly slow. Davis devoted half of her four-year doctoral program to this project, spending countless hours at the computer and at the whiteboard with Mehrotra. One-third of her dissertation described and interpreted the massive UNOS database. The rest of the work involved formulating models and designing simulations to predict the effect of changes to the kidney allocation system. "We drew on old techniques from other industries and developed new techniques based on the transplant system, which is a unique entity with unique constraints."

The Northwestern research culminated in the development of an expanded kidney sharing strategy, called KSHARE, that has been rigorously tested using a mathematical model. The authors report that their research "provides evidence that small changes to kidney allocation policy can result in significant improvements in geographic equity."

Preliminary results showed that geographic disparity in kidney transplantation rates could be reduced from 26.9 percent to 7.5 percent after 10 years, by restricting kidney procurement and transplantation to 600 miles, or no more than three geographically close donor service areas. UNOS already permits donor service areas in the same state to share kidneys, but only two states adopted this practice.

UNOS has called for incremental change to assess any policy shift and to prevent disruption of patient care and expectations. KSHARE takes into account these and other priorities and constraints.

Northwestern's ultimate goal is to produce a policy recommendation and management system for UNOS to consider. In February 2014, the collaborators presented a symposium on their research at the annual meeting of the American Association for the Advancement of Science.

A SOFTWARE SOLUTION FOR SURGICAL RESIDENTS AND PATIENTS

The opportunity for a surgical resident to participate in a patient's care from diagnosis to surgery to post-operative follow-up visit is

critical to surgical training. Continuity of care also reduces the likelihood of medical mistakes. The logistical challenge of ensuring that residents gain enough continuity of care experience has been compounded by duty-hour restrictions. These limits are set by the Accreditation Council on Graduate Medical Education and have provided impetus for some medical educators to find solutions to this long-standing problem.

Heron E. Rodriguez, MD, associate professor in vascular surgery and radiology, Feinberg, was one of these educators. He contacted Sanjay Mehrotra, who in consort with former McCormick doctoral student Jonathan Turner, went to work.

PICTURED WITH SANJAY MEHROTRA, DIRECTOR, CENTER FOR ENGINEERING AND HEALTH (2ND FROM LEFT), IS DANNY SAMA, DIRECTOR, ANALYTICS, NMH; VIKRAM KILAMBI, NORTHWESTERN PHD STUDENT, INDUSTRIAL ENGINEERING AND MANAGEMENT SCIENCES; SAURABH SHARMA, PERFORMANCE MANAGER, NMH EMERGENCY DEPARTMENT; AND STEPHANIE GRAVENOR, CLINICAL ANALYTICS LEAD, DEPARTMENT OF EMERGENCY MEDICINE. *TO LEARN ABOUT THE WORK OF THIS TEAM TO ADDRESS EMERGENCY DEPARTMENT OVERCROWDING, GO TO MAGAZINE.NORTHWESTERNMEDICINE.ORG.*

It is standard procedure now for PhD students working with Mehrotra to be embedded in a medical unit, but Turner piloted the model. Besides reviewing reports and studies on resident training and the continuity of care problem, he spent six months at Northwestern Memorial Hospital (NMH) shadowing vascular surgery residents and gathering data to inform his mathematical modeling of the problem.

One of the first things Turner found out was that "residents prefer being in the operating room over anywhere else and will skip clinics to do so." He also learned that residents rotating through vascular surgery at the beginning of an academic year gain little surgical experience since they must compete with eager new fellows for the same opportunities.

Turner reviewed two months of charts to estimate a baseline figure for continuity of care on the vascular surgery rotation. The figure he came up with? Zero. Longer lag times exist for vascular patients than for many other patient groups, with the typical time between diagnosis and surgery being three weeks. The rotation is just one or two months. The review also provided real data about rotation patterns, including time spent in clinic, number of surgeries performed, and whether case-log needs were considered when staff dispatched residents to the operating room.

The next step was to develop a simulation model to determine if continuity of care could be enhanced by lengthening or restructuring rotations; using a resident-return model, whereby residents may see patients post-operatively even after starting a new rotation; or employing an apprenticeship model, whereby residents work with one or two faculty mentors in the operating room and outpatient office. He restructured rotations by increasing clinic attendance, having residents share responsibilities for patient consultations, employing an electronic case assignment system, and using an alert system to inform residents about returning post-operative patients.

He created three measurements for continuity of care: pre-operative, post-operative and comprehensive. Any resident who participated in diagnosing the patient and assisted in any of the patient's surgical procedures achieved pre-operative success. Post-operative success was met when a resident assisted in a patient's surgery and saw the patient during an outpatient follow-up appointment. Comprehensive success could be achieved if a resident participated in at least one diagnosis, surgery, and follow-up event.

What Turner found may seem counterintuitive: The structure of the rotation presented greater barriers to continuity of care than did rotation length. Each of his proposed structural changes was beneficial and, in combination, they significantly improved both pre- and post-operative continuity of care. The combined changes, however, had little impact on comprehensive quality of care, increasing it by just 4.1 percent. The apprenticeship model combined with a resident return model, on the other hand, resulted in residents achieving 34.5 percent comprehensive continuity of care with a 30-day rotation and 45 percent continuity of care with a 60-day rotation.

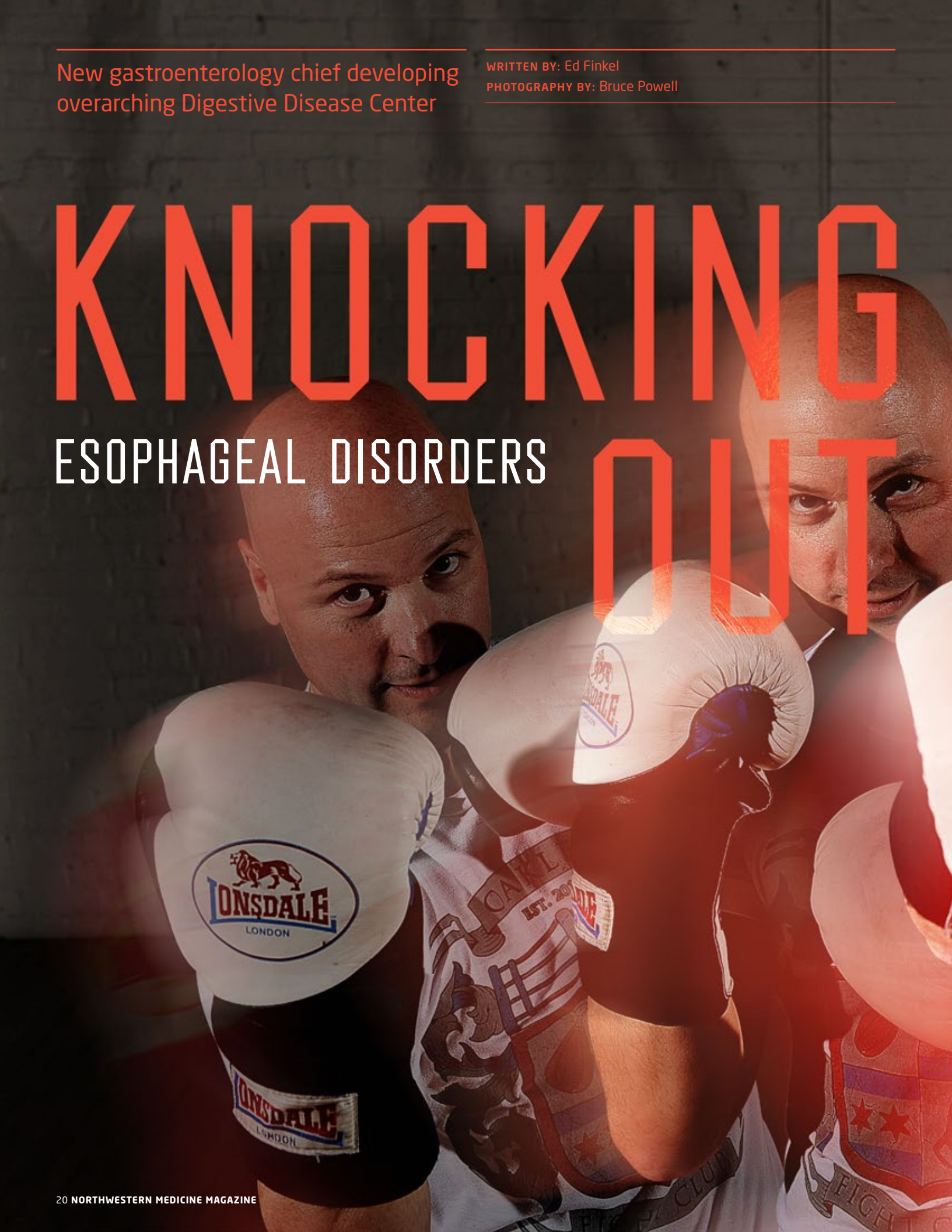
Drawing from this research, Turner developed scheduling software to facilitate decision-making about where and when to deploy which residents. It took into account a variety of factors, including a person's case-log needs and previous resident-patient interactions. The hospital piloted the software and plans to upgrade it. The Institute for Operations Research and the Management Sciences recognized Turner with its "Doing Good with Good Operations Research" award for his work, and NMH hired him as its first healthcare engineer manager for quality and innovation. He recently joined the Department of Systems Engineering at University Hospital, Augusta, Ga.

"This is just the tip of the iceberg," says Dr. Abecassis about the outlook for Northwestern Medicine projects with the Center for Engineering and Health. "This is a growth area with as many opportunities for collaborative research as your mind can imagine."

