

ALUMNI

MAYO CLINIC ISSUE 1 2018



A REVOLUTION
IN PANCREATIC
CANCER
TREATMENT

FETAL SURGERY
CENTER OF
EXCELLENCE

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SENECENT
CELLS AND
AGING

LETTER FROM THE PRESIDENT

The Mayo brothers were visionaries in many ways. They set an example that is fostered at Mayo Clinic. At an institution like Mayo, many of our clinicians and scientists embrace the visionary spirit and run with it. They are truly too numerous to mention. This issue of *Mayo Clinic Alumni* looks at some of the Mayo visionaries who are changing practice and advancing scientific knowledge, following the admonition of C.H. Mayo “to heal the sick, and to advance the science.” We’re fortunate to have opportunities to rub shoulders with these change-makers in their fields. (Their enthusiasm, as you will see, can be contagious.)

As I experience the passing of years, I think more about what happens when a physician’s or scientist’s formal professional career draws to a close. Managing the transition from employed to retired can be a challenge. As with any important life milestone, serious planning is called for. In the story on page 36, you’ll learn more about our emeritus staff. Suffice to say that we could all do well to engage more with our emeriti and benefit from their immeasurable expertise and experience.

I hope to see many of you in Berlin at the Alumni Association International Meeting (page 40) in June. We have impressive presenters for the CME portion of the meeting, and you’ll have afternoons free to explore this historic city, which has not only been reunited but reborn.



ERIC EDELL, M.D. (THD '88)

- President, Mayo Clinic Alumni Association
- Division of Pulmonary and Critical Care Medicine
- The Connor Group Professor of Thoracic Diseases in Honor of Claude Deschamps, M.D., and Eric S. Edell, M.D.
- Mayo Clinic in Rochester

“At an institution like Mayo, many of our clinicians and scientists embrace the visionary spirit and run with it.”

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About the cover: In an effort to be a cancer biologist, Jan van Deursen, Ph.D., made unexpected discoveries related to senescent cells and aging. *Science* magazine chose his work as a top 10 scientific breakthrough in 2011 and again in 2016 — the first time a researcher's work had been ranked more than once.



VISIONARY MAYO BROTHERS



Mayo Clinic and its alumni are often on the cutting edge of developments in medicine, science and other pursuits. Stories in this issue of *Mayo Clinic Alumni* are prime examples of this inclination toward innovation. It is worthwhile, from time to time, to reflect on fundamental elements of the Mayo Clinic history that forged the culture of innovation so deeply into the spirit of the clinic, its staff and its alumni.

The Mayo brothers were visionary in many aspects, including their outlook on medicine, practice areas and surgical techniques.

Collaborative practice

Drs. Charles (Dr. Charlie) and William J. (Dr. Will) Mayo were instrumental in developing the concept of teamwork in medicine, building a multidisciplinary practice when the profession had a guild mentality. The brothers had a global view of medicine, emphasizing that it transcended politics and nationality for the greater good of mankind. They made frequent trips to distant medical centers in pursuit of new knowledge.

"American practice is too broad to be national. It had the scientific spirit, and science knows no country."

— William J. Mayo, M.D.

Perpetuation of their clinic

Drs. Charlie and Will were forward-thinking in the perpetuation of Mayo Clinic. In 1919 they and their wives signed a deed of gift transferring all assets of Mayo Clinic — from the building and every test tube

to accumulated cash and securities — to the Mayo Properties Association. This move transformed their private practice into a not-for-profit organization dedicated to excellence in patient care, research and education.

"The ultimate success of the Clinic, past, present and future, must be measured by its contributions to the general good of humanity." — Deed of Gift

Well-functioning administration

The Mayo brothers wanted to make sure administration of the clinic was secure while they were still alive. In 1923 they reorganized the clinic from a partnership to a voluntary association — a cross between a group partnership and a corporation. All of their proprietary and participating interests in clinic income ceased, and they joined the rest of the staff on a fixed salary basis. Administration of the clinic was vested in a Board of Governors, and supervision of professional activities was entrusted to an executive committee.

According to *The Doctors Mayo* by Helen Clapesattle, "Despite the new degree of representation thus accorded to the staff, Dr. Will was not satisfied.



MAYO 1914 BUILDING, PICTURED IN 1924

Looking toward the future, when he and Dr. Charlie and their partners would be gone, he felt that a wider distribution of administrative responsibilities was necessary to educate more members of the group to an understanding of its problems and policies. So he proposed entrusting various phases of the administration to standing committees appointed from the staff."

The committee system was put in effect throughout 1923 and 1924. Dr. Will remained as the executive and "had no intention of relinquishing the reins until he was satisfied that the machinery for self-governance was adequate and that the group was sufficiently imbued with the traditional policies of the practice to continue them," according to Clapesattle.

In 1932, Dr. Will announced that he, his brother and Dr. Henry Plummer would withdraw from the Board of Governors in favor of three younger men from the staff. They would, he said, form an advisory committee and be available for consultation at the request of the clinic, but they were resigning control and responsibility to others.

Although the Mayo brothers relinquished legal control of the clinic in the 1920s, they remained on the Board of Governors. They eventually realized this

limited the clinic from being truly self-governing, and they wanted to let the clinic stand on its own two feet while they were still alive to advise. After 1932 neither brother ever attended a meeting of the Board of Governors or cast a vote in its decisions.

"I looked through a half-opened door into the future, full of interest, intriguing beyond my power to describe, but with a full understanding that it is for each generation to solve its own problems and that no man has the wisdom to guide or control the next generation." — William J. Mayo, M.D.

Surgical innovations

The Mayo brothers are regarded among the foremost American surgeons to have advanced surgical practice, improving upon European methods. The Mayos are credited with innovations in procedures for umbilical hernias, varicose veins, bunions and pyloric obstruction. In the late 1800s surgery for diseases of the gallbladder and bile ducts were seldom performed because of the associated high mortality rate. Dr. Will first reported on his surgical gallstone disease cases in 1892 and, 14 years later, Dr. Charlie published the results of 1,500 operations of that type with a 3.2 percent mortality rate. Dr. Will had a surgical first



Visiting surgeons observe Dr. Charlie
in the operating room in 1913.

when he described successful anastomosis of the bile duct to the duodenum for the treatment of stricture of the biliary tree.

Dr. Charlie was a leader in the surgical treatment of goiter in the U.S. In 1904 he described 68 patients who had operations for removal of simple goiters, with only two deaths. By the end of 1908 he summarized his experiences with 1,000 goiter operations. Almost half of his patients had operations for exophthalmic goiter or Graves disease.

In the early 1900s the Mayo brothers published a series of reports that described their techniques for the surgical treatment of duodenal ulcer and gastric cancer. In the early 1920s they were instrumental in introducing gastric resection for the treatment of duodenal ulcer.

Dr. Will made advances in renal and ureteral surgery, including devising an incision that gave wider exposure and ready access. He also helped to devise plastic surgical repairs for the renal pelvis. Dr. Charlie was one of the first American surgeons to perform prostatectomy, and he obtained good results with repair of exstrophy of the bladder.

"A surgical procedure should be planned so that the patient, with the least possible risk and loss of time, will receive the greatest possible benefit."

— Charles H. Mayo, M.D.

D.I.Y.

The story of William W. Mayo, M.D., mortgaging his house to purchase a microscope is legendary, and it illustrates the Mayos' unwavering commitment to new techniques, technology, procedures, equipment and devices to enhance medical care. Innovating surgical techniques in many cases requires instruments that don't yet exist, and the Mayo brothers took it upon themselves to make or have made what they couldn't get from commercial sources.

Among the equipment the Mayo brothers are credited with developing are an operating room table for the new Saint Marys Hospital, instrument stand for the operating room and examination table for general physical exams.

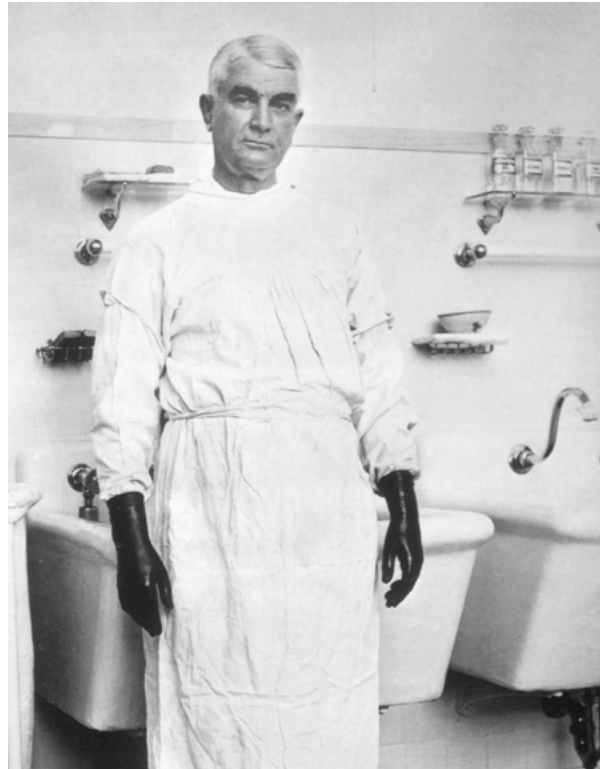
So high was the demand for surgical instruments in the early days of Mayo Clinic that an instrument shop was created to make new devices. Among the early instruments created that were later manufactured by commercial instrument companies were forceps, gallbladder scoop, appendix inverter and vein strippers. The pattern the Mayo brothers established was the foundation for an enduring culture of innovation and invention at Mayo Clinic.

End of active surgical career

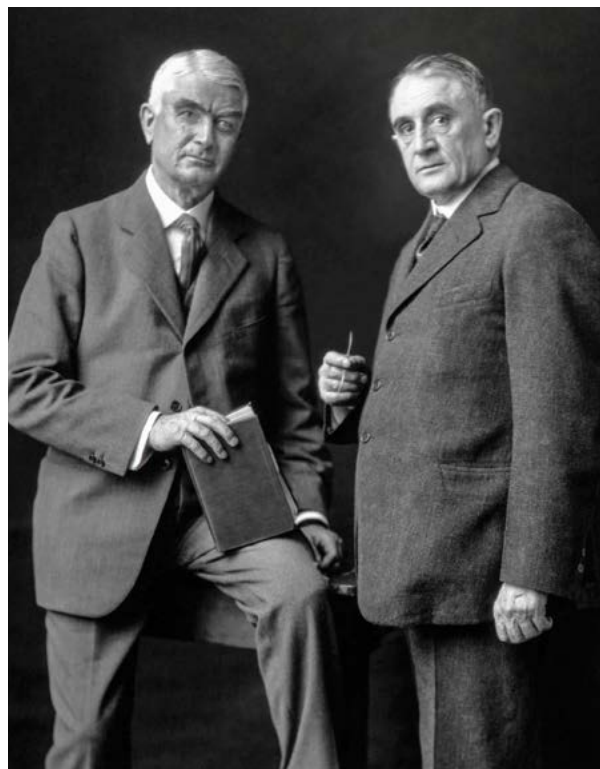
Dr. Will's decision to stop performing surgery in 1928 at age 67 also showed his vision in which the younger generation assumed control while he could still advise them. "I want to stop while I'm good," he said. "I don't want to go on like some others I've seen, past my prime, doing the surgery that younger, surer men ought to be doing."

In the year before he retired, according to Clapesattle, Dr. Will had observed "that the younger men really possessed in the enthusiasm of youth the ability to grasp and orient new knowledge, even though it might conflict with former experiences — an ability that I no longer had in so marked a degree. I had the wisdom of experience, but I carried also the weight of past responsibilities. When this became clear to me, I was happy to turn, in the interest of the profession that I love so well and of the patients who had been my first thought, from an active surgical career to that of surgical adviser, that I might give to the younger surgeons such of value as I had, and to the patient the benefit of my experience." ▲

Innovating surgical techniques requires instruments that don't yet exist in many cases, and the Mayo brothers took it upon themselves to make or have made what they couldn't get from commercial sources.



DR. WILL MAYO, 1922



DRS. WILL AND CHARLIE MAYO, 1925



RODRIGO RUANO, M.D., PH.D.



FETAL SURGERY PROGRAM ELEVATES MATERNAL-FETAL MEDICINE

‘EXTRAORDINARY ABILITY’



Imagine being deemed so critical to a health care organization that the state legislature acts immediately to allow you to practice there. That’s how Rodrigo Ruano, M.D., Ph.D. (OBG ’16), chair of the Division of Maternal Fetal Medicine in the Department of Obstetrics & Gynecology, came to Mayo Clinic in Rochester. Calling him an eminent physician — an internationally trained physician with extraordinary ability — Mayo Clinic urgently appealed to the Minnesota legislature in May 2016, 10 days before the end of the legislative session.

To practice in the U.S., foreign-trained physicians must pass the U.S. Medical Licensing Exam, which typically requires at least a year of study. Previously Dr. Ruano practiced at Texas Children’s Fetal Center at Texas Children’s Hospital. Texas and a handful of other states have adopted legal provisions that allow extraordinarily skilled foreign-trained physicians to practice at academic medical centers.

