

Tufts

Medicine



**CELEBRATING THE DISCOVERIES, PIONEERS, AND
INNOVATIONS AT THE HEART OF OUR SCHOOL.**



CONNECTED ACROSS GENERATIONS

It was eye surgery that brought together two School of Medicine alumni who graduated six decades apart. Fuchs' Dystrophy was blurring the vision of Augusta Law, M47. So when Christopher Sales, M09, MGO9, a surgeon at Weill Cornell Medicine in New York who's trained in Descemet membrane endothelial keratoplasty—a minimally invasive corneal transplant—came across her radar, Law traveled from New Hampshire to see him. Sales successfully performed the procedure on August 15.

"I am so glad to be a part of the long tradition that TUSM brings to the study of health, medicine, and science," said Law. One of five women in her Tufts graduating class, Law went on to work for the New Hampshire Division of Public Health Services. Sales is humbled that Law trusted him, he said, and was reminded "how one's vision, if taken away, can make independence and self-reliance feel out of reach—and likewise, if restored, can give them back." —COURTNEY HOLLANDS

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COVER STORY In April 1893, seven doctors seceded from Boston's College of Physicians and Surgeons. Each chipped in \$50 to start a new medical school at 188 Boylston Street under the auspices of Tufts College. Many thousands of graduates and a few converted garment factories later, Tufts University School of Medicine this year celebrates a century-and-a-quarter of medical excellence. To mark the anniversary, we highlight just some of the discoveries, pioneers, and innovations at the heart of our school.

BY SOL GITTLEMAN, COURTNEY HOLLANDS, MOLLY McDONOUGH, HELENE RAGOVIN, GENEVIEVE RAJEWSKI, AND FRANCIS STORRS

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Spurred by the staggering poverty among African-Americans in the Mississippi Delta in the mid-1960s, Dr. H. Jack Geiger and Tufts created the country's first community health centers—and launched a movement.

BY COURTNEY HOLLANDS



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Cover illustration by Matt Herring

THANK YOU, JERRY LEWIS

The cover story of the Summer 2017 *Tufts Medicine*, “The Hunt for Hope in the Genome,” was about a team of researchers—including Tufts President Anthony P. Monaco—who combed through millions of DNA letters three decades ago to find the flawed gene responsible for Duchenne muscular dystrophy. Their discovery led to the first-ever FDA-approved drug for treating the deadly disease.

Partly to thank for this groundbreaking work? Jerry Lewis. The late, legendary comedian—who died on August 20 at age 91—raised more than a billion dollars as the longtime national chairman for the Muscular Dystrophy Association (MDA), the organization that funded Monaco and Kunkel’s research.

“This funding supported the MDA clinics, which provide excellent care for patients and their families, as well as basic and clinical research on neuromuscular diseases,” Monaco said, as he reflected on Lewis recently. “It was at the MDA clinic at Children’s Hospital Boston, where I became part of the clinical care team and collected DNA samples from patients and their families for our genetics research—which led to identification of the gene.”

Monaco also recalled how Kunkel, two research technicians, and he met

Lewis at the MDA headquarters in New York City after their 1986 breakthrough. “I had grown up seeing Jerry in movies and on TV for the annual Labor Day MDA Telethon,” Monaco said. “It was quite exciting to meet him in person; it was a celebratory and fun occasion for all of us.”

“I was introduced to him as the student who found the gene, and Jerry asked how old I was,” Monaco recalled. “When I said 25 years old, he replied, ‘I have ties older than that!’”



SHAREWOOD TURNS 20

The Sharewood Project—a student-run medical center offering free care located in Malden, Massachusetts—celebrated its 20th anniversary with an open house on October 14. The Summer 2017 issue of *Tufts Medicine*, featuring the oral history “We Are Sharewood,” was on display at the event, which also included tours and a silent auction.



LAURELS

Department of Immunology chair **CAROLINE ATTARDO GENCO** has been selected as

an Executive Leadership in Academic Medicine fellow at Drexel University for this school year. Her “institutional action project” for the program, which seeks to boost women in

high-level academic medicine positions, is focused on enhancing the translational impact and sustainability of biomedical research across Tufts.

The American Medical Association Foundation awarded a 2017 Excellence in Medicine Minority Scholars Award to **DOMINIQUE PRUE, M20**, for her commitment “to a career focusing on equitable and

humanistic care for all patients, with an interest in practicing in an underserved community.”

MARTA GAGLIA, assistant professor of molecular biology and microbiology, received a Research Scholar Grant from the American Cancer Society to study caspase regulation of interferon in Kaposi’s sarcoma-associated herpesvirus infection.

Tufts Medicine

VOLUME 76, NO. 1
WINTER 2018

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Tufts Medicine is published two times a year by the Tufts University School of Medicine, Tufts Medical and Sackler Alumni Association and Tufts University Office of Publications.

The medical school’s website is tufts.edu/med

Read us online at go.tufts.edu/tuftsmedicine

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LOOKING BACK AND AHEAD



I STARTED MEDICAL school at Columbia University in 1960, the year John F. Kennedy was elected president. Back then, the basic sciences were taught in silos: anatomy, histology, physiology, pharmacology, and biochemistry each had its own unit. During lectures in big amphitheaters, the professor in the pit would talk for hour after hour while we vigorously scribbled notes. At

home, we'd study those notes and textbooks and then regurgitate the info on exams. Your scores were posted so the whole class could see just how you did.