New gastroenterology chief developing overarching Digestive Disease Center

WRITTEN BY: Ed Finkel
PHOTOGRAPHY BY: Bruce Powell

KNOCKING OUT ESOPHAGEAL DISORDERS



John E. Pandolfino, MD, '97, '01 GME, '05 MSCI, has been at Feinberg for more than two decades—as an intern and then a resident in medicine, a gastroenterology fellow, and finally, as a professor and attending physician at Northwestern Memorial Hospital. Last summer, he landed his "dream job" as chief of gastroenterology and hepatology, and the avid boxer intends to go 15 rounds in establishing the department as one of the nation's finest.

"This is the job I always wanted," says Dr. Pandolfino, an internationally recognized specialist in esophageal disorders, and the Hans Popper Professor at the Feinberg School of Medicine. "You can have a tremendous amount of impact in developing and mentoring people. My goal is to create an interwoven clinical and research machine."

A fellow of both the American College of Gastroenterology and the American Gastroenterology Association, Pandolfino has focused his own research on malfunctions of the esophagus, which he notes can seriously affect one's quality of life.

"When you think about what revolves around eating, it's not just nutrition, it's a social activity," he says. "It's not just the patient but also family members who suffer due to poor quality of eating. It's tough to watch someone struggle through their holiday meal."

Through his NIH-funded research, Pandolfino and his team developed the Chicago Classification of Esophageal Motor Disorders, which changed how researchers think about and triage conditions that result from the improper movement of food and liquids down the throat to the stomach.

"We've developed algorithms, refined the classification scheme and have created the world's best treatment center for esophageal motor diseases," he says.

According to Pandolfino, the Chicago Classification continues to evolve and has led to emerging technologies such as high-resolution impedance manometry, which can simultaneously measure pressure and anatomical variations. This "can be extremely important in teasing out very subtle abnormalities that can explain symptoms in some patients," he says.

DR. JOHN PANDOLFINO, CHIEF OF GASTROENTEROLOGY AND HEPATOLOGY, WITH ONE OF HIS MENTEES, DR. ANDREW GAWRON (STANDING), AND ONE OF HIS MENTORS, DR. PETER J. KAHRILAS.

In more recent years, Pandolfino has branched out to work with behavioral health colleagues to delve into the psychosocial elements of these diseases.

"If I only focused on the 'plumbing aspect,' I would only be doing half the job," he says. People's fear and anxiety doesn't cause esophageal symptoms but makes them worse.

Nationally, Dr. Pandolfino has been intimately involved in developing clinical protocols and has authored guidelines for clinical practice in manometry, reflux testing, and the management of diseases like gastroesophageal reflux disease (GERD) and achalasia. He's also been involved with numerous scientific journals and has served as editor-in-chief of *Diseases of the Esophagus*. On an international level, he has been an invited speaker, named lecturer and visiting professor in China, India, Japan, throughout Europe, and South America.

PAYING IT FORWARD

Mentorship is a theme that's run through Pandolfino's career. He greatly values the relationship he's had with the man he replaced, Arvydas D. Vanagunas, MD, who had served as interim chief since January 2011, and who knew Pandolfino as a resident and fellow. If not for Vanagunas' influence, Pandolfino isn't sure he would be in academic medicine today.

"He set the stage, where I could see somebody being a really good clinician and a really good scientist," Pandolfino explains.

Eventually, Pandolfino met another mentor during his fellowship, Peter J. Kahrilas, MD, Gilbert H. Marquardt Professor of Medicine, who had a major impact on his career. "Peter taught me the science and research skills that would set the foundation for all of my academic success. His attention to detail and his ability to define complex physiologic interactions is something that I continue to try to emulate today," he says.

Dr. Vanagunas says he saw Pandolfino's potential early, when the latter became an outstanding teaching resident and then chief medical resident.

"I've seen him mature as a clinician and a scientist and make an international name. His skill set is impressive. He's been a role model, mentoring a lot of our residents to go into research," Vanagunas says. "If a student or resident works with him, they're pretty much guaranteed to have a rigorous experience."

That description squares with **Andrew Gawron, MD, PhD, '10 GME**, a fourth-year fellow who will become an assistant professor at University of Utah in the fall. "He's always been very devoted to helping people find their unique career path," Dr. Gawron says. "He sees the big picture of academic medicine, and how there's multiple routes to success."

Pandolfino says developing residents, fellows and junior faculty is a high priority. "I want to support them the same way my mentor helped me," he says. "My ultimate goal is to create the most well-rounded digestive disease specialists—and department—in the nation."

BENCH TO BEDSIDE

As Dr. Pandolfino works to strengthen the breadth of expertise at Northwestern, he's also looking to solidify connections between patient care and research while respecting patient privacy.

"That's been my dream, to build that infrastructure where the clinician-researcher connection works seamlessly. That's what a university center should be doing," he adds. "One of the big focuses of my career right now is taking physiologic knowledge from high-end research and translating it to clinical outcomes."

Pandolfino says researchers need to be aware of how psychosocial stressors and hypervigilance levels can play into generating symptoms. To that end, he has led the development of ways to improve quality of life for patients with the swallowing disorder dysphagia, using cognitive behavioral therapy and hypnosis to help calm patients and undermine the spread of symptoms.

Other new and exciting work includes techniques to study physiologic responses in the gastrointestinal tract, which connects the relationship between fluid volume and pressure, giving researchers a better understanding of peristaltic functioning, the

wavelike contractors that move food along.

Among Pandolfino's early research management initiatives as chief has been the development of a Digestive Disease Center that is tying together smaller centers focused on diseases of the esophagus, bowel and colon, while also pursuing new directions. Stephen Hanauer, MD, recently recruited from the University of Chicago, will lead the center.

"I look forward to building this out, bringing together things that are already here and supplementing them with new components, building infrastructure so they can feed on each other," Pandolfino says. "We will integrate a collaborative of physicians and surgeons and develop a specialized behavioral medicine team focused on improving quality of life, helping the patient develop self-management skills and cognitive techniques that improve outcomes beyond medical or surgical treatment."

FAMILY AND PHILANTHROPY

Fostering the success and well-being of others is a repetitive theme in Dr. Pandolfino's life. He spends a good chunk of his free time as founder of the nonprofit Motts 58 Foundation, which raises money to support educational and youth development programs on the west side of Chicago. The foundation offers a boxing program to help inner-city youth get off the street and learn discipline, and Pandolfino says 10 or 15 kids participate at any one time.

The foundation was inspired by Motts Tonelli, a former Cook County Board president who was burned over 75 percent of his body as a child, became a superstar athlete in college, enlisted in the Army and survived both the Bataan Death March and four years in a prisoner-of-war camp. "He was a testament to perseverance and dignity," explains Pandolfino, who once had Tonelli as a patient. "He wanted to be a good citizen."

A former boxer who has resumed the sport through his involvement with the foundation, Pandolfino says he has a passion for philanthropy, as well. "We have all this wealth in the city," he says. "Philanthropy and donating your time is something I pride myself on. This is my small part."

When he's not working at Feinberg or for the Foundation, Pandolfino is happy to be with wife Barbara, 5½-year-old daughter Liv and bulldog James. "Any spare time I have is focused on them," he says.

A Brooklyn native, Pandolfino credits his parents for instilling the values in him that he admired in Motts Tonelli. "My parents always pushed the value of being a good citizen," he says. "People don't value citizenship anymore. It's much harder to follow the rules than to break them."

Pandolfino's mentor and mentee see those values embodied in him both personally and professionally. "John is the type of person who is very much devoted to patient care," Dr. Gawron says. "He doesn't necessarily have a one-track mind in terms of research … He's able to help students and residents, clinical fellows and faculty guide their careers as well as their research interests. The other thing about John, he's definitely one of those people who is available if you need him."

DR. JOHN PANDOLFINO POSES WITH KIDS WHO PARTICIPATE IN THE MOTTS 58 FOUNDATION'S BOXING PROGRAM AT OAKLEY FIGHT CLUB & FITNESS ON THE WEST SIDE OF CHICAGO. ALSO PICTURED ARE SOME OF THE GYM'S TRAINERS ALONG WITH OWNERS, LALO BEAS AND CARLOS CASTANEDA.

"His standards are very high for everything he does," Dr. Vanagunas adds. "He's a great role model for all of us who work in GI, especially the younger faculty. Hard work, diligence and commitment to science have worked out well for John. He's a very stand-up guy who honors his commitments and is loyal to his team." M

RHYTHM OF LIFE

Circadian science advances speed up importance of timing in medicine

WRITTEN BY: Cheryl SooHoo
PHOTOGRAPHY BY: Laura Brown, Bruce Powell

PHYLLIS ZEE, MD, PHD

INTRODUCTION

NOTES

NORTHWESTERN INVESTIGATORS DISCOVERED FIRST TIMEKEEPING GENE DUBBED "CLOCK" IN THE 1990S

DISRUPTION IN NATURAL LIGHT-DARK CYCLE CAN CAUSE OR EXACERBATE DISEASE AND NEURODEGENERATIVE DISORDERS

ONGOING PROGRESS HAS REACHED THE CRITICAL POINT WHERE INNOVATION IS MORE THAN READY TO ENTER THE PRACTICE OF MEDICINE

Timing truly is everything, especially when forging a new path in medicine. Emerging from growing evidence that out-of-sync circadian rhythms can result in serious health consequences, the nascent field of circadian medicine has the potential to revolutionize modern health care with the leadership of Northwestern Medicine.

In the 1990s, Northwestern investigators discovered the first timekeeping gene and appropriately dubbed it "Clock." This major breakthrough led to others as researchers, only in the last decade, have begun linking disrupted biological clock timing in cellular processes and physiological systems—from insulin production to blood pressure—to adverse health outcomes. Increasingly, studies show poor sleep, shift work or chronic jet lag, for example, can throw off our natural light-dark cycle, causing or exacerbating illnesses from diabetes and cardiovascular disease to neurodegenerative disorders.