As a result of Mayo’s appeal, Minnesota passed a similar law, allowing eminent foreign-trained physicians to practice in the state if they are deemed to be a person with “extraordinary ability in the field of science or as an outstanding professor or researcher” as defined under federal regulations. The physicians also must be a faculty member at one of the state’s two academic medical centers — Mayo

Clinic or the University of Minnesota — to be eligible for licensure.

Dr. Ruano was recruited to Mayo Clinic to establish a center of excellence for fetal surgery in the Upper Midwest — one of only about eight such centers in the U.S. The move by the legislature was prudent. In Dr. Ruano’s first year at Mayo Clinic, he performed 20 fetal surgeries. These procedures, which typically are performed between 16 and 32 weeks of gestation, include:

- Less-invasive fetal surgery
 - Fetoscopic laser ablation of placental anastomoses for twin-twin transfusion syndrome
 - Fetal endoscopic tracheal occlusion (FETO) for congenital diaphragmatic hernia
 - Fetal cystoscopy and vesico-amniotic shunting for lower urinary tract obstruction
 - Fetal thoraco-amniotic shunt placement for fetal hydrothorax
 - Fetal intrauterine blood transfusion
 - Fetal atrial septostomy for intact atrial septum
 - Fetal valvuloplasty for aortic and pulmonary stenosis
 - Radio frequency ablation of fetal tumors
- Open fetal surgeries
 - In utero repair of spina bifida

- In utero fetal tumor resection (sacroccygeal teratomas and lung masses)
- Ex utero intrapartum treatment (EXIT) delivery for high-airway obstructions

Dr. Ruano is considered an international expert in specialized FETO procedures for severe congenital diaphragmatic hernia and fetal cystoscopy for severe lower urinary tract obstruction syndrome. FETO procedures involve inserting a tiny scope into the mother's uterus, advancing it into the fetus's mouth to the trachea, and deploying and inflating a latex balloon to block the airway for a few weeks to allow the lungs to increase in size. The mother must remain near Mayo Clinic after balloon placement until the fetal endotracheal balloon can be safely removed several weeks later. After the baby is born, the hole in the diaphragm is repaired by pediatric surgeons.

Without this procedure to develop seriously underdeveloped lungs, many of these babies don't survive the first hours after birth, according to Randall Flick, M.D. (ANES '95), director of the Mayo Clinic Children's Center. "With FETO, many of them do very well and have lower requirements for intensive care and ECMO (extracorporeal membrane oxygenation). Dr. Ruano has brought a wealth of experience to Mayo Clinic, allowing us to build on what we already offered and provide new services.

"Families are very sophisticated in looking for this type of specialty care and will travel across the country for it. Offering FETO and other fetal interventions gives the Mayo Clinic Children's Center national visibility. Our group is the first in the Upper Midwest to provide this specialized procedure."

Dr. Ruano received a 2017 Regenerative Medicine Minnesota Research Award to help him establish a fetoscopic regenerative program. The award also will allow him to evaluate the feasibility and safety of prenatal tracheal occlusion to regenerate fetal lung growth. He will participate in a Phase II multicenter trial to investigate the efficacy of FETO in

regenerating fetal lung growth in the U.S. under FDA regulations.

Fetal interventions, including FETO, treat defects and conditions earlier in the development process and improve fetus health prior to birth.

"Fetal surgery is a relatively new and evolving field," says Dr. Ruano. "It can improve outcomes for babies facing potentially life-threatening conditions."

Rodrigo Ruano, M.D., Ph.D.

- Chair, Division of Maternal Fetal Medicine, Department of Obstetrics & Gynecology
- Department of Physiology and Biomedical Engineering
- Professor of Obstetrics and Gynecology
- Mayo Clinic, Rochester

Medical school:

- Faculdade de Medicina de Universidade de São Paulo, Brazil

Residencies:

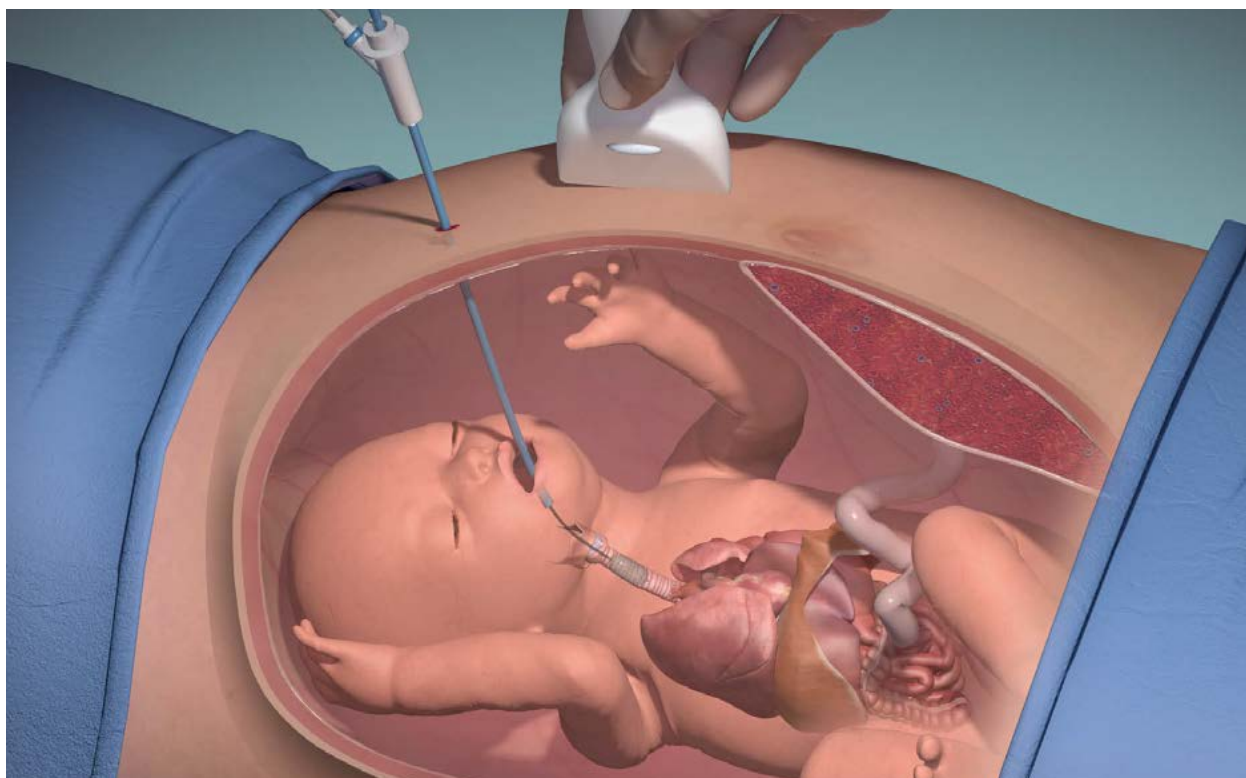
- Obstetrics and gynecology, Hospital das Clinicas da Faculdade de Medicina da Universidade de São Paulo
- Obstetrics and gynecology, Hôpital Necker-Enfants Malades, Université de Paris V, Paris, France

Ph.D.:

- Faculdade de Medicina de Universidade de São Paulo

Fellowships:

- Clinical fellowship, maternal fetal medicine, Hôpital Necker-Enfants Malades, Université de Paris V
- Clinical fellowship, maternal fetal medicine, Centre Hospitalier Intercommunal Saint-Germain-en-Laye, Université de Versailles Saint-Quentin-en-Yvelines, Paris
- Postdoctoral research fellowship, obstetrics and gynecology, Maternité Necker Enfants Malades, Université de Paris V
- Postdoctoral research fellowship, obstetrics and gynecology, Baylor College of Medicine, Houston, Texas
- Postdoctoral research fellowship, obstetrics and gynecology and pediatric surgery, Hospital Vall D'Hebron, Barcelona, Spain



Rodrigo Ruano, M.D., Ph.D., is an expert in fetal endoscopic tracheal occlusion (FETO), which involves inserting a scope into the fetus's mouth via the mother's uterus. Then, a balloon is inflated to block the fetus's airway to allow the lungs to develop.

Department of Obstetrics & Gynecology Chair Abimbola Famuyide, M.B.B.S. (OBG '02), says establishing Mayo Clinic as a national player in fetal surgery was one of his top priorities. "My vision for the maternal-fetal medicine practice included growing beyond a regional patient base. Patients will travel for a world-class fetal intervention program. Dr. Ruano has already surpassed my expectations in sheer volume of cases. In only a year at Mayo Clinic, he's published more than 30 papers and given us a prominent place in NAFTAFNET (North American Fetal Therapy Network, an association of U.S. and Canadian medical centers with established expertise in fetal surgery and other multidisciplinary care for complex fetal disorders).

"We are delighted to have Dr. Ruano as division chair and head of our fetal surgery practice. He trained with the best in the world and is instinctively a Mayo physician in terms of valuing excellence, innovation, compassion and teamwork."

Fulfilling the vision of a maternal-fetal medicine destination medical center

Dr. Ruano is devoted to fulfilling Dr. Famuyide's vision: ensuring the division becomes a destination medical center for complex maternal and fetal diseases.

"I was attracted to Mayo Clinic's mission of patient care, innovation and quality, and saw an opportunity to establish a strong multidisciplinary fetal surgery program with regenerative medicine capabilities to treat conditions and defects before birth," he says. "We're progressing and growing faster than I expected. The fetal intervention patients we've had to date came to Mayo specifically for these services — the best in prenatal diagnosis, fetal therapy and maternal fetal care."

Within a year or two, Drs. Ruano and Famuyide hope to have new physical space for a maternal fetal medicine center of excellence. Dr. Ruano is particularly fond of the model at a hospital where he trained as a resident and clinical fellow — Hôpital



ABIMBOLA FAMUYIDE, M.B.B.S.



RANDALL FLICK, M.D.

Necker-Enfants Malades in Paris, France. That hospital offers a maternal fetal medicine center within the largest children's hospital in France.

"I had the opportunity to train with a pioneer in fetal surgery at Necker within a group that was responsible for the best studies in the field at the time," says Dr. Ruano. "Their hospital model ensures that fetuses we operate on can smoothly transition to the pediatric unit for care after birth."

Dr. Flick describes the model as caring for the child even before birth. "The future of our Children's Center is incorporating maternal-fetal medicine to offer care for children in utero, through childhood and into adulthood for those with congenital diseases.

Dr. Ruano has done an extraordinary job putting together a comprehensive, integrated team that is quintessential Mayo Clinic — obstetrics, anesthesia, pediatric surgery, neonatology, geneticists, radiology, nursing and others — to come to the patient and carefully consider the best course of action."

Jumping at the chance to practice at Mayo Clinic

Coming to Rochester in 2016 wasn't Dr. Ruano's first exposure to Mayo Clinic. He was a visiting resident at Mayo Clinic in Florida in 2000. "I learned a lot about surgery, fetal ultrasound and maternal fetal medicine, and came away with the impression that Mayo Clinic was an amazing institution," he says. "I recognized

“Offering FETO and other fetal interventions gives the Mayo Clinic Children's Center national visibility. Our group is the first in the Upper Midwest to provide this specialized procedure.”

– Randall Flick, M.D.

that the Mayo Clinic principles were the same as what were in my heart, so when I had the opportunity to return more than a decade later, I jumped at it.”

Improving upon innovations

Dr. Ruano is already improving upon the innovations he brought to Mayo Clinic.

He plans to begin offering less invasive fetal repair of spina bifida in 2018 — operating on the fetus with tiny scopes instead of by opening the uterus. No more than three other centers in the U.S. offer fetoscopic repair of spina bifida.

Dr. Ruano learned the technique during his postdoctoral training fellowship in obstetrics and gynecology at Hospital Vall D’Hebron in Barcelona, Spain. His group at Texas Children’s Hospital refined the technique.

“Our goal at Mayo Clinic is to be less invasive, use smaller instruments, see better and do more complex

procedures that achieve the same outcomes for the babies but with fewer maternal risks,” he says. “For example, the repair of spina bifida with scopes will allow patients to have vaginal deliveries.”

Dr. Famuyide notes that Mayo Clinic recently added a pediatric neurosurgeon with expertise in fetal procedures, Edward Ahn, M.D. “Our capabilities will expand by a couple of magnitudes when we can offer fetal brain interventions,” he says. “This probably wouldn’t have happened without Dr. Ruano’s presence at Mayo Clinic and the support of Robert Spinner, M.D. (MDPH ’89, NS ’00, chair of the Department of Neurologic Surgery at Mayo Clinic in Rochester and the Burton M. Onofrio, M.D., Professor of Neurosurgery). It’s exciting to see how quickly this program has developed. We hope to add a fetal intervention surgical fellowship to train the next generation of subspecialists and further cement this program at Mayo Clinic.” ▲

Mayo Clinic Maternal-Fetal Medicine Center

Drs. Famuyide and Ruano had a vision to establish a destination Mayo Clinic Maternal-Fetal Medicine Center. This center of excellence offers multidisciplinary care for women with complex, high-risk pregnancies including the most advanced fetal diagnostic capabilities and therapies.