Those distant memories are so different than the approach we take today at Tufts. Many of our classes are pass/fail, and students work in teams, helping each other learn. We build our lessons around organs and diseases and then teach the students physiology, pathophysiology, and pathology in a more integrated manner, with a focus on reasoning skills and how to find evidence-based information. That way they get a much better understanding of what's essential, what isn't, and how it all fits together.

Most importantly, we expose students to diseases and patients during their first year, so they start connecting what they're learning to a living, breathing person.

As many of you can attest, the explosion of knowledge we've had since my med school days is unbelievable. Medicine and science are constantly evolving—much of what I was taught turned out not to be true. And we tell our students that: Probably half of what they're learning now will not be considered true or current a few decades from now.

Yet, while so much has changed—and continues to change—in medicine and medical training, one thing has remained constant: the School of Medicine's commitment to excellence. To mark our 125th anniversary in April, this issue looks back at some of

the many significant achievements and breakthroughs by faculty, students, and alumni since TUSM opened its doors in 1893 (with women constituting more than 25 percent of the inaugural class, no less).

There's the late Robert Schwartz, whose groundbreaking work in immunosuppression in the 1950s paved the way for successful transplant surgery—enabling people who would have died in their 30s, 40s, and 50s of kidney disease to get transplants and live normal lives. The same principles that enabled kidney transplants carried over to liver, heart, lung, and bone marrow transplants, and more. Schwartz's discovery had a dramatic effect on medical care, and on the lives of countless patients.

A few more highlights: Tufts took a stand against eugenics in the first half of the 20th century, even though the pseudoscience was culturally acceptable at the time. In the late 60s, our faculty members Count Gibson and H. Jack Geiger founded the nation's first community health centers, in Boston and Mississippi. Roderick MacKinnon, M82, H02, shared the 2003 Nobel Prize in Chemistry for his work concerning ion channels in cell membranes. And more recently, triple Jumbo and infectious-diseases physician Nahid Bhadelia, J99, F04, M05, fought Ebola from the frontlines in Sierra Leone.

We have a lot to be proud of, but we're especially proud of all the doctors we've trained. The School of Medicine has produced thousands of excellent clinicians, who are compassionate caregivers working all over the country and world.

This is vital because even 125 years from now—when technology's expanding role in how we diagnose, treat, and relate to patients coupled with the unpredictable march of science will transform medicine—we'll still need doctors to continue their role as teachers, educating patients so they can make the choices that are right for them. Something to celebrate, indeed!

HARRIS A. BERMAN, M.D.
Dean, Tufts University School of Medicine



At left: Giles Li, executive director of the Boston Chinatown Neighborhood Center, talks to Tufts students in a new public health field course; students visit the Pao Arts Center in Chinatown.

Sense of Place

A new public health course immerses students in Boston's Chinatown. **BY COURTNEY HOLLANDS**

DURING ONE OF the first sessions of “Introduction to Building Healthy Neighborhoods and Communities”—a new field course offered last fall by the School of Medicine’s Department of Public Health and Community Medicine—five students took a walking tour of Boston’s Chinatown. As they assembled under the neighborhood’s iconic, lion-flanked gate, noises from nearby construction all but drowned out the guide’s voice.

Later, in their reflections on the experience, several students wrote about the din. “Being in that environment, hearing that kind of noise, and seeing the hustle and bustle gave them a better sense of what it’s like to live and work in that community,” said professor Carolyn Rubin, who also directs the Addressing Disparities in Asian Populations Through Translational Research (ADAPT), a Tufts Clinical and Translational Science Institute project.

And that’s exactly the point: It’s one thing to read studies and textbooks about public health; it’s quite another to immerse yourself in a community’s rich culture and day-to-day life. The interactive course—which Rubin will teach again next year—encompasses off-site visits, in-class lectures, and discussions with community partners in Chinatown, a vibrant immigrant enclave that has been squeezed in recent years by high

rents and gentrification. Health concerns in the neighborhood include chronic stress, mental health issues, smoking and its consequences, and diabetes and other chronic diseases—as well as obstacles to health-care access.

For Jasmin Shores, a first-year student in the Master of Public Health program who starts medical school next year at Tufts, talking with two residents about living costs, the language barrier, sending their children to distant schools, and more was especially illuminating. “I saw that a lot of their health issues and challenges were related to this huge amount of stress that’s affecting their quality of life,” Shores said. “Just hearing from them was really insightful.”

Second-year Doctor of Public Health student Helga Zaire agreed. “It’s very helpful . . . when you talk to

people who are facing problems, to hear their views and the way they analyze the situation,” she said.

The off-site visits, meanwhile, give students an up-close look at the work various health and housing groups are doing in the community, Rubin said. When the class toured the Greater Boston Golden Age Center, they learned how the nonprofit serves the elderly through adult day programs and checked out the lunchroom and one of the apartments. “I hope that students understand that if they’re trying to improve health at the neighborhood or community level, there are multiple stakeholders who need to be involved in that conversation,” Rubin said. “They learn that this kind of work is messy and complex—and it requires dialogue.”

To wit: The final group project focused on how land use affects the overall health and well-being of a neighborhood through the lens of R-1, one of Chinatown’s last remaining parcels of public space. Though Tufts has leased the lot from the city for parking, students interviewed various stakeholders and reviewed documents to recommend ways the university, Tufts Medical Center, and Chinatown can work together to ensure the space benefits all.