Northwestern faculty members across campuses have started translating circadian-based scientific advances to clinical care through the development of novel molecular chronodiagnostics and chronotherapies. Ongoing progress in this area has reached the critical point where innovation is more than ready to enter the practice of medicine.

PHYLLIS C. ZEE

NOTES

THERE ARE SOME 6,000 SLEEP CLINICS IN THE COUNTRY BUT NOT A SINGLE ONE FOCUSES ON CIRCADIAN MEDICINE

THE SLEEP-WAKE CYCLE IS THE MOST OBVIOUS OF THE BIOLOGICAL RHYTHMS, BUT WE SHOULD ALSO BE LOOKING AT ALL PHYSIOLOGICAL PROCESSES

FRED TUREK, PHD

NOTES

BY CHANGING THE LIGHT-DARK CYCLES OF MICE, WE CAN BETTER UNDERSTAND THE BIOLOGICAL PROCESSES OF CIRCADIAN DISRUPTION

THE MIDNIGHT MUNCHERS PACKED ON AS MUCH AS 48% MORE WEIGHT THAN MICE FED AT NATURAL HOURS

"There are some 6,000 sleep clinics in the country but not a single one focuses on circadian medicine, and that's truly the game changer," says Phyllis C. Zee, MD '87, '89 GME, PhD, Benjamin and Virginia T. Boshes Professor of Neurology and director of the Circadian Rhythms and Sleep Research Laboratory at Northwestern University Feinberg School of Medicine. "The sleep-wake cycle is the most obvious of the biological rhythms, but in a patient's care, we should also be looking at nearly all physiological processes, such as cognitive, cardiovascular and metabolic functions, which are also controlled by the circadian clock."

Northwestern Medicine already attracts patients from around the world with sleep and circadian disruption disorders thanks, in large part, to Dr. Zee who has led national efforts to meld the fields of sleep and circadian rhythms in the clinical arena. Now the time has come for the establishment of the nation's first Center for Circadian and Sleep Medicine.

"The science is all here at Northwestern," says Zee, an associate director of the University's Center for Sleep and Circadian Biology (CSCB) and principal investigator on numerous circadian rhythms studies. "The combined strength of our basic and translational research components puts us in the perfect position to incorporate laboratory discoveries into clinical care."

DISRUPTION AND DISEASE

Mice don't stay up late to party or watch a movie. The nocturnal creatures stick to their naturally evolved body clocks: they get shut-eye during the day and feed and play at night. Exhibiting similar clock function to humans at a molecular level, mice have allowed Fred W. Turek, PhD, Charles E. and Emma H. Morrison Professor of Biology in the Weinberg College of Arts and Sciences, and of neurology at the Feinberg School and CSCB director, to separate behavior from biology in the study of the circadian clock system.

"Humans are the only species that disobey their biological clocks on a regular basis," says Dr. Turek, who was a member of the pioneering Northwestern research team that identified the first clock gene in mammals. "However, we can turn our mice into shift workers, so to speak, by changing their light-dark cycles so we can better understand the biological processes of circadian disruption."

Forced to work the "graveyard" shift, the mice in his studies have mirrored ailments often seen in humans with similarly misaligned biological rhythms. Late night and early morning workers, for example, often fight the battle of the bulge. Dr. Turek and his colleagues found the same to be true of animals that ate when normally they would be sleeping. The midnight munchers packed on as much as 48 percent more weight over their baseline than mice fed the same food at natural waking hours. Female shift workers such as nurses and flight attendants with constant jet lag have been shown to experience fertility and menstrual problems. The Turek research group discovered that mice with severe circadian disruption had significantly poorer pregnancy outcomes.

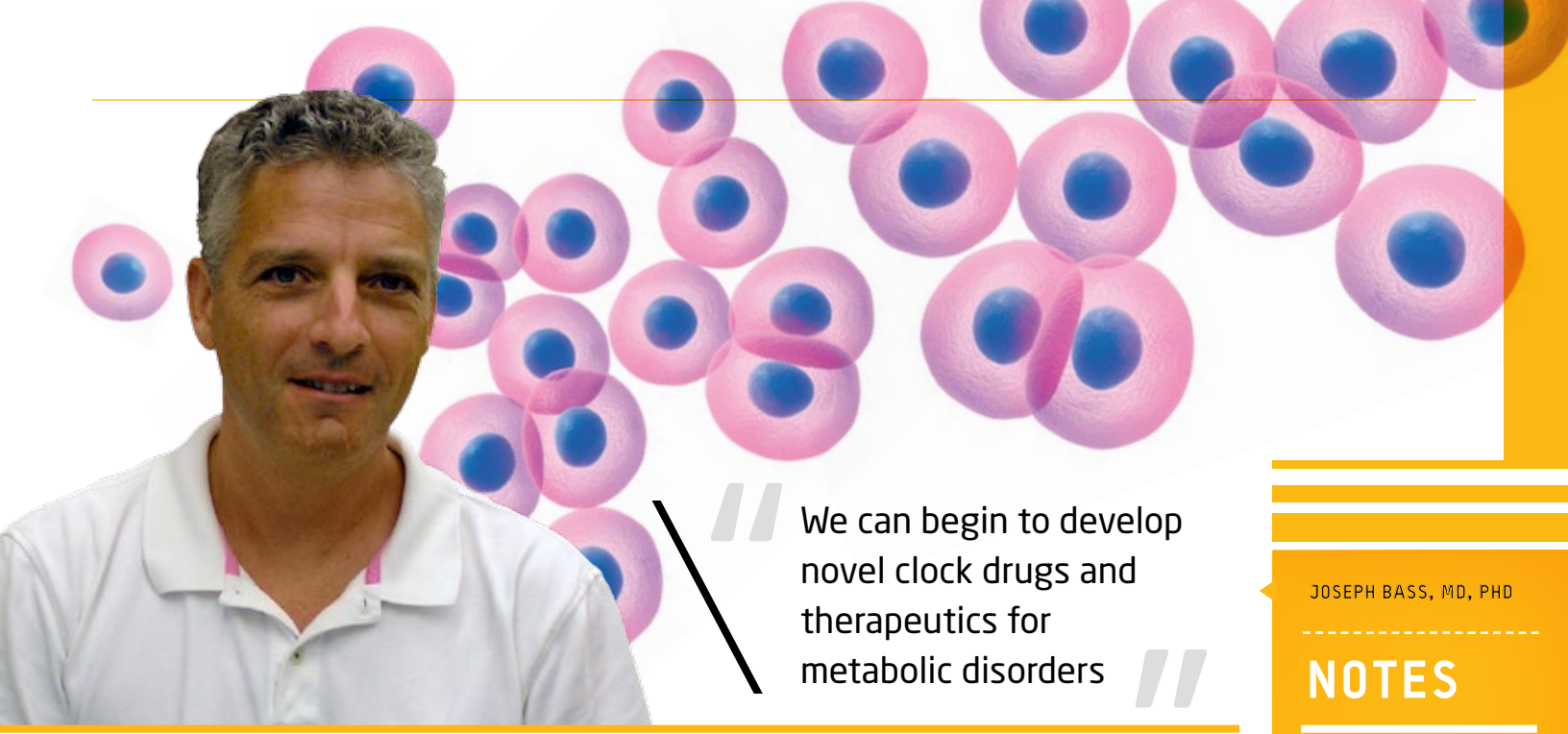
Last June, Dr. Turek and collaborators at Rush University Medical Center in Chicago published results of a study exploring abnormal circadian timing with the development of alcoholic liver disease. The disorder only occurs in 30 percent of severe alcoholics. They found in animal models that out-of-whack rhythms increased susceptibility to alcohol-induced "gut leakiness" or weakness in the intestinal lining that, in turn, more easily paved the way for liver damage.

RHYTHM AND REASON

While caring for diabetic patients, Joseph T. Bass, MD, PhD, Charles F. Kettering Professor of Medicine and chief of endocrinology, can't help but think about timing—faulty timing, that is, of defective pancreatic clocks. "A molecular clock in our pancreas tells the body when and how to metabolize blood sugar," he explains. "When you manipulate this clock, you begin to see effects on glucose control and susceptibility to diabetes and other metabolic diseases such as obesity."

In 2010, Dr. Bass' research group detailed in the journal *Nature* a connection between circadian timing and the production of insulin in the pancreas. The Northwestern investigators were the first to show in mouse models that pancreatic islet cells release insulin to a specific circadian-based rhythm.

The Bass laboratory also focuses on the role the circadian clock plays in programming when cells consume or store fuel. This process speeds up



> We can begin to develop novel clock drugs and therapeutics for metabolic disorders

JOSEPH BASS, MD, PHD

NOTES

A MOLECULAR CLOCK IN OUR PANCREAS TELLS THE BODY WHEN AND HOW TO METABOLIZE BLOOD SUGAR

IN MOUSE MODELS, PANCREATIC ISLET CELLS RELEASE INSULIN TO A SPECIFIC CIRCADIAN-BASED RHYTHM

or slows down the burning of calories in response to, for example, feeding and fasting states that typically fluctuate between sleep and wake cycles. Dr. Bass and his colleagues recently revealed that internal timekeeping triggers cells to tank up—the better the clock, the better the body's fuel efficiency.

"Understanding the control of the clock in the field of metabolism is among the highest impact areas in basic science, judging by the number of citations," says the molecular endocrinologist. "By figuring out the wiring, we can begin to develop novel clock drugs and therapeutics for metabolic disorders."