Services include:

- Preconception care for women with increased medical, surgical or genetic risks
- Genetic testing and prenatal testing
- Diagnostic and therapeutic procedures
- Sophisticated imaging technology
- Prenatal diagnosis of birth defects
- Intrauterine care including fetal therapy
- Management of medical, obstetrical and surgical complications
- Maternal-fetal surgery
- Planning for route and timing of delivery
- Smooth transition of care for infants



A REVOLUTION IN PANCREATIC CANCER TREATMENT



Mark Truty, M.D. (CI '06, S '09), has dedicated his career to giving patients with pancreatic cancer more quality time with their loved ones. Much more time. The mission is personal for him. His own father, Kazimierz Truty, a Polish immigrant and mechanic at a meatpacking plant near Chicago, died 20 years ago from pancreatic cancer at age 58.

"My dad had typical symptoms of back pain, weight loss and diarrhea," says Dr. Truty, a consultant in the Division of Hepatobiliary & Pancreatic Surgery at Mayo Clinic in Rochester. "His symptoms continued, and he developed jaundice and was admitted to a community hospital. A general surgeon who wasn't experienced with pancreatic cancer operated on the tumor, which was wrapped around blood vessels, and cut through the tumor in trying to remove it. My dad was in the hospital for 89 days, had two more emergency operations and eventually went home, too ill for chemotherapy. He died in my arms after weeks of suffering.

"I was 19 years old, so it was a while ago, but scenarios exactly like this still happen across the country every day," he says. "When I got into medicine, I knew we had to advance the science and treatment for this disease. Pancreatic cancer

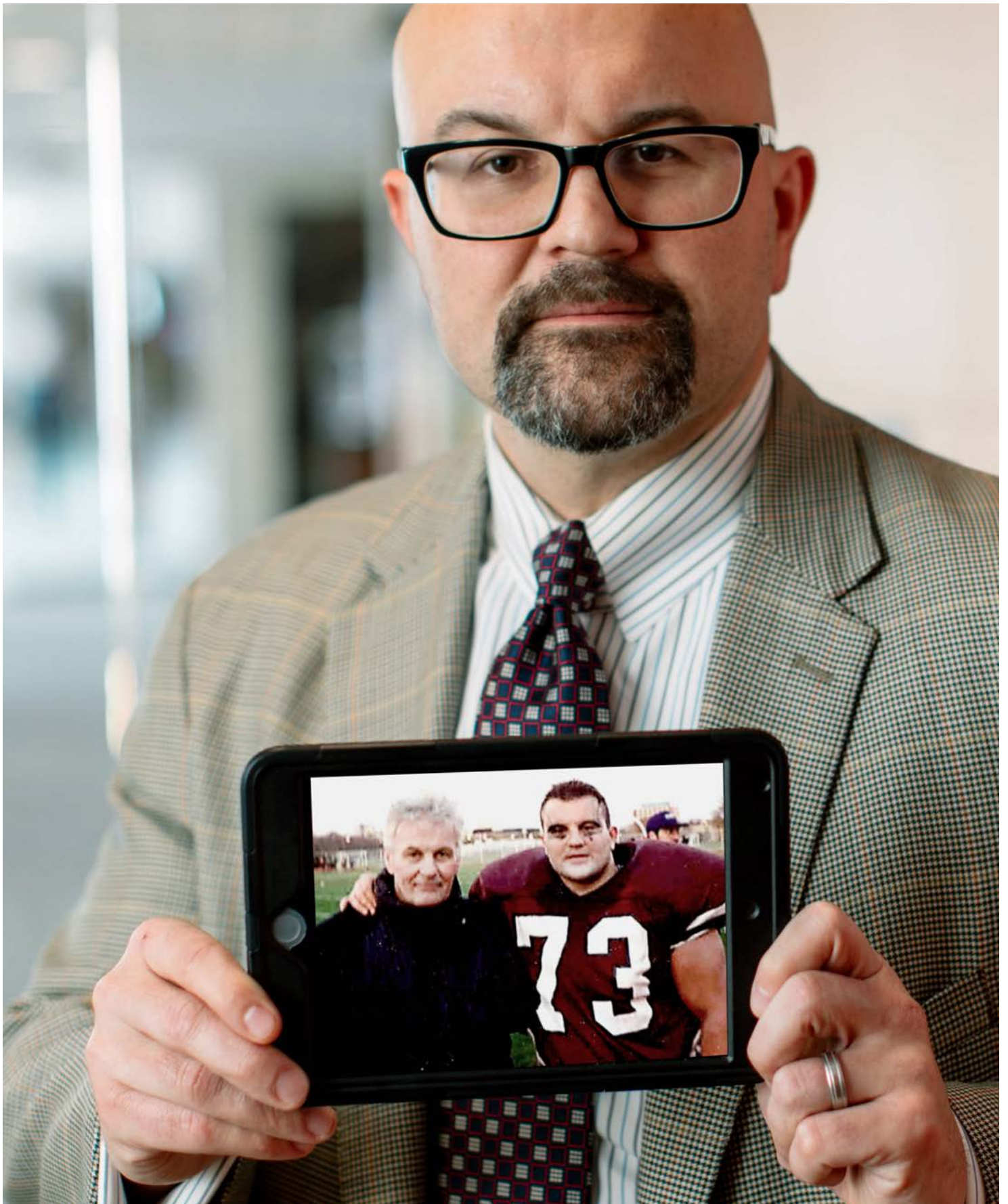
treatment hadn't evolved in three decades. Doctors did the same thing — performed inadequate operations on those whom surgery was unlikely to benefit and avoided surgery in many patients who would potentially benefit from an operation — and expected different results. This approach has been a miserable failure. I applied the surgical skills I learned from my mentors at Mayo Clinic during my training and collaborated with colleagues in other disciplines to break away from that traditional dogma.

"Patients want to know there's hope. They want another holiday with their loved ones. After they're diagnosed, they ask me if they'll live to see another Christmas. Now I get to tell many of them yes."

Upending traditional treatment

How are Dr. Truty and his Mayo Clinic surgical colleagues so confident in their ability to help patients see another holiday? They've upended traditional treatment for pancreatic cancer by introducing a sequenced treatment strategy that's being mimicked at other leading medical centers around the world.

The multidisciplinary approach includes boosting patients' health to endure treatment, providing neoadjuvant chemotherapy and radiation, and performing aggressive operations.



Mark Truty, M.D., during his first year of college, with his father, Kazimierz, shortly before he was diagnosed with pancreatic cancer.

The numbers don't lie. Patients with stage III pancreatic cancer (traditionally inoperable) have had eye-popping improvement in their outcomes. And they show no signs of cancer recurrence in follow up.

Realizing surgery alone isn't enough

The three-decades-old practice Dr. Truty describes involved a standard approach to surgery — operating on only very localized tumors that account for 15 percent of patients, followed by chemotherapy (proven to improve survival) if the patient could tolerate it. There was a glitch, however: many patients didn't receive the recommended chemotherapy due to challenges recovering from surgery or a belief that they didn't need it.

Despite significant technical improvements in the operation and advances in perioperative patient care, long-term outcomes and average length of survival didn't budge, averaging only 20 to 24 months. One reason for that may be that tumors thought to be localized had actually spread, reinforcing the concept that although surgery is necessary for long-term survival, it is not sufficient and alone is of minimal benefit. Dr. Truty says all patients with pancreatic cancer need chemotherapy to treat micrometastases.

"It was great that we learned how to safely perform these complex surgeries and decrease complications, but that alone wasn't going to affect longevity," says Dr. Truty. "Technical advances cannot defeat biological limitations."

Introducing new, ordered components

Not content with the status quo, Dr. Truty and his colleagues explored ways to further improve outcomes. In examining national data of pancreatic cancer patients, they found that surgical patients with elevated levels of the tumor marker CA 19-9 fared significantly worse than those without CA 19-9 elevations, even if their surgery was followed by chemotherapy. The only treatment sequence that provided good long-term outcomes was chemotherapy before surgery.

As a result of that finding, all Mayo Clinic pancreatic cancer patients now have a CA 19-9 blood test at diagnosis to guide treatment. CA 19-9 elevation indicates patients may have metastatic disease, and such patients may benefit from chemotherapy before surgery even if their tumor is otherwise surgically resectable. Pancreatic cancer can spread without it being detectable on scans — the aforementioned micrometastasis — according to Dr. Truty.

"We believe obtaining CA 19-9 levels at diagnosis provides an opportunity to clinically assess tumor aggressiveness," says Dr. Truty. "The test is widely available, inexpensive and a good predictor of how the patient will fare."

Armed with this revelation, pancreatic cancer specialists at Mayo Clinic have flipped the script and introduced neoadjuvant chemotherapy for many patients to improve survival and ensure that an operation will be of significant benefit.

There is, however, a larger fraction (35 percent) of patients whose tumors were traditionally considered too high risk for surgery due to growth outside of

“Pancreatic cancer is stigmatic for its traditionally deadly diagnosis. Patients begin ‘making arrangements’ and talking about hospice. That’s changing. We’re able to help people who have been told their disease is not treatable.” – Mark Truty, M.D.

About pancreatic cancer

- 53,000 patients in U.S. diagnosed in 2016
- 10th most common cancer but third-deadliest cancer
- Will surpass breast and colorectal to be second-leading cause of cancer death in U.S. by 2020
- Number of diagnoses expected to increase by 50 percent between 2010 and 2020
- Only 7 percent of those with pancreatic cancer live more than five years after diagnosis
- In at least 50 percent of cases, cancer has spread to liver, lungs or abdominal cavity by time of diagnosis
- Is usually asymptomatic in early disease

the pancreas and involvement of critical veins and arteries. Today more than 50 percent of these patients are having operations preceded by chemotherapy, using more effective drug combinations. Neoadjuvant radiation also has been added to the mix. Dr. Truty and other surgeons in his division were instrumental in turning those formerly “unresectable” cases into successful curative cancer surgeries.

Dr. Truty says having these three tools — chemotherapy, radiation and surgery — in the toolbox isn’t the key. Rather, how they’re used and in what sequence is key.

“I compare it to making my wife’s chocolate chip cookies,” he says. “I used the same ingredients, but my cookies didn’t turn out as well. Why? She knows how use all the ingredients in the right amounts and in the right order to get the optimal final product.

“What is the optimal final product for patients with pancreatic cancer? It is not the operation. Our goal is to extend quantity and maintain or improve quality of life. Surgery may be a critical component, or it can worsen both of these goals. We don’t have any secret ingredient. We tailor treatment to each patient and use the available tools in the right order and right amounts to accomplish our goals.”

Although other centers have now adopted this approach, Dr. Truty and his Mayo Clinic colleagues are leading the way in defining how to use this strategy most effectively.

Using more sensitive scanning

The treatment sequencing developed at Mayo Clinic includes looking at the entire patient and addressing their weight loss, malnourishment, jaundice, depression and other medical problems at diagnosis. Mayo Clinic’s multidisciplinary approach involves helping patients get in the best mental and physical shape to battle cancer treatment. After patients are stabilized, they receive modern combinatorial chemotherapy administered by Mayo Clinic medical oncologists specializing in pancreatic cancer.

“Traditionally, we looked at CT scans to see if chemotherapy had successfully reduced tumors,” says Dr. Truty. “But our experience reveals that only 25 percent of tumors show shrinkage on CT scans. That doesn’t mean the therapy wasn’t effective. A PET MRI scanner is much more sensitive and a better indicator of whether chemotherapy is killing cancer elsewhere in the body. If there is evidence of response with PET MRI, we’re confident the therapy also is treating the cancer ‘seeds.’ Most patients don’t die from their primary tumors; they die from metastases.”

There are fewer than 50 PET MRI scanners in the world. Mayo Clinic has two of them — in Minnesota and Arizona — and the Florida campus is getting one soon. Dr. Truty says the scanner has revolutionized Mayo Clinic’s practice and is an example of how a significant advance in one field — radiology — has allowed evolution in another — oncology.

“PET MRI helps us determine if the chemotherapy is working,” he says. “If it is, we continue chemotherapy until there is no more viable cancer or until the patient can no longer tolerate the side effects. If scans indicate chemotherapy isn’t working, we switch to another drug combination.”

Preparing for surgery

After chemotherapy, Dr. Truty relies on his colleagues in radiation oncology to initiate therapy, including proton beam, instead of going straight to surgery. “Surgery is only beneficial if we can remove tumors with negative margins,” he says. “Our ability to achieve negative-margin operations is markedly improved when patients have had radiation directed toward the intended surgical site.



Axel Grothey, M.D. (left), and Mark Truty, M.D., each lost a parent to pancreatic cancer, which makes their mission to revolutionize treatment much more personal. Dr. Grothey says this collaboration is one of the most rewarding he's had at Mayo Clinic.

"If there's no evidence of metastases after radiation therapy and the patient is in good enough physical condition, we operate. We do operations most surgeons wouldn't attempt, often with the assistance of our vascular surgery colleagues. We are aggressive in removing all the surrounding structure where the tumor may have been in contact with vessels, doing a complex vascular resection and reconstruction. We do more of these arterial custom 'bespoke' vascular resections than any other center — some of the operations lasting 14 hours."