Another stop on the Chinatown walking tour last fall was a colorful new mural designed by the Asian Community Development Corporation’s youth group. Titled “Tied Together by a Thousand Threads,” it shows eight connected bubbles filled with residents’ memories of struggle and strife, yes, but also dim sum, the historic elevated Orange Line train, and grocery stores. “My class is not just talking about the problems in Chinatown—it’s really about what the community is actively doing to address the health inequities in the neighborhood,” Rubin said. “I want students to see communities as active and resilient, and not just acted upon.”

Body of Work

Did you know that students can check out anatomical models from the Hirsh Health Sciences Library?

There are 42 body parts available for four-hour loans, including three pelvises and one knee.



The library’s skulls—the most in-demand item—were checked out a total of 189 times in October alone. Some are plastic and labeled, with or without attached muscles. Others are real.

A FEW OF THE AVAILABLE MODELS:



An Eye to the Future

New Sackler School dean Daniel Jay is on a mission to train graduates for a range of biomedical careers.

BY COURTNEY HOLLANDS

DANIEL JAY, NEW dean of the Sackler School for Graduate Biomedical Sciences at Tufts University School of Medicine, has carried around the same periodic table since eighth grade. “From a very early age, I had an interest in chemistry,” he said as he pulled the tattered artifact from his wallet. “The periodic table is a way that nature can be ordered, so that means there is an underlying mechanism—this was important to my thinking as an adolescent.”

Today, Jay’s mission for the Sackler School is to train other young scientists toward career excellence in academia and across the biomedical workforce. About 20 percent of the school’s trainees go on to academic positions, and “we need to train the other 80 percent to find their passions and give them the tools they need to compete, excel, and lead,” Jay said. To that end, the school will provide more opportunities for multidisciplinary education, experiential learning, and networking, and help students sharpen communication, presentation, team building, and other skills useful in a corporate environment.

“We are excited about Dan’s arrival in the Sackler dean’s office,” said Ira Herman, School of Medicine professor and director of the Cell, Molecular and Developmental Biology program at the Sackler School. “A consummate and creative collaborator, Dan is a devoted mentor and an internationally recognized innovator in the biomedical sciences.”

Jay grew up in Toronto, earned his bachelor’s degree from the University of Toronto and then headed to Harvard University in the early 1980s for his Ph.D. and postdoctoral training. He was an

associate professor at Harvard before joining the Tufts faculty in 1998. His research has focused on identifying proteins on cancer cells that are important in invasion of neighboring tissue, which could lead to the development of anti-metastasis drugs.

He has published more than 80 papers and mentored more than 60 graduate students, postdoctoral scholars, and undergraduates in his lab, and will continue this work as dean.

At Tufts, Jay has chaired and served on several committees and task forces; most recently he directed the postdoctoral affairs office at Tufts. Jay was also a co-director of the school’s National Institutes of Health-funded Post-Baccalaureate Research Program, which offers training for graduates from underserved communities who are interested in research careers.

“Dan has a fresh perspective on how to best equip students to enter the biomedical workplace, and we are eager to watch him flourish in this role,” said medical dean Harris Berman. “He is a man of many interests and brings real enthusiasm to the school.”

One of these interests is art—Jay is an adjunct professor of drawing and painting at the School of the Museum of Fine Arts at Tufts. The son of a grocer, he grew up sketching at the back of his family’s market. Jay’s first solo show was three decades ago, and for the last five years, his work has explored the intersection of art and science. “I have a scientist’s mind and an artist’s eye in the same head,” he said. Among recent projects are depictions of Tufts’ Talloires campus made with dyes used by 18th-century chemist Claude Louis Berthollet. Jay also created drawings of the Silk Road to be transformed into slides layered with silk protein by a 3D printer—a joint effort with Tufts engineering professor Fiorenzo Omenetto.

Some of Jay’s abstract art has even incorporated elements from his beloved periodic table. “There is something important at the interface of art and science that can benefit both fields, whether it is creativity, thinking outside the box, or problem solving and experimentation,” he said. “I feel truly blessed that I have two passions in my life—art and science—and that not only can I do both, but I can combine them.”

FORWARD THINKING

Among the fall offerings to help Sackler School students prepare for the future was a workshop with Sarah Cardozo Duncan of Career Strategist, as well as a drug-development course led by Agios Pharmaceuticals’ Stefan Gross, SK01. The Biomedical Entrepreneurs at Tufts series kicked off December 12 with a talk by iSpecimen founder Chris Ianelli, SK97, M00, and a pilot program placing interns at local companies is set to launch this summer.





At left: Participants in the Health Impact Partnership, founded by Emily Frank (below).

to do, and the work I believe can make a lasting change.”

Frank isn't the only one who believes it. In November, the Association of American Medical Colleges honored her with Organization of Resident Representatives Community Service Award, which recognizes those who have gone above and beyond the requirements of residency training to help improve nearby communities. She also received the Anne E. Dyson Child Advocacy Award from the American Academy of Pediatrics.

Now a third-year PLUS resident, Frank has trained 16 Oakland-based health centers in the HIP and Summer Health Bridge curriculums. After residency, she plans to work at the intersection of education and medicine: As a part-time educator, she'll help school administrators establish healthier practices for the students; as a part-time clinician, she'll encourage health administrators to promote public education.

“An unhealthy child can't learn well, and a child who's not learning well is going to have problems maintaining their health,” Frank said. “I really want to help us think more deliberately about how we can promote education in health care and vice versa.”