OF FLIES AND MEN

Although they snooze a little longer than people, common fruit flies (Drosophila melanogaster) get up at dawn and settle down after dusk much like we do. Interestingly, their DNA has made the tiny insect a good stand-in for humans. Says Ravi Allada, MD, chair and professor of neurobiology in the Weinberg College and of pathology at the Feinberg School and associate director of the CSCB, "One of the more amazing stories of science is that the genes regulating time in the wake-sleep cycle of flies are similar to ours."

Dr. Allada has gleaned much from his fly subjects. In 2011 his research team reported the discovery of a gene they named "twenty-four," that caused flies to sleep through their natural alarm clocks. Flies had a harder time waking in the absence of the gene that translates the protein PER, critical to regulating the 24-hour clock. This finding led to the recent identification of another gene, Ataxin-2, that also keeps biological rhythms on schedule in the fly. In humans, mutations of Ataxin-2 have been involved in causing neurodegenerative disorders such as amyotrophic lateral sclerosis (ALS) or Lou Gehrig's disease.

"We are now looking very closely at the connection of Ataxin-2 to the neurodegenerative disease process," says Allada. "People with neurodegenerative conditions often exhibit disruptions in their sleep-wake cycles. Is their disease preventing them from sleeping well or are disrupted circadian rhythms critical to the development of disease? Does poor sleep, for example, put you at risk for Alzheimer's?"

RAVI ALLADA, MD

NOTES

THE GENES REGULATING TIME IN THE WAKE-SLEEP CYCLE OF FLIES ARE SIMILAR TO HUMANS

GENE "TWENTY-FOUR" CAUSED FLIES TO SLEEP THROUGH THEIR NATURAL ALARM CLOCKS

MUTATIONS OF ATAXIN-2 HAVE BEEN INVOLVED IN CAUSING NEURODEGENERATIVE DISORDERS

STUDYING COMMON FRUIT FLIES, *DROSOPHILA MELANOGASTER*, HELPS FURTHER UNDERSTANDING OF THE HUMAN WAKE-SLEEP CYCLE

WILLIAM GROBMAN, MD, MBA

NOTES

NORTHWESTERN INVESTIGATORS HOPE TO DETERMINE IF DISRUPTED CIRCADIAN RHYTHMS CONTRIBUTE TO HEALTH ISSUES

IF SLEEP DISTURBANCE IS FOUND TO PUT PREGNANT WOMEN AT RISK, THEN WE COULD POTENTIALLY INTERVENE TO IMPROVE THE HEALTH OF MOTHOR AND CHILD

TIME SHIFTERS

As a circadian medicine clinician, Dr. Zee shifts biological time for her patients. She employs therapies such as light, melatonin or restructured time schedules to nudge the hands of the circadian clocks in a person's brain and body back into synchronization. While problems falling asleep or waking up, as well as conditions such as sleep apnea, bring many patients to Northwestern Medicine's clinical program for help, Zee envisions that the Center for Circadian and Sleep Medicine will go beyond sleep disorders.

"In addition to diagnosing and treating people like shift workers with circadian disorders, we also hope to see individuals with cardiovascular, metabolic, immunologic, psychiatric and neurologic disorders and assess their circadian timing," she says. "We have a tremendous opportunity to translate what we've discovered in a number of diverse areas of health."

Clinicians can already test patients for melatonin, a hormone which regulates rhythms such as body temperature and sleep-wake cycles and is only produced at night. However, there's room for more chronodiagnostics. To that end, Drs. Zee and Allada are working on the development of new molecular genetic-based tests to identify circadian disruptions in various diseases. While he didn't coin the phrase, board-certified pathologist Allada refers to this novel area of research as "chronopathology." He says, "We at Northwestern are poised to drive this new field forward."

In her translational circadian research, Zee has cast a wide net and looked at weight regulation, aging, sleep and exercise to improve insomnia, to name a few areas. In collaboration with Kelly G. Baron, PhD, director of the Behavioral Sleep Medicine Program at Northwestern, she has examined the influence of sleep and circadian timing on appetite and weight regulation. Involved in multiple cross-disciplinary collaborations, she partners with faculty across the medical school and University such as William A. Grobman, MD/MBA '97, '00 GME, professor of obstetrics and gynecology. The two are working on a multicenter National Institutes of Health pregnancy outcomes study monitoring new mothers-to-be (nuMOM2b). Collecting sleep breathing, patterns and quality data from some 4,000 women—a subset of a pool of 10,000 participants—Northwestern investigators hope to determine if disrupted circadian rhythms due to poor sleep from breathing disorders like snoring or sleep apnea and/or abnormal sleep activity contribute to health issues such as pre-eclampsia, restricted fetal growth or diabetes in pregnancy.

"We're looking for associations between sleep and adverse pregnancy outcomes," says Dr. Grobman. "If sleep disturbance is found to put pregnant women at risk, then we could potentially intervene to improve the health of mother and child."

Board certified in sleep medicine and neurology, Roneil G. Malkani, MD, '09, '10, '11 GME, works on resetting circadian clocks for patients with neurodegenerative disorders. The assistant professor of neurology runs a half-day clinic for patients with Parkinson's or Alzheimer's disease who also grapple with loss of sleep-wake rhythm, a common malady for these individuals. "Due to poor or unconsolidated sleep, these patients may be excessively drowsy during the day and need to take lots of naps," says Dr. Malkani. "Or they may wander at night, putting themselves at risk for falls."

In recent years, new findings in circadian biology and neuronal dysfunction have opened up exciting lines of inquiry. Among his projects, Dr. Malkani has been studying sleep-wake cycle disruption in individuals with mild cognitive impairment—often a precursor to Alzheimer's disease. "We're interested in seeing if disrupted rhythms have an actual physiological effect on the brain and cognition," says

RONEIL MALKANI, MD

NOTES

STUDIES SLEEP-WAKE CYCLE DISRUPTION IN INDIVIDUALS WITH MILD COGNITIVE IMPAIRMENT—OFTEN A PRECURSOR TO ALZHEIMER'S DISEASE

INTERESTED IN SEEING IF DISRUPTED RHYTHMS HAVE AN ACTUAL PHYSIOLOGICAL EFFECT ON THE BRAIN AND COGNITION

Malkani. This year he plans to embark on a study of Super Agers—80-something-year-olds who have maintained their mental faculties—to see if regular circadian rhythms have any connection to aging gracefully from a mental acuity perspective.

SAFETY, PERFORMANCE AND PRODUCTIVITY

Kathryn Reid, PhD, rode the rails in her native Australia to study the impact of shiftwork on fatigue and performance in the transportation industry. "I sat up front with the train drivers," recalls the research associate professor of neurology. "I talked to them and even fell asleep with them as they dozed off while working."

These alarming experiences provided equally disturbing data for Reid's research and ultimate PhD thesis. In a 1997 *Nature* article, she and colleagues described study results showing that performance declined with every hour of sleep deprivation. Staying awake continuously for 18 hours equated to a blood-alcohol concentration of 0.05 percent, and a 24-hour all-nighter resulted in the equivalent of 0.08 percent—the current standard limit for drunk driving in the United States. Only last year, the National Safety Transportation Bureau recommended that states lower the standard limit to 0.05 percent. Says Dr. Reid, "This study changed our field."

Today Dr. Reid relates her transportation and biological rhythms experience to the U.S. maritime industry. She's the principal investigator for a study on enhancing sleep efficiency for shift workers who pilot massive freight barges. Crews typically work and rest in six-hour shifts with a total of 12 hours on duty and 12 off in a 24-hour period. Fatigue impacts safety and performance issues, and transportation accidents can be highly destructive.

In 2013, for example, a barge carrying 80,000 gallons of oil hit a railroad bridge in the south and leaked oil into the Mississippi River. Working closely with Dr. Turek, who conducted some of the earlier studies in this area, Reid and colleagues are determining best practices for enhancing sleep for barge crews. Strategies include sleep apnea screening, treating underlying health problems, and improving sleeping conditions while on the water.

Outside of trains, planes and other motorized vehicles, Reid works on a variety of translational circadian research projects. Later this year, she and other Northwestern investigators will be involved in an NIH-funded multisite study that truly hits close to home: they will be studying the effect of fatigue and sleep deprivation on medical residents' performance.

From improving individual health outcomes to ensuring the safety of society, circadian science appears to be securing its place in the diagnosis and treatment of disease. And the time is now for circadian medicine to be recognized as an important part of the clinical equation, according to Dr. Turek.

"Circadian medicine has the power to transform medicine," he says. "We are entering a period much like that of the beginning of the 20th century when Einstein brought time to physics."

> "Circadian medicine has the power to transform medicine."

KATHRYN REID, PHD

NOTES

PERFORMANCE AFTER A 24-HOUR ALL-NIGHTER IS EQUIVALENT TO A BLOOD-ALCOHOL CONCENTRATION OF 0.08%—THE CURRENT STANDARD LIMIT FOR DRUNK DRIVING

WORKING TO ENHANCE SLEEP EFFICIENCY FOR SHIFT WORKERS WHO PILOT MASSIVE FREIGHT BARGES

Alumni President's Message

Dear Fellow Alumni:

Your Medical Alumni Association Board and its operating committees have been busily preparing, through this long winter season, for Alumni Weekend 2014. As part of our National Board Spring Meeting on April 12, we moved forward with our efforts in Strategic Initiatives, Mentoring/Networking, Fundraising and Engagement. (I'll provide you with an update on our progress in my summer message.) The Reunion Ball that evening celebrated the 50th reunion of the Class of 1964 and was enjoyed by all.

I would also like to highlight several other alumni events that occurred this winter. Feinberg Dean Eric Neilson and Northwestern Memorial HealthCare President and CEO Dean Harrison visited Feinberg alumni in warmer climates, including Los Angeles, Tucson and Naples, Fla., providing updates on activities of the medical school and Northwestern Medicine.