During the operation the surgeons send tumor samples to a pathologist, who quick-freezes the tissue and examines it for cancer — a technique developed at Mayo Clinic — and then reports back about margins and whether any cancer is still present.

After surgery, some patients receive additional chemotherapy.

The preliminary outcomes with this approach, referred to as total neoadjuvant therapy, will be published soon. The survival benefit is significant.

Collaborating is key

Axel Grothey, M.D. (HEMO '05), Division of Medical Oncology at Mayo Clinic in Rochester, works closely with Dr. Truty and other cancer surgeons. Like Dr. Truty, Dr. Grothey has personal experience with pancreatic cancer.

In 2003 his mother, Inge, was diagnosed with locally advanced pancreatic cancer in Germany. She had surgery, complicated by blood vessel involvement, and died within a week. "Improving the outcomes and life expectancy for patients with this disease is very dear to me," he says.

Dr. Grothey reiterates that aggressive surgery makes sense only if the cancer elsewhere in a patient's body can be controlled. That's where new chemotherapy agents come in.

"A cure is only achievable if control of the tumor spread occurs and the primary tumor can be removed," he says. "It's not just about surgical skill but, rather, our overall management of each patient with an integrated team approach. Mayo Clinic does teamwork like nowhere else."

Dr. Grothey cautions that every patient isn't a candidate for this pancreatic cancer protocol. "Sometimes patients want to be unrealistically aggressive and use every available tool even though that approach may negatively affect their quality of life without adding to their longevity. We try to rein them in. In the right patients, we're more than happy to be aggressive, and there's no better place to be than Mayo Clinic.

"Working with Dr. Truty and our other colleagues to revolutionize pancreatic cancer treatment has been one of the most rewarding collaborations I've had in 14 years at Mayo Clinic."

Shushing the naysayers

Dr. Truty says that while this approach isn't a cure for every patient, it's getting close. The protocol has resulted in significant improvement in survival, even for patients whose tumors previously would have been considered inoperable. Data on more than 160 patients with stage III cancer show remarkable success. With conventional treatment, their expected median survival would be less than a year. Their actual median survival is more than 50 months and counting. The majority of these patients show no signs of cancer.

"When I first started, we didn't use neoadjuvant therapy, and there were a lot of naysayers ... until we had data to demonstrate our success," says Dr. Truty. "Now other medical centers are using this approach, with Mayo Clinic leading the way.

"Pancreatic cancer is stigmatic for its traditionally deadly diagnosis. Patients begin 'making arrangements' and talking about hospice. That's changing. We're able to help people who have been told their disease is not treatable. I encourage Mayo Clinic alumni to tell their patients to get another opinion. Many community providers aren't aware of the revolution underway in the treatment of pancreatic cancer. I'll be happy when pancreatic patients around the world have the hope our patients feel." ▲

Wish list

Dr. Truty describes what's still needed to more effectively identify and treat pancreatic cancer.

Diagnosis prior to development of metastatic disease:

Researchers at Mayo Clinic are working on a more effective, noninvasive screening tool, but it is probably five to 10 years away, he says.

Type 2 diabetes is now considered a risk factor for pancreatic cancer, along with smoking and family history of the disease. Scientists aren't sure if pancreatic cancer causes diabetes or if diabetes increases the risk of pancreatic cancer. But most people diagnosed with pancreatic cancer have had a new diagnosis of diabetes within two years or had longstanding diabetes that worsened.

Better chemotherapy drugs: Dr. Truty's lab removes pancreatic tumors from patients and grows them in special mice. The tumors are genetically sequenced by investigators in the Mayo Clinic Center for Individualized Medicine to find possible drug targets in the mice. "We have hundreds of identical mice with a single patient's tumor in them, which enables us to screen a large number of available and new drugs with no risk to the patient," he says. "If we find a drug that works in a mouse, it's predictive of it working in the patient. We look for a biomarker that predicts the drug's response so we can use the same drug in other patients with that biomarker in a clinical trial.

"This is true individualized oncology, and it's happening at Mayo Clinic. This work is especially important for rare tumors for which there is no data."

Dr. Truty says not many medical centers are very successful in growing pancreatic cancer in xenografts. Mayo Clinic succeeds in this effort because of the collaboration between surgeons and pathologists. They can transfer tumor tissue to mice within 30 minutes — "from warm patient to warm mouse."

"Testing drugs in mice helps us shorten the time normally required to develop clinical trials," says Dr. Truty. "Most pancreatic cancer patients don't have the luxury of time to wait five to 10 years for a traditional trial."

The lab also is transplanting tissue into mice from patients who have had chemotherapy, radiation and surgery to determine if the cancer is completely killed or likely to return. If the cancer cells grow in the mice, it gives Dr. Truty a heads-up to intervene with the patient while the tumor is still small.



SENESCENT CELLS AND AGING

FOLLOWING UP ON THE UNEXPECTED PAYS OFF



Starting at age 8, Jan van Deursen, Ph.D. (P '99), helped his carpenter father on the weekends when he built custom staircases, windows and doors for people in their village in the Netherlands.

"My father had a fast pace, and I had to keep up with him," says Dr. van Deursen. "I didn't realize it at the time, but he was very creative in solving problems in his craft, which involved significant improvisation. I give him a lot of credit for the influence he had on me."

That childhood wasn't idyllic, however. When Dr. van Deursen was 10, his mother started to develop symptoms of pulmonary fibrosis. She died during his last year of high school, after several years in and out of the hospital.

"I had to take care of my dad and do things that most kids of that age didn't do," he says. "It wasn't a good period for me. I'd always been a good student until things became difficult at home. Then I had a hard time just passing my classes so I could go to university. I knew what I wanted to do — pursue biology — but other things were going on in my life that occupied my attention. At university, I set a goal of just making it year to year.

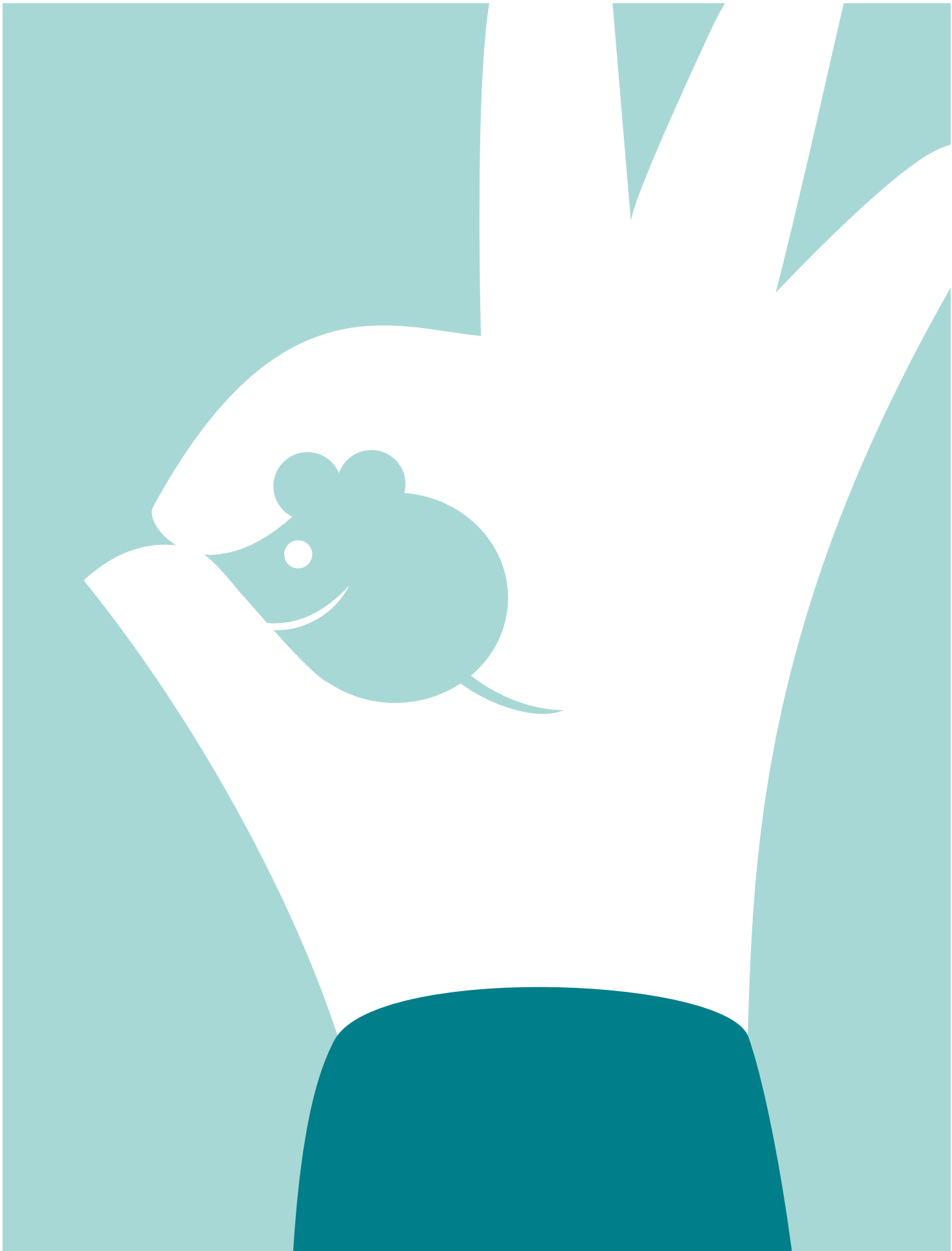
"By my third of five years, I'd passed the hurdle, becoming exceptionally interested in my studies and doing well. I was hooked on learning about all aspects of cells, organisms and molecular mechanisms that drive everything. I won some awards, which set me apart from others and helped me land a job after college in a good Dutch Ph.D. program."

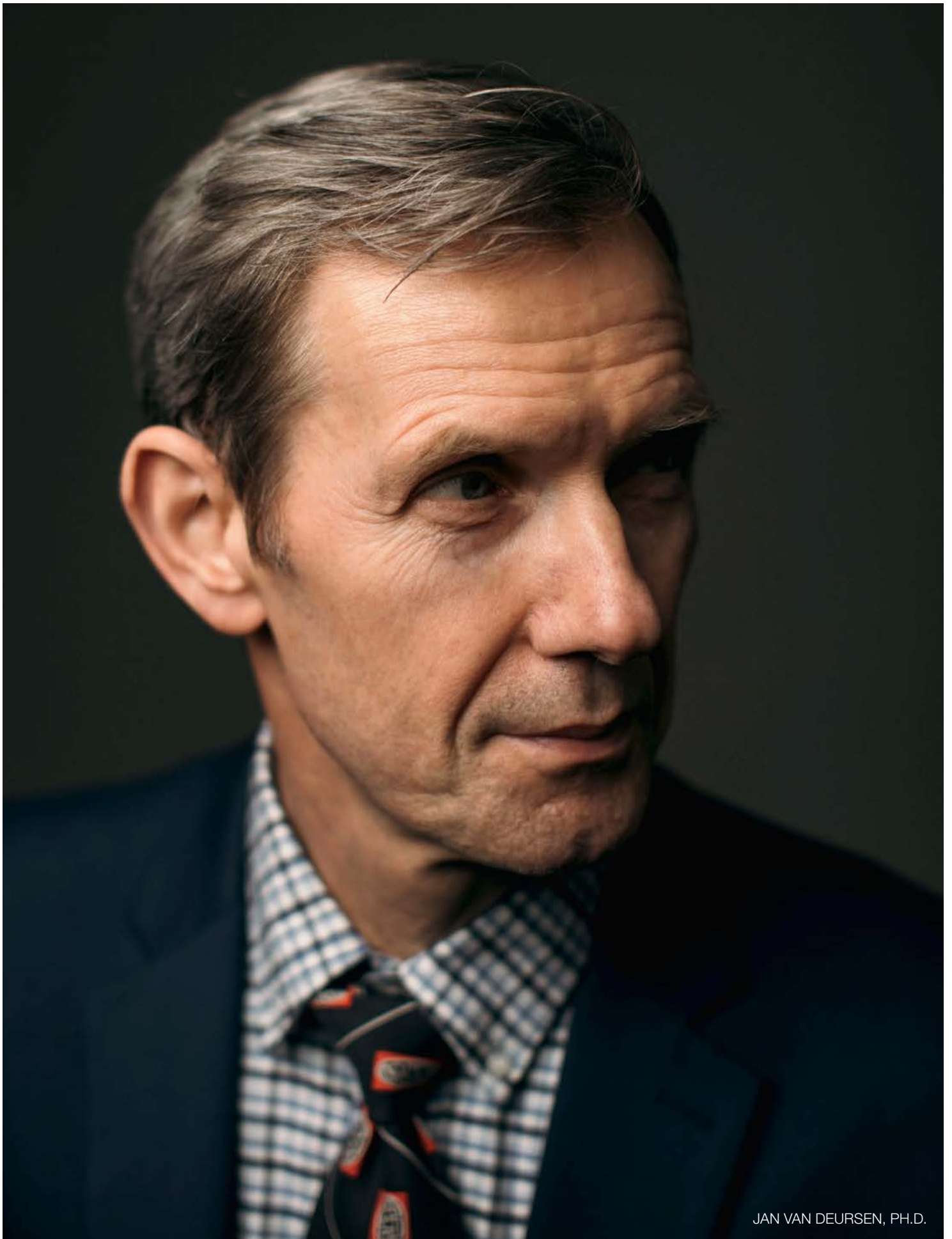
A niche with mice

In the late 1980s Dr. van Deursen began working with mice to recreate genetic mutations of diseases found in humans — work that wasn't being done to a great degree at that time.