MEDICINE MEETS EDUCATION

Community-service star Emily Frank, M15, gets young people excited about their health. **BY MONICA JIMENEZ**

WHEN EMILY FRANK was teaching life sciences in Vallejo, California, in 2008, she led her seventh-graders in an experiment to show how calcium strengthens bones. Inspired, her students wrote impassioned letters to pupils at another school about the importance of drinking milk. “I learned from my students that peer pressure is the strongest force on Earth and that kids actually care a lot about health, despite public perception otherwise,” Frank said.

She took the lesson to heart. In her first year at Tufts University School of Medicine, she founded the Health Impact Partnership (HIP). Through the community-service learning project, Frank and other medical students helped high schoolers develop leadership and advocacy skills. Students investigate a health issue in their community—diabetes, for example—then brainstorm ways to address it and put the ideas into action. “What I like the most about the classroom and about medicine is the opportunity to help someone realize their potential,” Frank said. “I was attracted to work one-on-one with kids to help them understand their health.”

The ongoing program won Frank accolades—the Tufts Presidential Award for Civic Life, the Massachusetts Medical Society Scholar Award, and an Excellence in Public Health Award from the U.S. Public Health Service—and was the basis for an initiative she started in 2016 as a first-year resident in the Pediatric Leadership for the Underserved (PLUS) program at the University of California at San Francisco: Dubbed Summer Health Bridge, it involves students in community wellness projects.

“Young people's engagement in these issues is critical for changing our health landscape. They have the most to benefit, and also the most to lose,” Frank said. “For me, this is the most fun part of residency—it's the work I went into medicine



A LEADER FROM THE LAB

Linden Hu, known for his work on Lyme disease, is the new vice dean of research. **BY HELENE RAGOVIN**

LINDEN HU ENTERED medical school at Brown University on track to become a primary care physician. But the unexpected success of his first research project—unexpected to him, at any rate—changed the course of his career. Hu discovered how the bacterium that causes Lyme disease uses proteins from a host against itself to ensure its survival—a significant step in understanding a disease that infects 300,000 people in the United States every year. “They say that if you hit the first time you play the slots, you keep on playing,” Hu said with a laugh. “So that’s how I got started.”

Almost two decades later, Hu has secured more than 20 National Institutes of Health (NIH) grants and is an internationally recognized expert on Lyme disease. In November, he became the vice dean of research at the School of Medicine.

As a small-to-medium research enterprise, the medical school can best use its resources to produce high-impact results through integration of research areas and increased collaboration within the medical school and with faculty across the university, Hu said. “With

the current focus nationally on interdisciplinary science, it’s a great time to develop areas of collaboration in areas where we are already strong.” For example, multiple groups at the medical school are collaborating with scientists in biomedical engineering on the Medford/Somerville campus.

Hu joined the School of Medicine in 2015 as a tenured professor of molecular biology and microbiology. He has had an appointment at the medical school since 1997 while on staff at Tufts Medical Center, where he was vice chair for faculty development in the department of medicine. He has served on numerous research-related committees at Tufts and on NIH review panels, and has mentored dozens of young investigators.

While the extent of government research funding is never certain, Hu is optimistic. “I think the current climate puts the medical school in a good position,” he said. “The NIH is really looking for higher-risk, higher-impact projects that impact human health, and that plays to our strengths.”

Hu’s focus on Lyme disease, which combines bench and clinical work, is a good case in point. The Lyme infection rate is climbing around the country; the number of new cases reported each year is about triple the rate from 20 years ago, according to the Centers for Disease Control and Prevention.

Since that first “lucky” project, conducted during a fellowship at Tufts Medical Center, his lab has studied the interaction between the Lyme-causing pathogen *Borrelia burgdorferi* and host organisms, the development of Lyme arthritis, and other topics. As vice dean, Hu intends to continue his research and one of the projects in the works is an attempt to prevent human transmission of Lyme disease by developing a vaccine for the field mice that spread it.

How close are scientists to eradicating Lyme disease? “Eradicate is a strong word,” Hu said. “I’d say we’re probably 10 years away from getting it under control.”



Linden Hu

Research

Where ideas take root



To Fear or Not to Fear

Tufts researchers find an underlying neurological mechanism for mediating fear response. **BY KIM THURLER**

A CHILD MAY reach for a honeybee buzzing around a bright flower—but a child who has previously been stung by a bee may shrink from the insect. This is because humans, like all mammals, have dedicated circuits in their brains for expressing learned fearful behavior and for suppressing such fear.

When an experience proves threatening or painful, nerve cells in the brain's basolateral amygdala (BLA) store that memory. Later, in similar circumstances, the cells can trigger fear-based behavior. If future experience

repeatedly proves similar situations are not dangerous after all, then the original fear memory will typically be suppressed over time in a process called extinction learning. But people suffering from post-traumatic stress disorder (PTSD) or other anxiety disorders may experience disabling recurrences of fear. By uncovering the precise mechanisms underlying fear memories and their suppression, researchers hope to find more effective treatments for such conditions.

Now Leon Reijmers, an assistant professor of

neuroscience, and his colleagues at Tufts University School of Medicine, have published findings in the journal *Nature Neuroscience* demonstrating that a particular type of BLA nerve cell, the PV interneuron, plays a key role in suppressing the neurons that store fear memories after fear extinction learning has occurred.

The researchers were able to home in on the PV interneurons' role by treating genetically modified mice—which had undergone fear extinction learning—with a chemogenetic agent that turned off these interneurons. Without functioning PV interneurons, the mice displayed fear behavior that had previously been extinguished.