In addition, on March 6th, we held a special event on the Chicago campus for more than 100 medical alumni, faculty, students, staff and friends entitled, "Beyond the Classroom: Northwestern Serves Chicago." This event showcased seven of the community health programs that have produced a significantly positive impact on the great city of Chicago, and that owe their success to the volunteer efforts of Feinberg students and faculty. They included:

» *Chicago Youth Programs (CYP),* was started by a group of Northwestern University medical students, including Joe DiCara, '86 MD, 30 years ago as a recreational program to keep Cabrini Green kids off the streets. Today, CYP includes more than 50 programs that serve 400-500 youth, preschool through college, at three Chicago public housing sites. Volunteers provide health care services, safe recreation, cultural programs, education, career guidance and mentoring.

» *Community Health Clinics* offer free primary and specialty medical screenings and services from students, residents and faculty in a number of racially diverse communities that are underserved in Chicago.

» *Good Neighbors* is a partnership with Feinberg medical students, the Fourth Presbyterian Church and the Chicago Lights Elam Davies Social Service Center to build relationships with homeless individuals in the medical school's Streeterville neighborhood. Students go out on Friday afternoons with duffle bags of non-perishable food and drink, toiletries, resource information cards and other necessities.

» *Health Professional Recruitment and Exposure Program (HPREP)* and the *Northwestern Medicine Scholars Program at Westinghouse College Prep* expose high school and college students to the study of medicine, with anatomy, ethics and problem-based learning classes and a research project. Medical students act as mentors to participants.

» *Women's Health Science Program for High School Girls & Beyond* provides science education programs to females from Chicago Public Schools who are considering careers in science and medicine. WHSP encompasses three academies: the Oncofertility Summer Academy (OSA), the Infectious Disease Summer Academy (IDSA), and the Women's Health Summer Academy (WHSA).

» *Keep Your Heart Healthy* is the first-of-its-kind initiative in the U. S. to try to identify and provide resources for those individuals most at risk for developing heart disease; and counsel those individuals not yet at high risk to make changes in diet, exercise and other areas. This collaborative effort between Northwestern, the Chicago Department of Public Health, and several community partners—including the Greater Diabetes Empowerment Center and Family Focus—is funded by the GE Foundation.

In addition to plenty of conversation and camaraderie, attendees enjoyed a presentation on the Keep Your Heart Healthy project, with remarks from Dr. Donald Lloyd-Jones, chair of the Department of Preventive Medicine; Dr. Stephen Havas, research professor in Preventive Medicine-Epidemiology; Nilay Shah, fourth-year MD/MPH student; and Dr. Bechara Choucair, Chicago Public Health Commissioner and adjunct associate professor in family and community medicine.

As emphasized in the Leadership Message on page 2, postgraduate medical education for our residents and fellows in all specialties is a centerpiece of Northwestern Medicine. These highly talented young professionals complete their training, carrying the flag of Northwestern excellence wherever they go. Let us not forget that they are alumni. I would also encourage soon-to-be graduates to remember what your training program has done for you and to get engaged with the Northwestern University Medical Alumni Association. We need your ideas, your feedback and your help to build the network—your network.

All the best,

David Winchester, '63 MD
Alumni Board President

Progress Notes

'50s

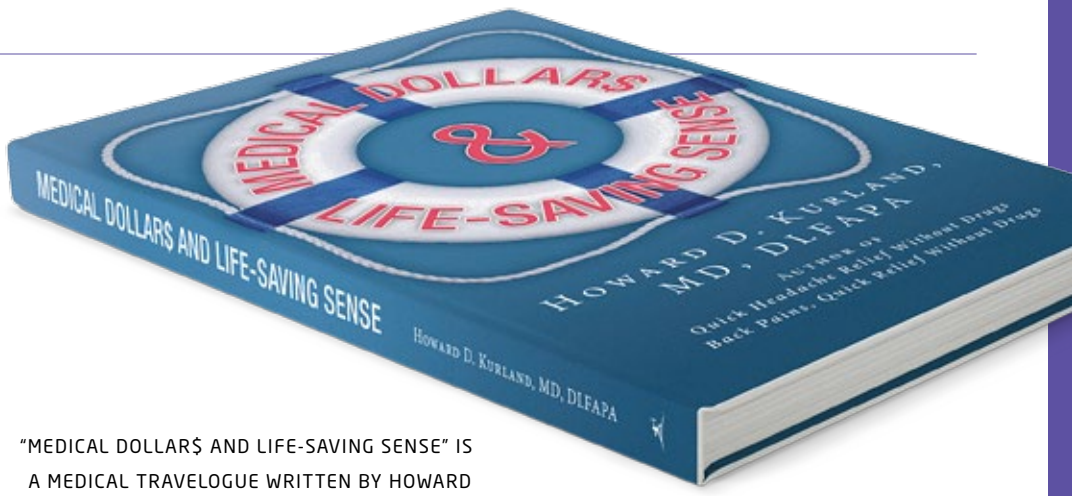
Robert W. Rasch, '51 MD, of Johnson City, Tenn., has enjoyed a long, full career. He served as an officer in the Army Medical Corps, where he was awarded the Bronze Star and United Nations Service Medal, among others. After his military service, he worked in medical academia, moving from the University of Chicago to Marquette University and then to East Tennessee State University, where he was chairman of the Department of Physiology for 10 years. During his academic career, he attended many national meetings and presented and published numerous papers.

Robert A. Kyle, '52 MD, of Rochester, Minn., continues to do research on multiple myeloma and the monoclonal gammopathies at the Mayo Clinic in Rochester. Dr. Kyle also publishes papers, travels, and lectures frequently.

Howard D. Kurland, '59 MD, of Kenilworth, Ill., writes: "In 1965, I returned to Northwestern as chief of Psychiatry and Neurology at the VA Research Hospital. While serving as a lieutenant commander in the USN Medical Corps (1961-65), my original research documented adrenocortical dysfunction in depressive disorders. In 1969, I went into full-time private practice. I served as a senior attending psychiatrist and senior attending neurologist at Evanston Hospital teaching neuropsychopharmacology to psychiatry residents. Following 9/11/2001, I resigned from my inpatient hospital and teaching responsibilities because I was requested to serve in an advisory capacity for the national government. I continued my private office practice in Kenilworth, and it still remains active."

Dr. Kurland is a Distinguished Life Fellow of the American Psychiatric Association, Life Fellow of the Pan-American Medical Association, and a Fellow of the Academy of Psychosomatic Medicine. He was a founding member of the board of directors of the Institute for Advancement in Prosthetics, and director of the Barr Foundation. He has been recognized as one of America's Top Psychiatrists by the Consumers Research Council of America, was selected as a charter member of Peer-Reviewed Physicians, and is a top doctor in the Global Directory of Who's Who.

His recent book "Medical Dollar$ and Life-Saving Sense" is a medical travelogue for patient enlightenment about obtaining economical, quality medical care in the 2014 environment of managed care and "Obamacare."



"MEDICAL DOLLAR$ AND LIFE-SAVING SENSE" IS A MEDICAL TRAVELOGUE WRITTEN BY HOWARD KURLAND, '52 MD.

'60s

Michael L. Friedman, '67 MD, of Rancho Palos Verdes, Calif., is grateful to report that after almost suffering an acute myocardial infarction on a cruise ship, he was stabilized enough to be taken to the Santa Barbara Cottage Hospital. He was lucky to have no heart damage with a 99% blockage and received a single stent after an angiogram and balloon angioplasty. He was able to return to work the following Monday. Since then he has lost 25 pounds, is feeling great, and is thankful for the interventional cardiologist and great hospital that saved his life!

Judy Schneebeck Bensinger, '68 MD, of Lake Forest, Ill., ran a private practice in adolescent medicine for 42 years. She retired in December and started Forever Young – MedSpa, which specializes in laser skin care rejuvenation and body sculpting. She and her husband, Peter, are the parents of four grown children.

Gary Rusk, '69 MD, Finley Brown, '69 MD, Louis Fazen '69 MD, and Norman Segal, '69 MD, reported on behalf of the 45th reunion committee an enthusiastic response by the class to attending the 45th Reunion and participating in the Class of 1969 Scholarship Fund. They send many thanks to all who have contributed so far and encourage class members to consider a pledge so they can meet their goal of 100% participation and raising more than $100,000. Dr. Rusk asks that classmates call him directly (212.734.7810) with any questions about the campaign.

'70s

Richard Kane (Kunske), '71 MD, of Raleigh, N.C., retired in 2012 after 35 years of practicing urology, during which he was chief of surgery and chief of staff for several years. He has been happily married to Susan for 31 years. He welcomes classmates to his home if they are ever in the area.

H.R. Woodward, '73 MD, of Omaha, Neb., is president of the Nebraska Spine Hospital, which he helped establish four years ago. The hospital, a 12 physician clinic with 34 beds and six operating rooms, offers complete diagnosis and treatment of pathological conditions of the spine from the occiput to the coccyx.

Michael Meehan, '74 MD, of Napa, Calif., is retiring after 32 years as an orthopaedic surgeon for Kaiser. He recently attended his 40th class reunion in Chicago.

'80s

Ed Eisler, '81 MD, of San Francisco, was recently elected chief of staff at the California Pacific Medical Center (CPMC) in San Francisco. For 13 years prior, he served as chair of the Department of Anesthesiology at CPMC. He has also taken up marathon running and ran his third Boston Marathon in April 2014.

'90s

Robert J. Wolf, '91 MD, of Glencoe, Ill., has returned to Northwestern to practice internal medicine with The Northwestern Medical Group (NMG), the multi-specialty group practice of Northwestern Medicine. Dr. Wolf works with a team to provide care in the clinic, hospital and nursing home settings.