"My work was at the forefront of that development," he says. "The senior scientists in the U.S. and Britain, who at the time were ahead of me, received the Nobel prize in 2007 for their groundbreaking work."

On completion of his Ph.D., he accepted a position with St. Jude Children's Research Hospital in Memphis, Tennessee, where he spent two years building a transgenic mouse facility. He then became an independent investigator, soon armed with a Research Program Project Grant (R01) from the National Institutes of Health.





JAN VAN DEURSEN, PH.D.

"I didn't know the extent of it beforehand, but very successful researchers wanted animal models for their genes of interest, so I spent two years making animal models," he says.

From his research came watershed papers in *Nature*, *Science* and *Cell*. Seeking an ideal environment for raising his family, Dr. van Deursen moved to Rochester, Minnesota, with his wife and two daughters in 1999. He accepted a position at Mayo Clinic.

A new home at Mayo

"Dr. Bill Crist, the former head of hematology/oncology at St. Jude's (PD '97, now retired), had gone to Mayo and recruited Rick Bram (M.D., Ph.D., PD '98, now chair of the Department of Pediatrics at Mayo Clinic) and me," says Dr. van Deursen. "The environment at Mayo was extremely collegial. Physicians at Mayo know a lot about physiology and diseases, are open to interacting with basic science labs and are genuinely interested in collaborating. A basic research lab can benefit greatly from having clinical colleagues around, as is evidenced by the publications originating from my lab over the last 18 years.

"At some institutions, you are required to be loyal and exclusive to your department. At Mayo, you just find your way — whatever collaboration makes sense. I've never found it difficult to identify good collaborators. I really like Mayo's loose, fluid departmental structure."

At Mayo, Dr. van Deursen developed a facility to create mouse models of human disease. He unexpectedly hit upon a major breakthrough — one that researchers had been trying to figure out for 50 years. It was the effect of senescent cells on aging. Senescent cells accumulate with age, lose their original function but fail to die.

An accidental discovery

"I was trying to be a cancer biologist," he says. "In my attempts to make cancer models in 2001, I made a number of interesting discoveries that had nothing to do with cancer. When I see something unexpected, I get more interested in it. I don't abandon a finding just because it doesn't fit where I intended to go. So I followed up on this finding. I'd been trying to make an animal model for aneuploidy — a universal

Jan van Deursen, Ph.D.

- Consultant, Department of Pediatric and Adolescent Medicine
 - Chair, Department of Biochemistry and Molecular Biology
 - Director, Transgenic and Knockout Core Facility
 - Director, Paul Glenn Laboratories of Senescence Research at Mayo Clinic
 - Co-leader, Cell Biology Program, Mayo Clinic Cancer Center
 - Co-leader, Cancer and Cell Aging Platform, Mayo Clinic Center for Biomedical Discovery
 - Professor of Biochemistry and Molecular Biology, and Pediatrics
 - Vita Valley Professor of Cellular Senescence
 - Mayo Clinic, Rochester
-
- Graduate: Master's Degree, molecular biology; Ph.D., cell biology, Radboud University Nijmegen, Nijmegen, Netherlands
 - Undergraduate: Radboud University Nijmegen
 - Native of: Gemert, Netherlands

hallmark of cancer cells that rearranges the DNA and chromosomes. In making the model for that chromosomal instability, we found that the mice didn't get cancer but developed an aging process that was accelerated by six times."

The mice had a cell type that accumulated at a high rate — a cell type that young mice don't have. The cells were senescent. No one had yet determined whether senescent cells were neutral, beneficial or detrimental.

"We started to make the connection," says Dr. van Deursen. "If mice have accelerated aging and accumulate these cells at a young age, maybe the senescent cells actually accelerate aging. In 2008 we published the first link between senescent cells and features of aging including muscle wasting, cataracts and lipodystrophy. This was done in collaboration with Dr. Andre Terzic (CV '92), a long-term collaborator at Mayo."

Follow-up studies resulted in several high-profile papers, one of which was in *Nature* in 2011 and also chosen by *Science* magazine as one of the top 10 scientific breakthroughs of the year.

“ Understanding the biology of a disease can lead to transformative discovery that may change the treatment of diseases that are chronic and currently impossible to treat.”

– Jan van Deursen, Ph.D.

A spin-off

Mayo Clinic spun off Dr. van Deursen’s discovery to Unity Biotechnology, a company looking to make an impact on aging and diseases of aging. Dr. van Deursen is co-founder of the company, which is focused on determining if senescent cells can be removed in humans and developing therapeutics. The company is gearing up for clinical trials on osteoarthritis and glaucoma in humans.

“I started the basic science groundwork for this about 15 years ago, which led to interesting discoveries in 2011. Now we’re exploring therapeutic applications in human trials,” says Dr. van Deursen. “If these trials are successful, they will open the door for us to explore other diseases.”

Osteoarthritis and glaucoma were chosen for the first trials because they can be treated with local administration of the drug — a joint or ocular injection — instead of systemically. This helps to avoid the need to control potential side effects in an early-stage drug.

An encore

In 2016 Dr. van Deursen and colleague Darren Baker, Ph.D. (TBIO ’05), published further research, which showed two major findings:

1. Mice that were genetically modified to have self-destructing senescent cells were healthier. They had better kidney function, their hearts were more resilient to stress, they developed cancers at a later age, they explored their cages more, and they had an increased lifespan of 25 to 30 percent compared to other mice.

2. Mice that were genetically engineered to have their senescent cells killed with a drug who were fed a fat-rich diet for three months had 60 percent less plaque (fatty buildup) in a major artery than did the other mice.

“My lab built a program at Mayo from what was basically a failed cancer study, which turned out to be really important for understanding a number of diseases and presented opportunities for future treatment of disease, including Alzheimer’s disease, osteoarthritis, atherosclerosis, heart disease and cancer,” says Dr. van Deursen. “It’s a good reminder to do curiosity-driven research and follow up on unexpected observations. Sometimes that’s a challenge because our clinical colleagues want to make a difference in patients’ lives very quickly. For transformative impact, one really needs to understand the molecular and cellular aspects of a disease.”

Results of the most recent research were published in *Nature* and *Science* in 2016 and, again, named by *Science* as one of the top 10 scientific breakthroughs — the first time a researcher’s work had been ranked more than once. Dr. van Deursen’s research placed fifth.

“The breadth of studies in the top 5 is mind-boggling,” he says. “It’s a great honor to be included.”

By the end of 2016, the research published in *Nature* already was the 10th most frequently downloaded paper in any scientific journal.

“Understanding the biology of a disease can lead to transformative discovery that may change the treatment of diseases that are chronic and currently impossible to treat,” says Dr. van Deursen. ▲

FAST 5

DR. VAN DEURSEN

1 | How did the rush of attention due to your research in 2016 differ from the experience in 2011?

The experience in 2011 was nerve-racking. We gave more than 200 interviews. Being in the spotlight isn't always a good thing. You have to develop a thick skin. I got baptized quickly. You have to be careful when translating findings about aging because everyone is listening.

I was totally surprised when we were back in the spotlight for our research in 2016. Our work was very well received as it was less conceptual and much more translatable to laypeople.

2 | Are others working on similar things as you?

I don't worry about the competition — it's distracting. If I know a colleague at Mayo or somewhere else is working on the same thing, I tend to go a different direction because I don't want to compete. There are too many things I can do and be original. My research has spawned a lot of similar work, however.

3 | What advice do you have for other researchers?

Sometimes you can make a great discovery and be the first to arrive at a finding. Six months later three other groups show the same thing. You were all working on it and got to the same endpoint. The discovery would have been made anyway.

In my lab we follow up on unexpected findings and try to sort them out. That way our path to innovation is likely different from those taken by others in the field. Follow the latest experiment's data, and build on it.

4 | What's your perspective on aging?

Most of your scientific life you work in a specialized area and talk predominantly to scientists, not laypeople. With aging, it's different. It affects everyone, so it's of interest to everyone. I get asked how to live forever and which supplements and drugs to take. I don't really like that.

How aging plays out is still a big mystery. A century ago the average lifespan was about 50. For a lot of species, the reproductive lifespan and end of life coincide. Mouse fertility ends after about six to nine months. Ninety percent of mice in the wild are dead by 1 year of age, and by age 3 in the lab.

Everything in our bodies works really well up until about 45 or 50. From a historic perspective, that's when we're about to die. Historically, we rarely saw the diseases that occur after 50 as major diseases. Few people were that old. Now, with sanitation, houses, good food, treatment for communicable diseases and good work environments, the average lifespan is almost 80. Those extra 30 years are a period where all kinds of things break down in the body. Cellular and molecular systems that were designed to run for 50 years break down.

We need to figure out what's happening and try to fix it — not so we can live longer but so chronic diseases don't negatively affect quality of life. I'd rather die on the 18th hole of my favorite golf course than in a wheelchair in a nursing home. With the basic discoveries we're making in aging, we hope to improve quality of life in the later years.

5 | What do you do to protect your health as you age?

I'm 54 and a marathon runner. I can feel the difference between now and 10 years ago. My body is slowly declining. My job is largely sitting at a workstation. I make a conscious decision to exercise four times a week for about 90 minutes each. I bicycle to work every day in all seasons. It's only 20 minutes a day, but it adds up. I believe that eating fairly healthy helps; I don't want to be overweight. The answer may not lie in insufficiently tested supplements. Eating healthy and exercising are the only things you can currently do proactively to add more good years to your life.



NEW PH.D. PROGRAM AIMS TO SPEED TRANSLATION, APPLICATION OF REGENERATIVE MEDICINE THERAPIES

Mayo Clinic Graduate School of Biomedical Sciences has launched a Regenerative Sciences Training Program, joining the ranks of only a few enterprising doctoral research training programs in regenerative sciences in the U.S. The program will prepare the next generation of scientists to accelerate the discovery, translation and application of cutting-edge regenerative diagnostics and therapeutics.



KAREN HEDIN,
PH.D.

In 2017 the program admitted its first three students, selected from second-year Ph.D. students in the school. Each year another three or four students will be admitted to the five-year program. Eventually the program will include students on all three Mayo Clinic school campuses.

Students will graduate with a doctorate in biomedical sciences with an emphasis in regenerative medicine and one of seven tracks:

- Biochemistry and molecular biology
- Biomedical engineering
- Clinical and translational sciences
- Immunology
- Molecular pharmacology and experimental therapeutics
- Neurobiology of disease
- Virology and gene therapy

Students will receive multidisciplinary training in regenerative sciences research; skills for translating regenerative medical solutions into clinical applications; ethical use of regenerative medical solutions; communication with scientific, medical, business and government professionals; and biobusiness development and federal regulations.

Students in all five Mayo schools will be able to attend the program's classes in person and by teleconference.

Karen Hedin, Ph.D. (PHAR '95), director of the Regenerative Sciences Training Program and associate director of education for the Mayo Clinic Center for Regenerative Medicine, says the program was a priority of Fredric Meyer, M.D. (NS '87), the Juanita Kious Waugh Executive Dean for Education, Mayo Clinic College of Medicine and Science. "Mayo Clinic believes regenerative medicine, which makes it possible to repair diseased, injured or congenitally defective tissues and organs, will be a vital component of medical and surgical practice in coming years," says Dr. Hedin. "Mayo Clinic now offers regenerative-based therapies to address a rapidly expanding range of health issues across all medical specialties."

Dr. Hedin notes that regenerative medicine research training benefits all three Mayo Clinic shields. "We're aiming to give students the tools to speed up the translation and application of novel therapies. Graduates of the program will be integral to advancing the discoveries and building the multidisciplinary workforce needed to drive the future of health care at Mayo Clinic and around the world."

The new fellowships are funded by the Mayo Clinic Center for Regenerative Medicine. The center is working with Mayo Clinic College of Medicine and Science to develop a master's degree program in regenerative sciences, organize a symposium on regenerative medicine to share discoveries with the world through continuing medical education, and add a regenerative medicine component to the surgical residency programs. ▲



THE FIRST THREE STUDENTS IN NEW DOCTORAL PROGRAM

The first three students in the Regenerative Sciences Training Program are:

Paige Arneson, (BMB '21) (center) — Specializing in biochemistry and molecular biology. Her research focuses on the loss of muscle mass from disease and aging and metabolic regulation of muscle stem cells. She received undergraduate degrees from the University of Wisconsin-Superior.