That finding confirmed a hypothesis proposed in Reijmers' earlier work, but the researchers also made another, unexpected discovery: PV interneurons regulate an ongoing tug of war between a neural circuit that expresses fear memories and a competing circuit that extinguishes fear memories.

"When we recorded electrical activity in the BLA of our test mice, we saw brainwaves—or oscillations—at two different frequencies, each with a different relationship to fear expression. Oscillations around 4 Hz correlated with more fear behavior while oscillations

around 8 Hz correlated with less fear," Reijmers said. "Silencing the PV interneurons after fear extinction learning increased the activation of the fear-associated 3 to 6 Hz oscillation as well as increased the activation of the fear neurons. Our findings suggest that oscillatory activity could be a useful target for therapies to address disorders such as PTSD."

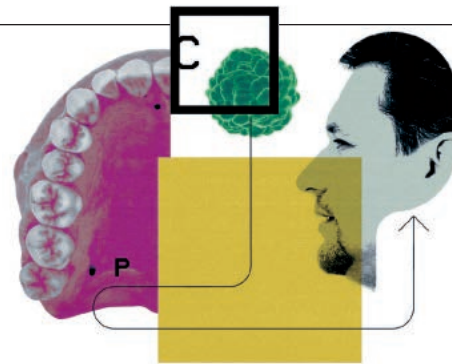
First author on the paper is Patrick Davis, a fifth-year student in the combined M.D./Ph.D. degree program offered by the Sackler School in conjunction with the School of Medicine, through a Medical Scientist Training Program grant from the National Institutes of Health. Other authors are Yosif Zaki, a Northeastern University undergraduate who was an intern in Reijmers' lab, and Jamie Maguire, an assistant professor of neuroscience at Tufts.

"We need a far better understanding of the basic mechanisms at work in the brain before we can start to apply them to treat disease," said Davis. "While this type of work is many years away from being clinically beneficial, I firmly believe that collectively the neuroscience community can help patients who suffer from anxiety disorders."

KIM THURLER is former executive director of the Office of Public Relations at Tufts University.

A Cancer Clue?

Studies show positive associations between periodontal disease and risk of some tumors. **BY COURTNEY HOLLANDS**



FILE THIS UNDER important reasons for flossing and scheduling regular cleanings: After reviewing 46 publications examining the relationship between oral health and risk of cancer, Tufts researchers found positive associations between gum disease and lung, pancreatic, and head and neck cancers.

This is especially concerning considering how widespread periodontitis is in the United States, said Dominique Michaud, professor of public health and community medicine at the School of Medicine, and lead author of the paper published in *Epidemiologic Reviews*. Around 47 percent of adults over age 30 have periodontitis and the prevalence increases with age to 70 percent in individuals 65 years and older.

More studies are needed to understand the exact biological underpinnings of the associations—and the possible role of gum disease in cancer development. “Whether the impact of periodontal disease on cancer risk is a direct effect or a consequence of shared genetic and/or environmental factors is extremely difficult to untangle,” Michaud and her team write in their large-scale review. Questions abound: Could the systemic inflammation that comes with periodontal disease be

a culprit? Are the bacteria responsible for periodontitis altering the immune response in other organs?

After investigating periodontal disease and cancer risk for a decade and analyzing other recent work in the field, Michaud has advice for future studies: larger sample sizes; improved measures for periodontal disease (though radiographs and oral exams are considered the most accurate gauges, many of the

studies Michaud’s team looked at relied on self-reporting); and better adjustment for smoking and other risk factors. “That was our motivation,” she said. “To gather as much data as we could to move the field forward and bring attention to it for others to do more research.”

And as evidence linking periodontal disease and cancer risk accumulates, the research could lead to public health recommendations and

policy changes, Michaud said. Identifying individuals or populations with an elevated risk of cancer through periodontal disease status may help inform treatment and prompt dentists to refer patients for cancer screenings. “Whether [periodontal disease] causes cancer, I can’t say for sure yet,” she said, “but it’s important to make patients aware of their periodontal disease status and encourage them to treat it.”

KNOW YOUR KNEES

Do you play soccer, or regularly push your limits while weight lifting or long-distance running? You could be at higher risk for developing knee osteoarthritis, according to a research review led by School of Medicine research associate professor Jeffrey Driban. For the *Journal of Athletic Training* report, Driban and his team analyzed data from 34 articles and studies seeking links between participation in sports and knee osteoarthritis, which affects 30.8 million adults nationwide. “There’s been some back and forth with some people thinking physical activity is bad for joints because of repetitive overloading, and others saying it’s good because it helps maintain healthy body weight, strength, and endurance,” Driban said. “We wanted to get a more nuanced picture of what was happening to better advise people on which activities are safe.”

After looking at participants in a wide variety of sports, the researchers determined that playing sports doesn’t make a person more likely to develop knee osteoarthritis in general. But broken down by sport and level of competition, it was a different story. The data showed that elite- and nonelite-level soccer players, as well as runners, weight lifters, and wrestlers who compete at a professional or international level, developed the condition at rates three to seven times higher than people who don’t play sports. Those numbers aren’t cause for serious alarm—only one in 10 former athletes in the studies got knee osteoarthritis—but they do warrant further research, which should include more female and nonelite competitive athletes. Future studies should also include data about when and how long each sport was played, Driban said.