Alex Montero, '95 MD, of Washington D.C., currently works as assistant program director for quality and safety for the internal medicine residency and as patient safety officer, both at Georgetown University Hospital.

'00s

Henry Nguyen, '01 MD, of Chicago, opened the first McDonald's franchise in Vietnam in downtown Ho Chi Minh City in February. He stated that for a developing market like Vietnam, the McDonald's Training System will be invaluable in training tens of thousands of people in the service industry in the decades to come and will also revolutionize the food quality and safety standards. On the menu are unique items like the McPork and McPork Deluxe sandwiches to reflect the eating habits of the region, where pork is the most-consumed protein.

Mark Nolan Hill, '77 MD, of Highland Park, Ill., helped coordinate and host the opening ceremony for "Warriors and Art: A Path to Healing," an art therapy project that showcases veterans' creative work across all disciplines with expressive explanations of their experiences and feelings. Dr. Hill hosted and moderated the event at The Art Center in Highland Park and provided entertainment with his band, Dr. Mark and the Sutures. The exhibition will travel around the country and end up in Washington D.C.

Kelly Martens, '07 MD, '08, '12 GME, of Baltimore, completed a shoulder and elbow fellowship at Thomas Jefferson Hospital in Philadelphia and began working at the Mid-Atlantic Permanente Medical Group in Largo, Md., in September. Her husband, Michael R. Murray, MD, '08, '12 GME, is a spine surgeon who started practicing at MedStar Union Memorial Hospital in September. They were married in New York City in August 2013.

KACHIU LEE, '10 MD/MPH, WITH HUSBAND WILLIAM HIGGINS, MD.

Kachiu C. Lee, '10 MD/MPH, of Providence, R.I., is currently a dermatology chief resident at Brown University. After graduation in June 2014, she will start fellowship training in Laser and Cosmetic Surgery at Harvard Medical School's Wellman Laboratories of Photomedicine, and will also be supervising dermatology residents in her role as clinical instructor. She contributed to the USMLERx test bank, First Aid for the USMLE Step, and First Aid for the USMLE Step 2 CS, as part of the popular First Aid series. She is married to William Higgins, MD, and they recently welcomed their first child, Alexandra.

GME

Jeanne Horowitz Huff, '08 MD, '09 GME, and Matthew R. Huff, '99 WCAS, '02 L, of Chicago, are the proud parents of Jessica Ziva, born March 6, and brother Tom Lev.

Tomi Wall (Pandolfino), MD, '00 GME, of Lafayette, Calif., practiced as a clinical instructor at Massachusetts General Hospital for their medical and cosmetic dermatology divisions. She has two children: a 7-year-old son and a 3-year-old daughter. She is now enjoying private practice in northern California, sharing office space with Katie Rodan, MD.

Randall McCafferty, MD, '00 GME, of Helotes, Texas, has been chief of neurosurgery at the San Antonio Military Medical Center (SAMMC) for the last several years and is currently deployed to Afghanistan as the director of Joint Combat Casualty Research. He is a Colonel in the United States Air Force.

PT

Steve Anderson, '80 BSPT, and wife Sharon, enjoyed a wonderful Washington state alumni gathering at their home in Bellevue on October 17, 2013. Joining them for the fun were Nelson Liu, '06 DPT, of Seattle, Nathan (Nate) Coomer, '06 DPT, and Erin Egly Coomer, '06 DPT, of Hunts Point, Katherine (Kate) Winborn, '06 DPT, of Seattle, Teri Jo Thompson Lientz, '95 MPT, of Tacoma, and Lynne Robinson, '85 BSPT, also of Bellevue.

Lynne Robinson, '85 BSPT, of Bellevue, Wash., was elected to the Bellevue City Council this fall. Robinson is a member and former chair of the Bellevue Parks and Community Services Board and former chair of the city's Network on Aging.

Tricia Catalino, '96 MPT, of Las Vegas, is assistant professor at Touro University Nevada where she teaches Pediatrics, Lifespan, Professional Practice, and the Culture of Disability. She serves as vice chair of the Early Intervention SIG, member of the Section on Pediatrics Annual Conference (SoPAC) planning committee and the Division for Early Childhood (DEC) Recommended Practices Commission to improve the quality of services provided to young children with disabilities and their families.

Jenny Long, '96 MPT, DPT, of Palms, Mich., works as the rehabilitation services director at rural community-based McKenzie Health System in Michigan. She received her DPT from Washington University in May. Jenny and husband Scott have four children ages 1 through 9 years.

Jen Caccomo Matarazzo, '06 DPT, of Hoffman Estates, Ill., husband Rico, and big sister Ava welcomed Luca Joseph on Sept. 7. Jen is a PTHMS clinician educator and assists in the lifespan and neuro courses.

Suzanne Semanson, '06 DPT, of New York City, stopped by NUPTHMS and visited with the Class of 2013 during the students' last

academic trimester before heading out on their final 6-month clinical experiences.

Paul Bissler, '09 DPT, of Chicago, proud father of a 6-month-old son, completed the Loyola University Medical Center post-professional residency program for physical therapists in orthopaedics in 2012. Paul will be receiving his Orthopedic Certified Specialist certification in Las Vegas at the 2014 APTA Combined Sections Meeting. Loyola is one of two centers in Illinois, and 52 centers nationwide, to receive an accreditation in orthopaedics. John Ragonese, '98 MPT, of Brookfield, Ill., is the residency program coordinator. Lilliana De Armas, '08 DPT, completed the residency program this year.

STEVE CHURCHILL AND AMY FINENDALE, BOTH '09 DPT, WED IN 2012.

Classmates Steve Churchill, '09 DPT, and Amy (Finendale) Churchill, '09 DPT, of Minneapolis were married July 7, 2012, in Superior, Wis. Amy is employed by the University of Minnesota Medical Center-Fairview in Minneapolis. Steve is employed by Nova-Care in Minnetonka.

Classmates Sarah Roeder, '12 DPT, and Nathaniel Collins, '12 DPT, of Colorado Springs, Colo., were married August 17, 2013. Several of their classmates joined in the celebration.

Progress Notes Awards and Honors

'70s

Cynthia Peska Northup, '74 MD, of Sheboygan, Wis., has been chosen as the medical director for the new Palliative Care Program for the Aurora Sheboygan Memorial Medical Center.

JEFFREY S. VENDER, '75 MD (2ND FROM RIGHT), WAS HONORED WITH THE CREATION OF AN ENDOWED CHAIR IN HIS NAME.

Jeffrey S. Vender, '75 MD, of Winnetka, Ill., was honored by the creation of an endowed chair, the Jeffrey S. Vender, MD, Chair of Anesthesiology Research and Education at NorthShore University HealthSystem Evanston Hospital. This was made possible by a group of 130 individual donors.

Moses Rodriguez, '77 MD, of Rochester, Minn., was named Mayo Distinguished Investigator, the highest award given to a member of the staff at the Mayo Foundation. In addition, he recently published a textbook, "Multiple Sclerosis," with two colleagues. Published by Oxford Press (2013), the book for which Dr. Rodriguez did all of the illustrations, is a top seller on this topic on Amazon.com.

'80s

Mira Bjelotomich Irons, '80 MD, of Milton, Mass., became senior vice president for academic affairs for the American Board of Medical Specialties in October.

Renate Savich, '82 MD, of Albuquerque, N.M., currently a professor of pediatrics at the University of New Mexico, was named chair-elect for the American Academy of Pediatrics Section on Perinatal Pediatrics, the organization which represents more than 6,000 neonatologists in the United States. She was also invited to be a member of the new AAP Helping Babies Breathe Steering Committee.

Scott Zeller, '86 MD, of Orinda, Calif., was awarded the Simanek Distinguished Service Award by the California Hospital Association (CHA) during the 2013 Behavioral Health Care Symposium for his research in developing, promoting and leading efforts to understand the effectiveness of a Psychiatric Emergency Services (PES) framework known as the "Alameda Model."

Xinnian Dong, '88 MD, of Durham, N.C., the Distinguished Arts & Sciences Professor of Biology at Duke University, was elected a 2013 Academy Fellow in the American Academy of Microbiology. She is a plant molecular biologist, recognized for her work in understanding plant immune mechanisms.

Li-Hsien "Lily" Rin-Laures, '88 MD, of Chicago, became the first woman partner elected to the executive committee at Marshall, Gerstein & Borun. She has more than two decades of experience focused in biotechnology and pharmaceutical intellectual property law. Rin-Laures is founding member of the firm's committee on diversity and inclusion and was recognized as a 2012 "Leading Law Firm Rainmaker" in Minority Corporate Counsel Association's Diversity & the Bar. She also co-founded and was the first president of the Chicago chapter of Women in Bio, a nonprofit for women in the life sciences.

'90s

W. Hussong, '92 MD, '97 GME, of Salt Lake City, was named chief medical officer and director of laboratories at ARUP Laboratories in July. ARUP is a national clinical and anatomic pathology reference laboratory.

'00s

Shelly Weiss, '09 MD, of Buffalo Grove, Ill., a genetic counselor and regional medical specialist, was named to the second annual "Double Chai in the Chi: 36 Under 36" list by the Jewish United Fund/Jewish Federation of Metropolitan Chicago's Young Leadership Division and Oy!Chicago. Weiss is chair of the associate board for the Center for Jewish Genetics, promoting awareness of hereditary conditions to Ashkenazi Jews. She also works as an educational and resource contributor with the organization Bright Pink, encouraging high-risk women to be proactive about their breast and ovarian health. She is an active fundraiser for pancreatic cancer research and support services. She also volunteers with children and adults with special needs.