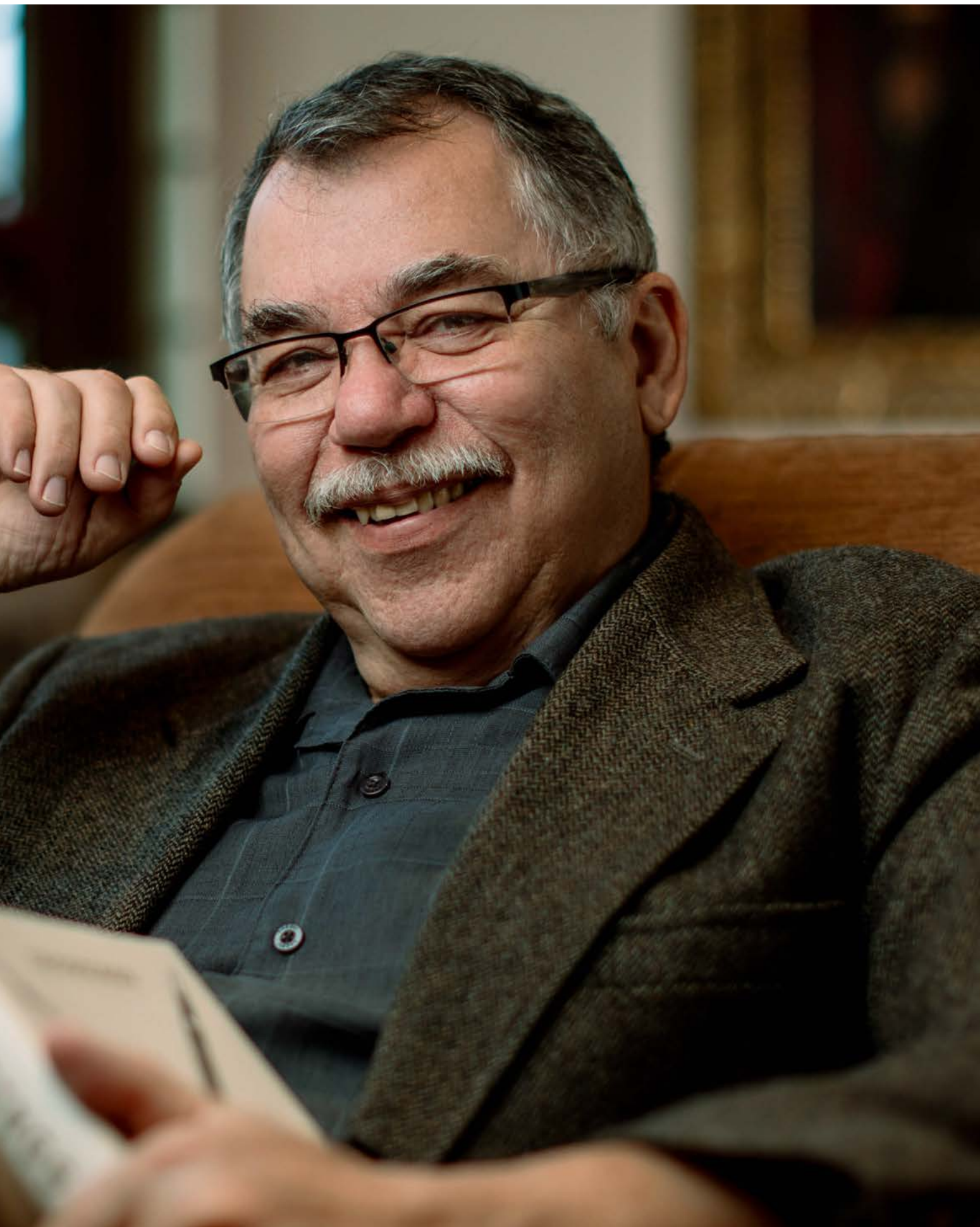
Emma Goddery, (IMM '21) — Specializing in neuro-immunology. Her research focuses on improving stem cell treatments for neurodegenerative conditions caused or accompanied by abnormal inflammation in the central nervous system. She received her undergraduate degree from Arizona State University in Tempe.

Christopher Paradise, (MPET '21) — Specializing in molecular biology and experimental therapeutics. His research focuses on regeneration of bone and cartilage tissues for treatment of musculoskeletal diseases and injuries. He received his undergraduate degree from St. Olaf College in Northfield, Minnesota, and worked for two years as a Mayo Clinic researcher before pursuing his doctorate.



WHERE ARE THEY NOW?

*Jon Kerstetter, M.D.
Pushing through the boundaries
that define him*



In 1988 Jon Kerstetter, M.D. (MED '88), finally achieved his dream of becoming a physician, overcoming poverty and other obstacles. He was 38. Then he achieved another goal and became a military surgeon at 42. His “advanced” age required a special waiver. He was in his element, serving in deployments to Iraq, when an accident forced him home to Iowa for multiple surgeries. During one, he had a stroke and was left with significant cognitive and physical deficits, forcing him to abandon his career. He spent years in rehabilitative therapy and found growth and understanding in writing about his experiences. Writing not only aided his recovery but also helped him find a new identity: author and healer.

Native American

Jon Kerstetter, M.D., was born in 1950 into the Oneida Nation in Wisconsin, a Native American reservation near Green Bay. His mother described their life as having little prospect of anything except month-by-month survival. When Dr. Kerstetter was young, his single mother moved to Brigham City, Utah, for a better life. They lived in the rear portion of a gas station.

*“Instead of a front yard, we had blacktop, gas pumps, and a bell that dinged when cars pulled in for service.”**

In 1960 they moved to a 285-square-foot house. Its only indoor plumbing ran to a sink in his mother’s bedroom. Two years later, they moved back to Oneida to rejoin their Indian community.

“One elder, who was a traditional healer, spoke in soft Oneida phrases and smoked a pipe. When I told him I wanted to be a doctor, he put his wrinkled brown hands on my head and prayed. After he prayed, he reached in his pocket and pulled out a small medicine bag and took a pinch of tobacco in his fingers. He rubbed it in my hands and I could smell the earthy aroma. Later, my mom told me he knew I wanted to become a doctor even before I had said anything and that he was blessing my hands to do good things. For days after, when I rubbed my hands together, I thought of them as doctor hands.”

*Italicized passages are excerpts from Dr. Kerstetter’s book, *Crossings: A Doctor-Soldier’s Story*.

Budding physician

The family’s next home was an abandoned cheese factory without plumbing. That was short-lived, and the family returned to Utah. Young Dr. Kerstetter spent Saturdays at the local public library, reading books about the history of science, the human body and the science of medicine. A favorite was *Gray’s Anatomy*. For his 12th birthday, his mother bought him a model of the human body called the Visible Man, and he practiced dissection and mock surgery. That Christmas, he received a microscope, which his mother bought on layaway.

“Beyond all the uncertainties of growing up in those early houses, each one fixed in the inertia of disrepair, I had a feeling a house could define me, at least partially. The physical nature of the house was one thing; the emotional nature of living in that house was a quite different thing. Where you lived mattered. The houses we lived in were small, old, decrepit, and peculiar. They held a history of the impoverished people who lived in them, and to anybody listening, especially to me, those houses shouted that we lived in poverty, both on and off the reservation. As I grew older, I became aware of the dark physics of that poverty. Starting in the sixth grade, and especially as I entered junior high and senior high school, I felt increasingly embarrassed and even



Jon Kerstetter, M.D., in 1953, Oneida Nation in Wisconsin.

“Getting to Mayo was the culmination of a lot of my dreams. For a kid from an Indian reservation in Wisconsin to get through high school and college and get to enter medical school at Mayo Clinic is unheard of. I walked around the first day in a dream.” – Jon Kerstetter, M.D.

ashamed that we lived as we did. ... I didn't want to be poor like my mother, to live in the kinds of houses we lived in, to scrape for every nickel we had, and to always be in want for something better. I wanted to push as far beyond her poverty as I could to accomplish the life I envisioned for myself. So I did just that. Over three decades of pushing boundaries, I eventually became the doctor of my boyhood dreams.”

As a freshman at the University of Utah in Salt Lake City, Jon Kerstetter checked premed on intake forms. A Native American academic adviser told him medicine would be a rough course for him and he'd be unlikely to succeed in medicine or science. The counselor told the would-be physician, “We don't do well in hard sciences. We become educators and social workers.”

Business executive

Dr. Kerstetter wasn't prepared for his first year of college. He took too many courses and didn't do well. He dropped premed as his major within a year, changed majors multiple times and finally graduated in business. He pursued a one-year master's degree in human resource management and went to work for IBM in Anchorage, Alaska, and then Chicago, Illinois.

“... I stuffed my dream of becoming a doctor into a subliminal closet while I pursued the more practical aspects of starting a career. Whenever I dressed the part of a businessman, I would walk into that closet and see the dusty edges of my dream, that stubborn vision of me as a doctor. And I held two dreams of myself: one defined a practical survival; the other defined who I really wanted to become.”

While working on a Ph.D. studying the physiology of stress and work performance at the University of Minnesota, Dr. Kerstetter took an occupational medicine course designed for physicians and graduate students entering public health. He was inspired to finally pursue his dream.

“After I presented my paper, Professor Veninga called me into his office to discuss it. His first words

were ‘Great paper.’ ... Then he said something that jolted me. ‘You should consider studying public health or medicine.’ You should consider studying medicine. I needed those words. When I heard them, it seemed as if they enlarged their meaning as they traveled toward my brain. ... I experienced an instantaneous awareness of a possible reality that nested itself in the word ‘medicine.’ My dreams of becoming a doctor became more than an undergraduate fantasy; they became transformed into image and movement and direction, and I felt connected to medicine once more.”

Medical student

In 1984 at age 34, Dr. Kerstetter entered Mayo Clinic School of Medicine. He was married with three children.

“I got a late start and was 10 years older than my peers,” he says. “Getting to Mayo was the culmination of a lot of my dreams. For a kid from an Indian reservation in Wisconsin to get through high school and college and get to enter medical school at Mayo Clinic is unheard of. I walked around the first day in a dream. I went to the anatomy building and put my hands on the wall and just said, ‘Wow.’

“Roy Rogers, M.D. (DERM '73), the dean of the medical school, came in the first hour and said, ‘A long time ago, we used to say to medical students to look to your left and right, and one of you won't be here at the end. Now, we say if you're here, we're invested in your excellence and success in medicine, and we invited you here because we know you'll become good doctors.’ That gave us permission to relax and enjoy the study of medicine.”

Mayo Clinic School of Medicine asked Dr. Kerstetter, as a medical student, to help it reach Native American students interested in medicine. The school organized “mini-medical school” on a three-day weekend and invited college students from tribes in Minnesota and Wisconsin.

"They had a ball," says Dr. Kerstetter. "The deans spoke, I gave a talk, we had a buffalo feast and a Native American healer performed a healing ceremony. Everyone involved could see Mayo Clinic was a different kind of place, interested in reaching out and developing leaders in medicine."

He graduated from medical school in 1988.

"Several times that day I opened the special folder that held my Mayo Medical School diploma. Printed after my name were the words 'Doctor of Medicine.' I paused in quiet reflection that I had become a doctor, that I was fortunate enough to have had my children and my wife help me with the journey, and that I had come so far from the Oneida Indian reservation where I had begun my life. ... I thought of the ... traditional Oneida healer who had blessed my hands that they might do good things. I quietly promised myself that they would."

'Trauma dog'

After receiving his medical degree, Dr. Kerstetter completed an internship at Marshfield Clinic in Wisconsin and an additional year of training at the University of Iowa Hospitals in Iowa City. He started an emergency medicine private practice in 1990, working at hospitals in Des Moines, Dubuque, Waterloo and smaller Iowa communities.

"Managing critical patients was my gift, and I loved it. I built a reputation in the larger hospitals as a 'trauma dog,'" says Dr. Kerstetter. "But a lot of medicine is maintenance. We need it, but it's not critical medicine. I was drawn to medicine that involved intensity and risk. Practicing civilian emergency medicine had become stale and predictable. I wanted to be a military doctor." He joined the Iowa National Guard at 42, requiring an age waiver and eventually becoming a flight surgeon. Dr. Kerstetter volunteered in war-torn Rwanda, Kosovo and Bosnia through various nongovernmental organizations.

Military doctor

His military experience culminated in three tours in Iraq at the height of war, and he felt the essential tension between killing and healing that military physicians face. "To be a good soldier in any capacity, one must commit to killing when necessary to protect the lives of those who depend on them," he says. "For military doctors, that mandate is no different from an



Jon Kerstetter, M.D., on the day of his college graduation with his mother, Margaret Archiquette Kerstetter.

infantryman. Soldier-doctors have a binary duty and mandate: heal whenever possible; kill when needed. Being faithful to both isn't easy. I negotiated that moral and ethical minefield by understanding that if I did not fully engage the role of a soldier, at least in the crucible of war, I could not effectively gain the trust of my fellow soldiers and would be far less effective in my role as a military physician. I had to prioritize my dual roles as soldier first, doctor second. Not everybody can survive in the warrior community, but those who choose it must commit to its mandates."