“The overall message to the public is that yes, some athletes are at risk,” he added. “But most are not, and if exercise guidelines are followed, sports are a safe, fun way to encourage people to be active.” —MONICA JIMENEZ

A Better Way to Measure Drug Interaction

CANCER, TUBERCULOSIS, AND HIV are among the many serious diseases that are frequently treated with combinations of three or more drugs, over months or even years. Developing the most effective therapies for such diseases requires understanding how combining drugs affects their efficacy. If the drugs synergistically reinforce one another, doctors may be able to lower doses, potentially relieving side effects, reducing treatment time, and improving patient quality of life. But if they work against each other, efficacy will be reduced.

Now researchers at Tufts, along with colleagues at Harvard University and Turkey's Sabanci University, have developed a new method to measure

how drugs act in combination. The new methodology is more efficient and less expensive than traditional testing, and provides a framework for systematic testing of any dose-dependent therapeutic agent.

“Identifying synergies early in the preclinical drug-development process can help us prioritize drug combinations for further development,” said Bree Aldridge, assistant professor of molecular biology and microbiology at Tufts School of Medicine and adjunct assistant professor of biomedical engineering. “But studying such drug interactions is challenging because of the sheer number of combinations and the current method of measurement.”

Such testing has historically been done on pairs of

drugs through a “checkerboard” methodology using an iPhone-sized plate containing a grid of tiny wells, typically 96 or 384 of them. A bacterium—or other target organism—is placed into each well along with a carefully calibrated dose of the two drugs in varying strengths. Bacterial growth in each well is measured to determine its response to the drugs. The complexity and cost of testing increase exponentially with the number of drugs being examined. To determine the synergy of five drugs, for example, would require measuring 100,000 cell response combinations on 1,000 plates. As a result, combinations of more than two drugs—called high-order combinations—rarely undergo such testing.

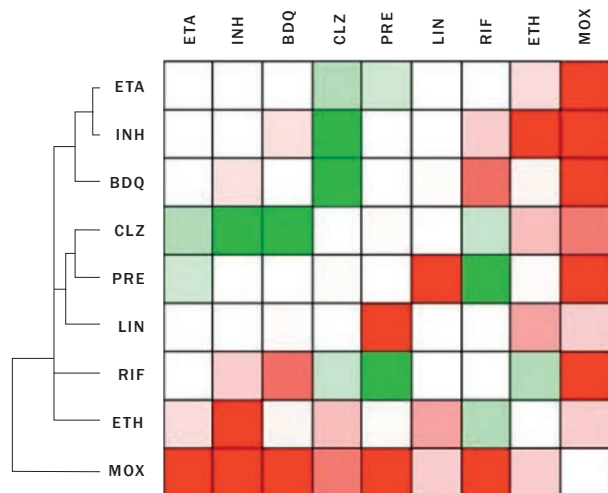
The new method, though, doesn't require an exhaustive analysis of all cell behaviors in all possible dose combinations. Instead, in order to predict which high-order combinations are most likely to be synergistic, it targets only the most information-rich combinations. In experiments using *Mycobacterium tuberculosis*, which causes tuberculosis, Aldridge and her collaborators found that measuring only certain wells in the grid mirrored the results obtained by testing all the wells.

Aldridge employs the analogy of assessing

metropolitan rush-hour traffic. “Instead of monitoring traffic in every neighborhood and on every road, if you look at traffic at multiple key points—such as the Massachusetts Turnpike and the airport tunnels in Boston—you'll be able to get a pretty good picture of whether commuting will be a breeze or a nightmare.”

The new proof-of-concept study, recently reported in the journal *Science Advances*, analyzed pairwise and combination interactions among nine drugs now used against *M. tuberculosis*. Aldridge, whose work merges molecular and mathematical approaches to the study of mycobacteria, hopes to test additional drugs in future studies of the method, dubbed DiaMOND (diagonal measurement of n-way drug interactions).

Aldridge stresses that drug synergy should be only one consideration in developing effective patient therapies. “Synergies observed in the lab are not always associated with optimum clinical treatments,” she said. For example, it may make sense to include less synergistic combinations in a regimen in order to help combat drug resistance. But, she added, “DiaMOND can play an important role by enabling us to do a much better job of identifying potentially valuable synergies among candidate drugs in the pipeline.” —KIM THURLER



Drug interactions are measured by the shape of the contour on a checkerboard of dose combinations. “Studying such interactions is challenging because of the sheer number of combinations,” said Bree Aldridge.

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Years and Counting

ILLUSTRATION BY MATT HERRING

IN APRIL 1893, SEVEN DOCTORS SECEDED FROM BOSTON'S COLLEGE OF PHYSICIANS AND Surgeons. Each chipped in \$50 to start a new medical school at 188 Boylston Street under the auspices of Tufts College. Many thousands of graduates and a few converted garment factories later, Tufts University School of Medicine this year celebrates a century-and-a-quarter of medical excellence.

From enrolling an initial class that was over one-quarter women to sponsoring the country's first two community health centers, the school has always been on the cutting edge. Ahead, we explore some of the discoveries, pioneers, and innovations at the heart of this school. But we also want to hear what the School of Medicine means to you—please send your thoughts and memories to courtney.hollands@tufts.edu.



Making Transplants a Reality

Robert S. Schwartz figured out how to prevent organ rejection. **BY GENEVIEVE RAJEWSKI**



MORE THAN 700,000 PEOPLE IN THE UNITED STATES received organ transplants over the past three decades—an incredible number considering that just 60 years ago, it was virtually impossible to transplant tissue without it being violently, and usually fatally, rejected by a patient's body. (The only successful transplants up to that point had been between identical twins.) It wasn't until 1958 that Tufts professor and hematologist Robert S. Schwartz made them feasible by uncovering a medical means for suppressing the human immune response.