PT

Mary Kathryn Wing, '73 PT Cert, of Phoenix, was the 2012 recipient of the APTA Henry O. and Florence P. Kendall Practice Award. Honorees must have engaged in extensive clinical practice for at least 15 years; positively and substantially affected the shape, scope and quality of physical therapy practice; helped other physical therapists; and demonstrated contributions to the association.

Health Volunteers Overseas was recently awarded a $736,000 USAID Grant (March 2013 to May 2015) to provide on-site educational programs to assist with the advancement of rehabilitation services in Rwanda. Antoinette "Toni" Sander, '87 MS, of Naperville, Ill., Physical Therapy and Human Movement Sciences associate professor emerita, is one of the instructors who will work with project leaders, the technical advisory group, and the Kilgali Health Institute on the project. Sander was in Rwanda from Sept. 2013 – March 2014. (Check out her blog at http://www.toniandbernieinafrica.com/)

HAND & HEART

MAKING PHILANTHROPY PART OF A BUSINESS PLAN

WRITTEN BY: Roger Anderson

Most Chicago-area residents are probably familiar with the work of Mark Kaufman, '89 PT, though they may not always realize it.

As owner of Athletico Physical Therapy, Kaufman's hands—or those of the company's 450 therapists—touch tens of thousands of athletes, accountants, administrators and artists every year.

"There was no grand plan for what we've accomplished when I opened that first facility in 1991, almost walking distance from Northwestern's PT program," Kaufman says. "I was two years removed from being a student and the idea was to open one location and keep it open."

Three years later, a second blue and white Athletico banner emerged. For Kaufman, the successes kept coming—the most recent of 80 clinics (the Loop's fourth) launched in February as part of a regional plan that will push the brand further into Wisconsin, Indiana and Illinois.

SMALL TOWN, BIG FUTURE

Growing up in a town of not more than 200 people, Kaufman arrived at Feinberg during a transformative time. Led by Sally Edelsberg, PT, '72 MS, associate professor emeritus of Physical Therapy and Human Movement Sciences, the PT program was increasing in size as Edelsberg moved the department, and its new research lab, to the current location at 645 N. Michigan Ave.

"Sally Edelsberg and the other faculty members not only prepared us well for professional issues and specific skill sets, but one of the strengths while I was at Northwestern was in orthopaedics, which fit nicely with my background and with what I wanted to do in the future," Kaufman explains. "The program gave students what they needed to succeed; I remember starting my clinical rotations being very well prepared."

After graduation, he decided to gain experience and increase his knowledge base. At 26, he left his first job and signed a 10-year lease in Chicago's Gold Coast neighborhood.

"You've got to understand, I'm from a small town," he says, pointing out that his current number of employees is approximately seven times the size of Olds, Iowa, where his parents still live. "Every step of the way has been an adjustment to my comfort zone, and what I'm content with today will change when we open the next facility tomorrow, or when we take on a new contract."

ATHLETICO
PHYSICAL THERAPY
Better for every body.®

GROWTH AND GIVING BACK

As the company expanded, Kaufman focused on Athletico's internal culture. You won't get far into a conversation without him mentioning its four core values: patient satisfaction, accountability, continuous improvement and teamwork. The emphasis pushed Athletico to the top of the *Chicago Tribune*'s Top Workplaces list in 2013.

"We've learned what makes a great physical therapist, what makes a great facility manager and whose personality and 'hard wiring' will fit with our culture," Kaufman explains. "Our goal is to hire the top 10 percent of the physical therapists available to us, and I'm extremely proud that the Northwestern pipeline continues to produce top-tier candidates."

What started with a single location, providing support for two sports affiliates, Athletico today is the official physical therapy sponsor of every professional athletic team in the Windy City—recently signing a long-term extension with the Bulls. It also boasts relationships with nearly 100 local high schools and more than 200 professional organizations, including the Big Ten Athletic Conference, Northwestern Athletics, Joffrey Ballet and U.S. Soccer.

"After a number of years of building the business, when I took a breath and thought about what drives me, what gives me passion, I began to consider a set of philanthropic endeavors," he says. "I've always tried to reflect on the blessings I've incurred and the luck that I've had or might have created with the mentors and the programs that I went through, Northwestern being one of them."

Kaufman and his wife have made numerous contributions to Northwestern University Physical Therapy and Human Movement Sciences (NUPTHMS), having established the Mark and Mary Ann Kaufman Enrichment Fund, a quarter-million dollar endowment dedicated for department priorities as determined by the chair.

In 2012, Kaufman launched the NUPTHMS Athletico Challenge Match to encourage more alumni to give back to the PT program. The challenge more than doubled the alumni participation rate.

The balance between Athletico, his work with groups like Big Brothers, Big Sisters of Metropolitan Chicago—where he sits on the board of directors—and time spent with wife Mary Ann and his three daughters, is something about which Kaufman remains cognizant.

When he's not on campus in Evanston visiting the Northwestern Athletics Department, he's watching his oldest daughter Fotini, a sophomore swimmer at Northwestern University, compete in the pool.

PRO SPORTS PARTNERS

- **CHICAGO BEARS,** NFL
- **CHICAGO BLACKHAWKS,** NHL
- **CHICAGO BULLS,** NBA
- **CHICAGO CUBS,** MLB
- **CHICAGO FIRE,** MLS
- **CHICAGO WHITE SOX,** MLB

"I've found my way through philanthropic giving, and combined with my family life, it gives me the energy I need to keep going," he says.

BUILDING FOR THE FUTURE

Based in Oak Brook, Athletico continues to improve its day-to-day core business of working with outpatients throughout the Chicagoland community and beyond.

In 2011, the company recommitted itself to providing quality care and service by measuring each patient's functional outcomes and satisfaction.

"The program differentiates Athletico and allows us to compare the results we are seeing with hundreds of thousands of other

providers around the country," Kaufman says. "It helps us to determine what we are doing well and where there might be opportunities to improve."

With nearly a dozen new clinic locations opening in 2013, Kaufman sees the potential for similar growth this year. The new facilities will likely stretch west toward the Quad Cities, south toward Champaign and north into southeastern Wisconsin.

"I think we have a fantastic team and it's certainly not been all me," he admits. "Every person, every employee, every staff member has contributed to our accomplishments. As long as you take the initiative, you can always get better. As long as we have that spirit and attitude, we will continue to be successful."

Medical School Became Launchpad for HEALTHCARE ENTREPRENEUR

WRITTEN BY: Bob Kronemyer

From an early age, Zeb Kimmel, '04 MD, MBA, marched to the beat of his own drum. For instance, he dropped out of high school in Oregon after only one year because his algebra teacher wrote an incorrect equation on the board while insisting it was right. "I told my parents that I thought the school was teaching me fake math," Kimmel, 43, recalls. "Then my dad (a radiologist) suggested the possibility of me teaching myself—which I did."

Instead of being home-schooled, the young teen took courses through the mail from the University of Wisconsin-Madison, where both his parents had graduated. Although he never received a high school diploma or a GED, he was able to accumulate college credits through the university, which paved the way for him to apply to traditional college and, ultimately, become a healthcare start-up entrepreneur.

HUNGER FOR LEARNING

Through the years, Dr. Kimmel has earned four degrees, including an undergraduate diploma in physics from Brown University, a master's degree in computer science from the University of Illinois at Urbana-Champaign, a Doctor of Medicine degree from Northwestern, and an MBA from the Massachusetts Institute of Technology (MIT).

At Northwestern, he initially enrolled as part of the MD/PhD program, working on a PhD in computer science. While in school, he digitized hardcopy medical documentation, which also automatically generated patient notes. He also created a miniature endoscope for endotracheal intubation. "I liked to tinker and was looking at a lot of different pathways, both hardware and software, for commercialization," he says.

Instead of completing a PhD degree, however, he started a dot.com company called Zebware in the late '90s that allowed any web page to be transformed into a document that could be shared in real time on the Internet. "The company eventually became part of the movie studio New Line Cinema," he notes.

Kimmel applied to medical school to advance the state-of-the-art in medtech. "Medical school has helped me to be an entrepreneur in two ways: first, to identify and prioritize the unmet needs which make the biggest difference in people's lives; and second, to communicate with and understand the objectives of healthcare professionals," he confides.

While at Northwestern, Kimmel was also fortunate to have some great mentors and role models. "These stellar individuals showed me how to work well on a team, behave professionally and embrace innovation," he explains. "They gave me a lot of support and I continue to be in touch with some of them even today."

He remembers anesthesiologist Ray Glassenberg, MD, "whose perceptive vision and sage advice made a big difference in my career"; and neurologist Jesse Taber, MD,

"who was my role model for the ethical, caring physician, always placing his patients above personal comfort or interest."

Upon graduation from medical school in 2004, the undaunted Kimmel joined a medical informatics research group at Harvard Medical School. While there he was loaned to the federal government, where he was one of the earliest members of the Office of the National Coordinator for Health Information Technology (ONC). "It was at ONC that I was given broad exposure to the entire healthcare information technology (IT) industry," he explains.

He also enrolled in the MBA program at MIT. Following graduation in 2007, he worked about five years for the healthcare technology division of the global management consulting firm McKinsey & Company, leaving at the end of 2011 to pursue a new start-up endeavor, Atlas5D.

DARE TO BE AN ENTREPRENEUR

Atlas5D is a touchless, phone-sized sensor that detects changes in how people move, including falling down, which is a leading hazard for older adults. The device is placed on a shelf or next to the TV at home. Either visual light or infrared light is used to measure movement; data are then shared with family and friends over the Web in real time. "Privacy is paramount," Kimmel emphasizes. "We do not store or share photos or video."