Dr. Kerstetter's third tour in Iraq ended in 2006 when he fell while running toward an incoming medevac, dislocating his left shoulder and breaking his right ankle. He was flown to Kuwait for an orthopedic examination, where it was determined he needed surgery. He returned home to Iowa City and, in the next year, had eight operations — five on his leg, shoulder and hand, and three for unrelated jaw and sinus problems. An MRI incidentally revealed a small aneurysm at the base of his brain, which was treated with a coiling procedure.

In the recovery room after the procedure, Dr. Kerstetter noticed his leg and arm were numb. Still, he was discharged and sent home, where he became unsteady and nauseated. That was followed by difficulty speaking and problems with fine motor coordination. On the fourth day home he fell and

realized he'd probably had a stroke from the surgery. Tests confirmed he'd had a multifocal stroke and had serious cognitive and physical deficits.

Dr. Kerstetter began a painstaking, years-long recovery, including coping with post-traumatic stress disorder (PTSD).

Identity loss

"While the physical struggle was immense, even more soul-crushing was the complete loss of my identity," he says. "What was I if not a soldier and a doctor? I felt I would have been better off dying in Iraq. I was in major denial for a long time. I was convinced I'd get better and could go back to medicine. It became clear that wasn't going to happen. If we're injured to the point of being incapable of our vocation, what do we do? My reading and comprehension were at a grade-school level for a year. I hadn't recovered a lot by the end of year one, and the first three years were kind of flat. At each plateau, doctors said that was it — I wouldn't progress further. I didn't accept that and wanted to have more. I had to have more. I spent 90 percent of my time in therapy."

Author

Dr. Kerstetter's neuropsychologist suggested an experimental therapy for vocational rehabilitation: writing about his medical and war experiences to help order his thinking, reform vital brain connections and heal. In 2009, with help from Veterans Affairs, he enrolled in a distance education program for a two-year master's degree in fine arts in creative nonfiction. His master's thesis became the initial framework for a book, *Crossings: A Doctor-Soldier's Story*, published in 2017. Persistent cognitive defects from his stroke forced him to write more than 100 drafts of each chapter to get them right.

In the writing program, Dr. Kerstetter's brain made new connections, and he recovered memories and information he'd lost. He continues in therapy — primarily attention processing and cognitive restructuring.

"Through writing, I've been able to accomplish exactly what I set out to do as a child — break through the boundaries that tried to define me," says Dr. Kerstetter. "I've learned that my life is not so much the product of circumstances or limits,

but the collective effort of pushing through the circumstances and lines that defy crossing."

Dr. Kerstetter says lessons he learned at Mayo Clinic helped him in his writing. "Mayo inculcates the importance of medical investigation: Observe with your eyes, fingers, head and other tools. Interpret findings. Make a diagnosis, and address the problem. I use that in my writing — observe, interpret, apply."

Today, in his tenth year of stroke recovery, Dr. Kerstetter is able to find a silver lining. "It forced me to take a deeper look at things," he says. "I'm more relaxed and patient with my kids and grandkids. I learned that you don't control the universe. Bad stuff happens. All we control is our response."

Healer

Dr. Kerstetter has had to pass the baton in clinical medicine. But he says he still identifies as a physician. "My friends call me Doc. I studied hard and earned the title, and I get to keep it."

While he says he'll always miss practicing, Dr. Kerstetter says he'd practice differently as a result of what he's learned. "I'd be more patient and listen far more to what patients have to say. The entire practice of medicine is too impatient. Patients and doctors aren't getting the quality time they need to interact. That's being cheapened by other forces. Now, it's a quick observation, identify a problem and get 'the cure' on the table."

Dr. Kerstetter is working with other veterans on writing, including speaking to Veterans' Voices, an organization that encourages veterans to write to experience solace and satisfaction. He describes *Crossings* as a book about resilience. "It's not a war or combat book; not a stroke or recovery book. Not a Native American book. It's all of those. Veterans see it as a book about healing.

"I'm still a healer trying to touch people's lives." ▲

Read about recent Mayo Clinic diversity efforts including engaging with American Indian groups, addressing African-American underrepresentation in medical research, recruiting diverse medical students and providing diversity-focused mentorship to medical students. alumniassociation.mayo.edu/news





WHERE ARE THEY NOW?

*Crystal Icenhour, Ph.D.
Hooked on research
and discovery*

Crystal Icenhour, Ph.D.

- CEO, Aperiomics
- Ashburn, Virginia
- Adjunct assistant professor, Duke University Medical Center, Division of Infectious Diseases
- Durham, North Carolina

Crystal Icenhour, Ph.D. (THDCC '05), was always interested in medicine. She studied premed in college. She spent significant time accompanying her grandmother, who had a heart attack at age 35, to physician appointments. Dr. Icenhour also had a natural entrepreneurial streak. She mopped floors, took inventory and made manual journal entries in her family's truck repair shop in Fort Smith, Arkansas. Those qualities formed a foundation for her career today: CEO for a biotech company.

A love of discovery

Dr. Icenhour thought she'd become a physician. But after a few years working in a research lab in the Department of Biological Sciences at the University of Tulsa, Oklahoma, she realized she preferred the science-and-research path. "I liked the mental pathways you go through to formulate and answer questions," she says. "I identified *Penicillium* and *Aspergillus* species found in allergy patients' homes. I was hooked on research and discovery."

Dr. Icenhour remained at the university, studying mycology in the Department of Biological Sciences, and then moved to the University of Cincinnati, Ohio, where she received a Ph.D. in pathobiology and molecular medicine, focusing on *Pneumocystis*. From there she went to Mayo Clinic in Rochester for a postdoctoral fellowship in the Thoracic Diseases Research Unit, studying with Andrew Limper, M.D.

(I '87, THD '91), Division of Pulmonary and Critical Care Medicine, where she identified and characterized *Pneumocystis* melanins.

"I wanted to build on my fungal pathogen work, and it was rare to find a group of mycologists at one institution," she says. "The breadth of resources at Mayo Clinic makes research much more efficient. And the collegiality isn't common in other academic settings. It was great exposure in how to build, foster and protect a strong brand — doing things the Mayo way. As a business leader, having trained at Mayo Clinic enhances my credibility."

A leap to a biotech start-up

Dr. Icenhour planned to pursue a career in academia but began to consider a career in industry. She went to Duke University Medical Center for a year as a research associate in the Department of Molecular Genetics & Microbiology. While there she met a professor from the University of Virginia who was starting a biotechnology company. He had a small business grant, which ensured a year of funding. Their interests aligned, so they co-founded Phthisis Diagnostics.

Dr. Icenhour served as president and chief science officer of the Charlottesville, Virginia-based company, which developed a range of molecular diagnostic products.

"It was a leap of faith," she says. "I figured I'd at least learn the intricacies of founding a company. I handled daily operations and grant management and started the research program."

She remained there for seven years, during which they raised almost \$6 million in grants from the National Institutes of Health and another \$1.1 million from angel investors. She led the company through acquisition by the Minnesota company Microbiologics.

“Perhaps medical science hasn't had the right tools to identify what's wrong with them. We hope to find answers for some of them so they can find healing for what ails them.”

– Crystal Icenhour, Ph.D.



CRYSTAL ICENHOUR, PH.D.

A shift to the business side

From there Dr. Icenhour co-founded Aperiomics, a biotechnology company based in Ashburn, Virginia. She and the other co-founders had developed technology they wanted to commercialize. Dr. Icenhour became the CEO, focusing on the business side while the technical co-founders concentrated on the science.

“At my first company I spent a lot of time on the science and learned it was too much to be chief executive and chief technologist,” says Dr. Icenhour. “I decided to focus on the business side at my new company.”

Aperiomics describes itself as an infectious disease company at the intersection of high tech and biotech — using an IT infrastructure to solve biological problems. The company aims to change how infections are identified.

“Clinicians often aren’t able to identify the cause of an infection, leading to trial-and-error treatment, the spread of infectious disease, misuse of antibiotics, and longer hospital stays and recovery times,” says

Dr. Icenhour. “Our technology uses deep sequencing to identify every known bacteria, virus, parasite and fungus in one test from clinical samples — plant, animal, human tissue, stool or blood. We extract DNA from the sample and do deep whole-genome sequencing. Our technology is software that sorts through our dataset of more than 33,000 bacteria, parasites, viruses and fungi — the largest database of its kind in the world — and reports back a list of microorganisms present in the sample. It’s enormously more powerful than PCR (polymerase chain reaction), which can identify only a handful of pathogens at a time.”

The company launched its technology in November 2016. Insurance providers have started to cover the service.

“We’ve accomplished a lot in three years,” says Dr. Icenhour. “We developed and launched a product that has helped hundreds of people get the answers they needed. That’s the whole reason I went into science — to use my skill set to have a positive impact on the world.”

A change to the clinical lab status quo

Dr. Icenhour says Aperiomics hopes to replace culturing and microscopy. “DNA sequencing allows us to see things in a way we haven’t been able to see before. We believe we can change the status quo of the clinical lab. Deep sequencing is being used in clinical labs today but mostly for cancer, prenatal testing and metabolic disorders. Few groups are using it for infectious disease testing.

“I’m responsible for educating the medical world about our capabilities which, we believe, will change everything about infection testing.”

Dr. Icenhour reflects back on her time with her grandmother. “She was chronically ill, and I’m not sure anyone knew what was going on with her health. Today, I get to help people who haven’t gotten the answers they’ve needed. I’ve heard from patients who weren’t taken seriously by their doctors. They were marginalized at best and put in psychiatric wards at worst. Perhaps medical science hasn’t had the right tools to identify what’s wrong with them. We hope to find answers for some of them so they can find healing for what ails them.” ▲



CLAIRE BENDER, M.D.



EMERITI STAFF — STAYING CONNECTED, FINDING RELEVANCE IN RETIREMENT



Did you know there are 900 Mayo Clinic Emeriti Staff who represent thousands of years of human and professional experience?

The Emeriti Staff consists of retired voting members of the Mayo Clinic Staff who have been designated emeritus by the Mayo Clinic Personnel Committee and approved by the site Executive Operations Team. Emeriti Staff are represented by the Mayo Clinic Emeriti Association.

According to Claire Bender, M.D. (I '77, R-D '80), newly elected president of the Mayo Clinic Emeriti Association in Rochester, the group aims to help emeriti continue to feel connected to the organization and to each other and to help them find relevance in retirement. "When I was the Personnel Committee chair under Dr. (Robert) Hattery (R-D '70, CEO of Mayo Clinic in Rochester from 1994 to 1998), I conducted exit interviews of retiring staff. Many had given their lives to Mayo and were scared to think about what they were going to do next. Not everyone has family nearby or current hobbies. I retired in 2014. I'm supplemental staff now and really relate to those feelings.

"Many years ago a colleague said about retirement: 'The day before you retire at Mayo, you're somebody.

The day after you retire, you're nobody.' We tend to forget about retired colleagues. Most emeriti have been in leadership positions, so they're used to contributing and leading. It's important to have a sense of purpose and to feel connected, useful and relevant. The Emeriti Association provides an opportunity for emeriti to continue to serve the Mayo mission in their own way in retirement and care for each other."

Dr. Bender says Mayo Clinic provides wonderful support for Emeriti Staff. The Emeriti Association organizes social activities and speakers. Members bicycle together, hike and picnic, and learn about healthy aging, mobile devices and social media.

"There is a lifelong compact of solidarity among Mayo Clinic active and emeriti staff that's enshrined in the legacy of the Mayo Clinic founders," says Dr. Bender. "The Emeriti Association is focused on honoring that compact. We're looking for opportunities to better engage with Mayo Clinic."

New mentoring program

One such outlet for engagement is a new mentoring program, pairing interested emeriti with Mayo Clinic School of Medicine students in Rochester and Arizona



EDWARD ROSENOW III, M.D., AND MEDICAL STUDENT KATHERINE KELSEY

— part of a student’s overall “mentorship family.” At the new medical school campus in Arizona, 15 emeriti have signed up to mentor medical students.

“We really appreciate emeriti involvement with the new class to add perspective on well-done careers, mentorship and advice,” says Joseph Drazkowski, M.D. (N ’01), the George M. and Kristen L. Lund Associate Dean of Student Affairs, Mayo Clinic School of Medicine – Arizona Campus. “Several of the student groups have met with the Emeriti Staff in Arizona, and everyone found it to be a positive experience.”

Alexandra Wolanskyj-Spinner, M.D. (I ’95, HEMO ’98), senior associate dean for student affairs for Mayo Clinic School of Medicine, calls Emeriti Staff an untapped resource. “Many of them have been incredibly prolific and accomplished, have a wealth of knowledge and experience, and have the perspective that comes with longevity. They’ve been in the Mayo culture for a long time and can enrich the experience of our students.”

Emeritus Edward Rosenow III, M.D. (I ’65), who retired in 1996, agreed to mentor six medical students in Rochester in the new program. But he’s not new to mentoring. “I feel every professional has



Distinguished Emeritus Award

The Emeriti Staff in Rochester gives an annual Distinguished Emeritus Award, recognizing efforts in education, academic productivity or humanitarian endeavors in retirement.