It started one morning in 1957 during ward rounds at New England Medical Center. Three leukemia patients had died after undergoing total body irradiation to prepare them for accepting transplants of healthy bone marrow. That morning, William Dameshek, the chief of hematology at Tufts, lectured his department—including Schwartz—about the risks of total body irradiation, which at the time was the only existing option for tamping down the immune system. “He said that we need another way,” Schwartz later recalled. “He assigned the task of finding it to me.”

Schwartz and Dameshek noted that under a microscope, the immune response involves a proliferation of cells—one that bears a striking resemblance to leukemia—and wondered whether it might be possible to chemically suppress it. Schwartz then contacted two pharmaceutical companies for samples of antileukemic drugs to test on rabbits. The first drug he administered, 6-mercaptopurine, suppressed the animals' immune response, and Schwartz recalled “dancing in the lab” with

a research fellow when they saw the evidence.

Schwartz and Dameshek then co-wrote a series of papers in 1958 and 1959 definitively showing that using 6-mercaptopurine to temporarily shut off the immune system response at the time of transplantation could stop organ rejection. Their research quickly spawned other studies, with researchers in the U.S. and England using the drug to successfully transplant skin and kidneys in dogs and other animals.

“It's unusual to see a discovery have so much impact, to see a breakthrough change practice so profoundly for the better,” said John K. Erban, M81, a professor at Tufts University School of Medicine and the clinical director of Tufts Cancer Center. In 1962, doctors performed the first human kidney transplant using a deceased donor, and the first liver transplant followed a year later. In 1967, a heart transplant was successful.

In 2000, the Transplantation Society awarded Schwartz its Medawar Prize, the field's highest honor, and his outsized contributions

to transplantation were also mentioned in two Nobel Prize speeches. And Schwartz didn't stop at transplantation: In the 1960s, he applied his chemical immunosuppression knowledge to fight autoimmune disorders. Schwartz died last August, but the lessons learned from his research will live on in the treatment of cancer and other diseases.



The Robert Schwartz, M.D. Scholarship, established in 2003, provides financial assistance for students at Tufts University School of Medicine. To make a donation to this fund, please visit go.tufts.edu/schwartz or call the TUSM Office of Development at 617-636-6770.



MY FAVORITE THING ABOUT TUSM. . .

Friends and the campus, as well as Medical Interviewing and the Doctor-Patient Relationship (MIDPR) and other small groups that give us opportunities to both learn and teach. — Alice Won, M19



MY FAVORITE THING ABOUT TUSM . . .

The eminent doctors, like Robert Schwartz, Jerome Kassirer, and Alice Ettinger, among many others, who have made it a great institution. —Thomas Hedges, M75

SEA CHANGES IN PEDIATRIC CARE

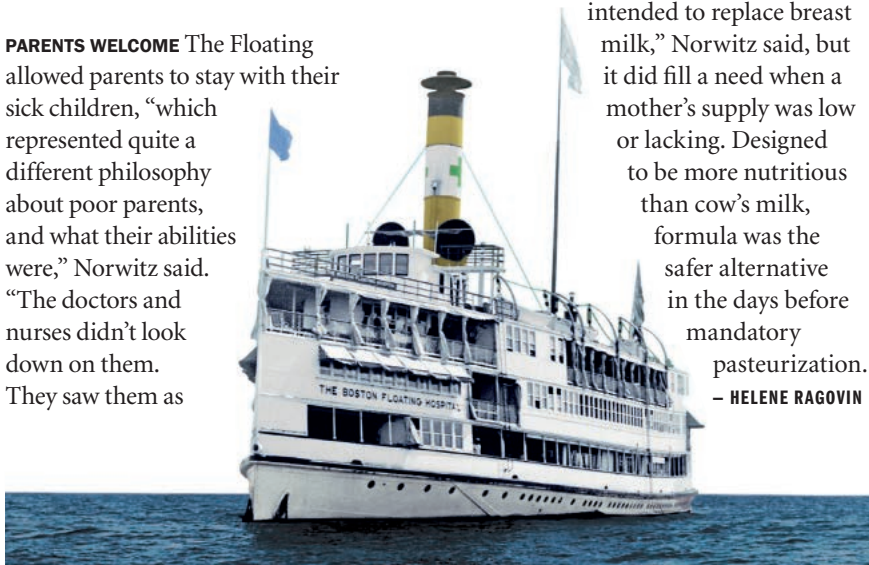
WHEN A BARGE NAMED THE CLIFFORD cast off from a pier in East Boston on a summer day in 1894, it launched a new era in pediatric medical care. Carrying low-income mothers and their sick young children for a restorative trip in the fresh ocean air, the ship soon became known as Boston's Floating Hospital (or the Floating, for short). Aboard the maritime infirmary—and later, on land—doctors, nurses, and scientists not only cared for generations of ailing children and trained hundreds of students from Tufts University School of Medicine, but conducted research and developed new thinking about treating pint-size patients. “I don't think people are aware of just how innovative the Floating was,” said Errol Norwitz, medical school professor and chair of obstetrics and gynecology at Tufts Medical Center. Ahead, a look at the discoveries and polices at sea.

PARENTS WELCOME The Floating allowed parents to stay with their sick children, “which represented quite a different philosophy about poor parents, and what their abilities were,” Norwitz said. “The doctors and nurses didn't look down on them. They saw them as

important partners in the health-care system.” That attitude also extended to teaching mothers how to care for their children after they disembarked.