The Atlas 5D name reflects the four dimensions of space and time, along with the fifth dimension (5D)—level of activity—a strong health indicator. The product allows for text alerts whenever there are changes in a person's movement. "I believe our device will help preserve their dignity and independence," he says.

Beta testing began last fall. To date, about 10 people have tested the device, which is expected to be offered commercially on the company's Website (www.atlas5d.com) within the year for $100-$200, plus an affordable monthly subscription.

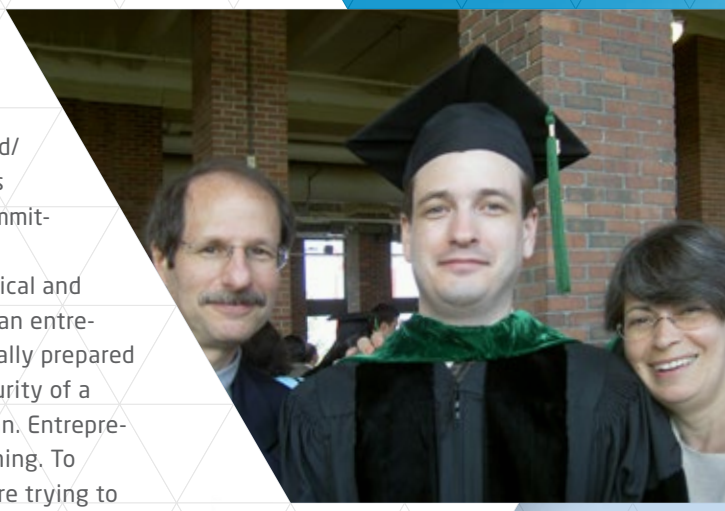
"Although I have been entrepreneurial my whole life, it is very, very difficult to be entrepreneurial in health care, as I have learned over the years, despite impressive technological advances," Kimmel observes. "Creating a new business in health care often requires gigantic scale for success because of the way our insurance reimbursement system works."

He continues, "The patience required to develop new technology is unbelievable. It has been two years since the inception of Atlas5D. A lot of this time has been spent building the technology, which is hard. Testing in real-world situations is also challenging. You often have to go back and approach the problem in a different way. This happened over and over again with the device."

Despite the setbacks, Kimmel keeps his end goal in mind. And he advises medical students who may choose not to pursue the traditional path of clinician and/or researcher, a trend he says is growing, to be aware of the commitment that is needed.

"There is both a psychological and practical component to being an entrepreneur. You need to be mentally prepared to give up the safety and security of a career as a practicing physician. Entrepreneurship is crazy time-consuming. To practice medicine while you are trying to start a company is virtually impossible."

Dr. Kimmel became an entrepreneur because he sought to make an impact through innovation. "The importance of entrepreneurship is experimentation: aiming for difficult, risky, high-impact goals, not knowing for sure which ones will work out and which will not, and being willing to change all your hypotheses on the turn of a dime," he says. "I believe that entrepreneurs are especially important in health care because of their willingness and freedom to experiment; they refuse to limit themselves to the status quo."



In Memoriam

Stephen L. Aldrich, '48 MD, of Black Mountain, N.C., died Dec. 24, 2013.

Kenneth D. Allweiss, '68 MD, of Manhattan Beach, Calif., died Dec. 15, 2013.

Donald S. Amsler, '62 MD, of Wheaton, Ill., died Nov. 18, 2013.

William T. Barnes, '43 Masters, '46 MD, of State College, Pa., died Dec. 6, 2013.

Sandra B. Box, '60 MD, of Winnetka, Ill., died Dec. 23, 2013.

James P. Carter, '57 MD, of Covington, La., died Feb. 12, 2014.

Gerald S. Dean, '47 MD, of Lake Forest, Ill., died Nov. 23, 2013.

Robert F. Finegan, '52 MD, of Black Mountain, N.C., died Nov. 29, 2013.

Frederick W. Fuller, '53 MD, of Bellaire, Texas, died Jan. 22, 2014.

David Grout, '71 GME, of Fort Atkinson, Wis., died Feb. 24, 2014.

Robert S. Heck, '54 MD, of Oak Lawn, Ill., died Dec. 31, 2013.

Ralph R. Holmes, '49 MD, '51 GME, of Los Angeles, died Jan. 11, 2014.

Hall Ketchum, '46 MD, of Tulsa, Okla., died Jan. 5, 2014.

Vernor F. Lovett, '55 MD, of Tucson, Ariz., died Jan. 20, 2014.

William P. Marineau, '53 MD, of Spokane, Wash., died Dec. 10, 2013.

J. Philip Nelson, '62 MD, of Scottsdale, Ariz., died Nov. 28, 2013.

G. Gayle Stephens, '52 MD, of Birmingham, Ala., died Feb. 20, 2014.

Michael F. Stokes, '67 MD, of Littleton, Colo., died Feb. 7, 2014.

Warren H. Williamson, '48 MD, of Racine, Wis., died Nov. 11, 2013.

Keith L. Wrage, '56 MD, of Rockford, Ill., died Nov. 19, 2013.

Upcoming CME Events

MAY

MAY 19, 2014
IPR Colloquium: Multi-Level Interventions to Address Healthcare Disparities
Chambers Hall
Ruan Conference Room (lower level)
600 Foster St, Evanston.
For more information, call 847-491-8712.

MAY 21, 2014
Silverstein Lecture: Max S. Wicha, MD
Robert H. Lurie Medical Research Center, Hughes Auditorium
303 E. Superior St., Chicago.
For more information, call 312-503-5602.

MAY 29, 2014
Feinberg Cardiovascular Research Institute Seminar: Dimitri Krainc, MD, PhD
Robert H. Lurie Medical Research Center, Baldwin Auditorium
303 E. Superior St., Chicago.
For more information, call 312-503-2296.

MAY 30, 2014
Lurie Children's Research: RNA Symposium Honoring Dr. Jim Manley
Robert H. Lurie Medical Research Center, Hughes Auditorium
303 E. Superior St., Chicago.
For more information, call 773-755-6383.

JUN

JUNE 11, 2014
6th Annual Lurie Cancer Center Symposium & 25th Annual Scientific Poster Session
Robert H. Lurie Medical Research Center, Baldwin Auditorium
303 E. Superior St., Chicago.
For more information, call 312-908-5250.

JUNE 12, 2014
9th Annual Pain and Palliative Care Conference
Prentice Women's Hospital, Conference Room L
250 E. Superior St., Chicago.
For more information, call 312-695-1391.

JUNE 13, 2014
Physiology Seminar: Chris J. McBain, PhD
Ward Building, Room 5-230
303 E. Chicago Ave., Chicago
For more information, call 312-503-1687.

JUNE 30, 2014
Cell and Molecular Biology Seminar Series: Dr. Anna Akhmanov
Wieboldt Hall, Room 408
339 E. Chicago Avenue
For more information, call 312-503-4215.

JUL

JULY 10, 2014
ASCO Oncology Review
Northwestern Memorial Hospital, Feinberg Pavilion, Conference Room A,
251 E. Huron St., Chicago.
For more information, call 312-908-5250.

JULY 22, 2014
Pediatric Firm Rounds
Ann & Robert H. Lurie Children's Hospital of Chicago, Rooms 11-152 & 11-160
225 E. Chicago Ave., Chicago.
For more information, call 312-227-4342.

More information at
magazine.northwesternmedicine.org

Lewis Landsberg Research Day Continues Decade of Growth

More than 300 scientific posters represented nearly every medical school department and showcased the work of faculty, fellows, residents and students from Feinberg's graduate, medical and physician-scientist programs at the 10th Annual Lewis Landsberg Research Day.

The April event also featured keynote speaker William Pao, MD, PhD, professor of Medicine, Cancer Biology and Pathology at Vanderbilt University.

"Over the past decade or more we have identified mutations in tumors, so-called driver mutations, which not only induce the formation of tumors, but their sustained signaling leads to a particular Achilles' heel that can be targeted with new therapies," said Dr. Pao, director of the Division of Hematology/Oncology and Personalized Cancer Medicine at the Vanderbilt-Ingram Cancer Center. "The reason we are all excited about this is because the molecular sub-setting has led to progress in terms of overall survivability of cancer."

50th Anniversary of First Northwestern Medicine Organ Transplant

During National Donate Life Month in April, Northwestern Medicine® celebrated the 50th anniversary of its organ transplant program. The first kidney transplant occurred Feb. 18, 1964, at Northwestern Memorial Hospital (NMH), the longest continual provider of organ transplantation in Chicago.

In the last five decades, NMH surgeons have been leaders in transplant innovation, performing a number of groundbreaking procedures in Illinois, including the state's first successful pancreas transplant in 1970, pancreas islet cell transplant in 1996 and laparoscopic (minimally invasive) donation surgery in 1997. These surgeons performed the world's second pediatric dual-kidney transplant in 1964.

Northwestern Medicine may also lay claim to one of the world's most successful kidney transplants. In 1970, Mary Matson, a business owner in Galesburg, Ill., received a kidney from a deceased donor. Deceased donor transplants often need to be replaced after 10 to 15 years, before the body builds up immunity and rejects the organ. Remarkably, Matson still has the same kidney she received nearly 44 years ago.

Northwestern's First Female Medical School Graduates

In honor of National Women's History Month in March, the Galter Library wrote about the first female Northwestern MD graduates, following the initiation of co-education at the medical school in 1926.

A quota of four women students was set for admission—four being the number needed for an anatomical dissecting team.

Read about these pioneers on the History Blog at *magazine.northwesternmedicine.org.*

More at *magazine.northwesternmedicine.org*

PICTURED ARE MEMBERS OF THE WOMAN'S MEDICAL SORORITY, WITH MEMBERS OF THE CLASSES OF 1931, 1932 AND 1933.

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