The 2017 recipient is Edward Rosenow III, M.D. (I ’65). In presenting the award to Dr. Rosenow, Claire Bender, M.D., said: “He is recognized for his genuine, trusted and never-ending service to our community and to Mayo Clinic. He has provided 22 years of service at the Salvation Army Free Clinic, where he cared for many patients while teaching numerous medical students and residents. Dr. Rosenow also has contributed important messages to current and future generations of physicians on the art of medicine.”

The inaugural award was presented in 2016 to Philip Karsell, M.D. (R-D ’71), who retired from the Department of Radiology in 1997. In retirement, he has made humanitarian and educational contributions including providing medical care in Haiti and several other countries.

an obligation to pass on what they've learned to others behind them," he says. "I had no mentoring in medical school. No one did in those days. Things have changed a lot. I have a passion for educating and want to use every opportunity to teach the things I had to learn the hard way."

Dr. Rosenow has mentored medical student Katherine Kelsey (MED '20) for several years. She was working in the lab of Mayo Clinic neurosurgeon Kendall Lee, M.D., Ph.D. (NS '06), when he connected her with Dr. Rosenow, who served on the Admissions Committee for Mayo Clinic School of Medicine.

"I took Katherine to lunch, gave her some materials I'd developed and discussed a strategy for her to succeed in getting into medical school," says Dr. Rosenow. "We've met semi-regularly since then, but she's off and running. Helping students like her replenishes my passion."

Kelsey is completing a master's degree in the science of health care delivery through Arizona State University. She will resume her third year of medical school in Rochester this spring. "Dr. Rosenow has shared his wisdom about the art of medicine with me — how to develop rapport with patients, show compassion and establish strong physical exam techniques," she says. "I've also learned from him how medicine and Mayo Clinic have transformed during his lifetime. He knows so much about Mayo's rich history and is enthusiastic about sharing this knowledge with others."

Kelsey met with Dr. Rosenow before her first medical school interview and kept in contact throughout the interview process.

"He provided me with guidance and resources he had created on how to prepare for an interview," she says. "I really appreciated his support. After an interview, he'd send me an email asking how it went, and we would discuss the specific medical school. In his mentoring role, he was always there cheering me on."

Now, Dr. Rosenow's grandson is applying to medical schools, so Kelsey met with grandfather and grandson to share ideas.

"Medical students can gain a unique perspective from emeriti," says Kelsey. "I have grown personally and professionally through having Dr. Rosenow as an emeriti mentor. I am very grateful for the opportunity to learn from him." ▲



About the Emeriti Association

- Consists of retired voting members of the Mayo Clinic Staff designated emeritus by the Mayo Clinic site Personnel Committee and approved by the site Executive Operations Team. Voting Staff members age 60 and older are welcome to participate, whether retired or active staff.
- Is a stand-alone organization funded by Mayo Clinic. The association doesn't charge dues but does charge for certain activities.
- Has 900 professionals and administrators — 665 in Rochester and Upper Midwest; 125 in Arizona area; 90 in Florida area.
- Marked the 70th anniversary of having a defined space and role at Mayo Clinic.
- Has a website (emeritus.mayo.edu), quarterly newsletter and private Facebook group.
- Members participate in academic meetings and social events; mentor medical students, residents, fellows and medical staff; may participate in research, consulting, publishing, lecturing, development and medical practice.
- Has dedicated space, with office, meeting room and computers: Plummer 10 in Rochester; Mayo Clinic Building on Scottsdale, Arizona, campus; and seventh floor Stabile North Building on Florida campus.
- Is governed by rules and bylaws and site-specific Executive Committees:
 - Rochester** — President, Claire Bender, M.D. (I '77, R-D '80)
 - Arizona** — President, David Gullen, M.D. (I '97)
 - Florida** — President, John Odell, M.D. (ANES '96)

Mayo Clinic active staff and students of Mayo Clinic College of Medicine and Science are invited to interact with emeriti.

emeritus.mayo.edu

To inquire about being mentored by an emeritus, invite an emeritus to speak or inquire about the Emeriti Association, contact

- MCRemeritus@mayo.edu
- ARZemeritus@mayo.edu
- FLAemeritus@mayo.edu



ALUMNI ASSOCIATION INTERNATIONAL MEETING



Mayo international review of select topics in medicine and surgery
June 21–23, 2018 • Berlin, Germany • Hotel Adlon Kempinski

Course director: *John Wilkinson, M.D. (MED '78, FM '81)*

Moderators: *Carolyn Moats, M.D. (FM '00); Atul Jain, M.D. (GIM '16)*

Speakers:

“Mayo Clinic School of Medicine in Arizona: New Skills for the 21st Century”

Michele Halyard, M.D. (RADO '89)

“How to be an Effective Advocate for Immunizations”

Robert M. Jacobson, M.D. (PD '89)

“3-D Imaging and Printing: New Applications for Practice”

Jane Matsumoto, M.D. (MED '80)

Jonathan Morris, M.D. (R-D '06, R-NEU '07)

“Travel Medicine Update”

Steven Krotzer, M.D. (I '01)

“Rapid Response to Stroke”

Joern P. Sieb, M.D. (N '93)

“HIV 2018: From Fatal Illness to Chronic Disease”

Stacey Rizza, M.D. (MED '95, I '98, INFID '01)



- Five-star historic hotel adjacent to Brandenburg Gate
- Saturday, June 23, scientific sessions in Horsaal Lecture Hall at historic Kaiserin Friedrich Haus
- Robust speaker lineup
- 6-day, 5-night optional post-conference tour — The Essence of East Germany — including visits to Leipzig, Weimar and Erfurt

“Healthy Aging: Lessons from Long-Lived Individuals and Societies”

Amit A. Shah, M.D. (I '14)

“Case Studies in Palliative Medicine”

Maisha Robinson, M.D. (I-1 '08, N '11, NHOSP '13)

“Preserving and Sharing Mayo Clinic Values in a Changing World”

David Agerter, M.D. (MED '79, FM '82)

“The Burden of Chronic Disease”

Victor Montori, M.D. (I '99, CMR '00, CLRSH '01, ENDO '02)

“Plummer Project — An Investment in the Future”

Steve G. Peters, M.D. (I '82, THD '84, CCM-I '85)

“Breast Cancer Screening and Diagnosis: Controversies and New Options”

Deborah Rhodes, M.D. (GIM '97)

“Spine Care: Controversies and New Developments”

Juergen Kiwit, M.D. (NS '91)

“Emerging Infections 2018”

M. Teresa Seville, M.D. (INFD '07)

“Delivering Highest Value Care at Mayo: How to be Trusted and Affordable”

Pablo Moreno Franco, M.D. (CCM-I '12)

“Enhancing Physician Well-Being and Preventing Burnout”

Liselotte Dyrbye, M.D. (CIM '01)

“Mayo Clinic – Oxford – a new Transatlantic Partnership”

Stephen Cassivi, M.D. (TS '02)

“Weak at the Strong Point: Physician Distress and Impairment”

Robert Bright, M.D. (P '07)



Registration information:

alumniassociation.mayo.edu/events



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MAYO CLINIC UPDATE

Mayo Clinic establishes HL7 interface with National University Hospital in Singapore

Mayo Clinic has established its first Health Level 7 (HL7) interface in the Asia-Pacific region with National University Hospital (NUH) in Singapore. This connection with Mayo Medical Laboratories, the global reference laboratory of Mayo Clinic, allows NUH to order specialized Mayo laboratory tests and receive patient results in real time.

HL7 refers to a set of international standards for transferring health care data between software applications used by the collaborating entities. The interface enhances patient safety and quality of care by expanding the flow of accurate health care information and eliminating manual processes. Mayo Clinic has established more than 500 HL7 interfaces with health care institutions around the world.

Mayo Clinic Board of Trustees re-elects chair

The Mayo Clinic Board of Trustees re-elected Samuel Di Piazza as its chair for another four-year term.

Di Piazza joined the Mayo Clinic Board of Trustees in 2010 and was elected chair in 2014. He is the retired global CEO of PwC, a network of firms in 158 countries that delivers assurance, advisory and tax services. He held multiple leadership positions during his 36-year career at the company, including chair, senior partner and member of the Global Leadership Team.



SAMUEL DI PIAZZA



Consider GRIT in 2018

Mayo Clinic has introduced a new CME course:

- GRIT for Women in Medicine: Growth, Resilience, Inspiration & Tenacity.
- Sept. 20–22, 2018
- Ritz Carlton, Lake Tahoe, California
- Co-directors: Anjali Bhagra, M.D. (I-1 '05, I '08); Susan Moeschler, M.D. (ANES '09, PAIN '11)

The course will empower women and men in medicine with the skills and resources to remove barriers and bias of women in leadership positions

specific to the challenges in health care. Leaders in business and health care will present evidence-based strategies to promote professional development and enhance personal well-being. Nationally, a large number of female providers report burnout, which has a known effect on patient experience, compliance and outcomes. This course will address the need for improved provider wellness and development of women for gender-balanced leadership in health care.

gimeducation.mayo.edu

J. William Charboneau, M.D., receives Gold Medal from Radiological Society of North America

J. William Charboneau, M.D. (R-D '80), emeritus professor of radiology at Mayo Clinic, received the 2017 Gold Medal from the Radiological Society of North America at its 103rd Scientific Assembly and Annual Meeting.

The Gold Medal is the society's highest honor, given to those who, in the judgment of the board, have rendered unusual service to the science of radiology. The award recognizes Dr. Charboneau's role as a leading authority in diagnostic ultrasound and a pioneer in image-guided treatment of cancers of liver, kidney, lung and bone.



J. WILLIAM CHARBONEAU, M.D.



JOHN W. WILSON, M.D.

Mayo Clinic team to combat infectious disease threats in Belize

Mayo Clinic, in collaboration with the University of Notre Dame's Eck Institute for Global Health and the Ministry of Health in Belize, has launched a five-year project to better characterize and detect vector-borne infectious diseases in Belize. A better understanding of these diseases, including Zika, dengue and chikungunya viruses, will improve public health and provider education.

John W. Wilson, M.D. (I '97, INFD '00), Division of Infectious Diseases, and Elitza Theel, Ph.D. (CM '12), director of Mayo Clinic's Infectious Diseases Serology Laboratory — both at Mayo Clinic in Rochester — are leading the project.

"Infectious diseases, especially vector-borne diseases, have no borders," says Dr. Wilson. "Understanding what goes on within our Latin American neighbors is paramount to identifying and mitigating the spread of some communicable diseases in the Americas."

In Belize the team will train clinical microbiologists, improve diagnostic testing capacity, enhance the capacity of the vector control unit of the Belize Ministry of Health and implement public health education strategies.



Mentor a medical student

The Alumni Association is seeking alumni to sign up to mentor Mayo medical students as part of the Alumni Connect program.

Medical students look up to alumni mentors for insights, wisdom and support. Mentors might be asked to host a practice visit or respond to questions via email.

To become a mentor:

- Visit alumniassociation.mayo.edu/mentorship.
- Activate your account with your Alumni ID if you haven't done so already. Otherwise, just log in.
- Complete the form.

Obituaries

Rene Beaudry, M.D. (I '66), died July 17, 2017.

John Epstein, M.D. (DERM '56), died Jan. 23, 2018.

J. Michael Gregory, M.D. (S '69, U '72), died April 12, 2015.

Hugh Dana, M.D. (HEM '80), died Aug. 3, 2016.

Donald Hunton, M.D. (I '61), died May 1, 2017.

Earl Isbister, M.D. (U '63), died Sept. 12, 2017.

Robert Jeub, M.D. (N '50), died Oct. 13, 2017.

Arthur Lehrman, M.D. (PLS '64), died June 23, 2017.

George Manstein, M.D. (PLS '54), died Dec. 2, 2017.

Edward O'Connell, M.D. (PD '63, PDA '65), died Dec. 11, 2017.

Walter Rothwell, M.D. (I '56), died Dec. 27, 2017.

Complete obituaries and alumni news
alumniassociation.mayo.edu/people

Mayo Clinic Alumni magazine is published quarterly and mailed free of charge to physicians, scientists and medical educators who studied and/or trained at Mayo Clinic, and to Mayo consulting staff. The magazine reports on Mayo Clinic alumni, staff and students, and informs readers about newsworthy activities throughout Mayo Clinic.

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READ MORE ON ALUMNI ASSOCIATION WEBSITE

The Alumni Association website offers more stories, including New Chapter features about mid-career and early-career alumni. Matthew Klein, M.D. (MED '93), and Aurelie (Lili) N'songo, Ph.D. (BMS '17, NBD '17), are among those profiled.

For the last year Dr. Klein has been a senator in the Minnesota Legislature by day and hospitalist in Minneapolis by night. Initially, most of his medical colleagues were in the dark about his dual identity. His cover was blown when the Minnesota governor fainted during a televised address, and Dr. Klein ran to catch him — a newsclip that went viral.

Dr. N'songo trained as a neurogeneticist at Mayo Clinic in Florida but today focuses on translating complex scientific concepts into approachable, accurate language as a science communications director at Delos Living in New York City.

alumniassociation.mayo.edu/new-chapter-stories



MATTHEW KLEIN, M.D.



AURELIE N'SONGO, PH.D.