GOT MILK? Doctors at the Floating Hospital believed breast milk was optimum infant nutrition, especially for ill or failing babies. So it's no surprise that by 1910, the hospital had established the first human-milk bank in the country, stocked with donations from nursing mothers, or from women who had lost their children. Staffers also dried and powdered the milk, so it would keep during hot summers in the era before widespread refrigeration.

FORMULA ONE Floating Hospital researchers also developed the first artificial formula, which came to be known as Similac. “It was never intended to replace breast milk,” Norwitz said, but it did fill a need when a mother's supply was low or lacking. Designed to be more nutritious than cow's milk, formula was the safer alternative in the days before mandatory pasteurization.
— HELENE RAGOVIN



FIRST PERSON

SANDRA R. HERNÁNDEZ, M84, on being a physician with a public health mission

During my residency in one of the epicenters of the HIV crisis—San Francisco General Hospital—I began to understand the interface between health care and the social factors that affect health. When I was approached about joining the AIDS Office at the San Francisco Department of Public Health, I jumped at the chance. The people there worked with urgency: seven days a week, all through the night. Public health is a team endeavor, and we had an entire community coming together to address HIV. At the same time, I continued to do clinical work, because my patients kept me grounded and because I felt it would help me make better policy. I once had an HIV patient who identified as a bisexual male. He was living in a garage because his family was afraid for him to touch anything. His experience profoundly informed my work when my department took on housing policies for people with HIV. The health challenges are different today, but many of the lessons we learned endure. Like HIV did, the opioid epidemic is forcing us to address substance abuse, behavioral health, and physical health in an integrated way, ensuring that what we do in health care matches what is needed in the real world. —As told to Molly McDonough

HERNÁNDEZ is president and CEO of the California Health Care Foundation.

LEADING the CHARGE

How Dr. H. Jack Geiger and Tufts created the country's first community health centers—and launched a movement.

BY COURTNEY HOLLANDS PORTRAIT BY BRAD DECECCO

IT ALL STARTED DURING FREEDOM summer in Mississippi.

Dr. H. Jack Geiger was there, in those sweltering months of 1964, as the national program chairman for the Medical Committee for Human Rights, a group of doctors and nurses who supported and cared for the civil rights activists. The poverty he witnessed among African-Americans was staggering.

In the cotton-producing Mississippi Delta, mechanization had all but put sharecroppers and day laborers out of work; in some areas, unemployment was over 60 percent. Families lived in dilapidated plantation shacks, most of them without piped water.

Widespread poverty and poor living conditions there inordinately affected the health of African-Americans. In 1961, the infant mortality rate among Mississippi's black families was 49.9 per 1,000 live births—more than double the rate for whites. Birth location is telling, too: 99.3% of white births took place in a hospital, compared to 53% of black births. As many as one in three African-Americans

in rural Mississippi reported that they'd never even seen a physician—out-of-work sharecroppers couldn't afford to go to the doctor, most of whom operated on a strict fee-for-service basis. "There's nothing I can do for 'em," a mother with two seriously ill children told a newspaper reporter at the time. "There's no doctor and I got no money for a hospital. All's I can do is wait and watch, either they get better or they gonna die. I can't do nothin' but wait and pray."

Geiger, now 92 and blind but ever the activist, still vividly recalls this desperation. "There were people trying to shoot squirrels and gather pecan nuts—anything to feed their kids," he said in a recent interview at his home in Brooklyn, New York.

With these formative experiences etched in his mind, Geiger decided he had to do something. The next year, he proposed and received federal funding to establish the country's first two community health centers—one in rural Mississippi, one in urban Boston—sponsored by Tufts University. Geiger and these centers sparked a national movement. Today, there are more than 1,400 health centers—operating

**Dr. H. Jack Geiger at
his home in Brooklyn,
New York.**



more than 10,000 clinical sites—in all 50 states and all U.S. territories.

Community health centers have been a democratizing force in medical care. They now serve one in four people in rural areas of the United States, and one in three of all Americans living below the poverty line. “What Jack Geiger has caused to happen is truly a marvel,” said Dan Hawkins, a senior vice president at the National Association of Community Health Centers. He created “a health-care system in his vision that is of the people, by the people, and for the people.”

of the Congress of Racial Equality and protesting the University of Chicago medical school’s then-discriminatory admissions process. After a few years as the science and medicine editor at the International News Service, Geiger started medical school in 1954 at Western Reserve University, now Case Western.

During his second year, he was beset by anxiety. *What am I doing here?*, Geiger remembered wondering. His ivory-tower university reality seemed so removed from the daily lives of

real anywhere, it was what the Karks were doing in South Africa,” Geiger said. “So, I went and learned an enormous amount.”

It was this model that he later suggested at a meeting of civil rights, Head Start, and medical workers in Greenville, Mississippi, following Freedom Summer. Geiger was then on the Harvard faculty, but Count Gibson, chairman of the Department of Preventive Medicine at Tufts, whom Geiger had recruited to work with the MCHR, took notice: The formidable

“IT OCCURRED TO ME THAT OUT THERE, WHO GOT SICK AND WHO DIDN’T ... WERE NOT MERELY BIOMEDICAL PHENOMENA. THEY WERE RACIAL, POLITICAL, ECONOMIC, AND SOCIAL PHENOMENA.”

JACK GEIGER HAS BEEN concerned with issues of social justice since he was a teenager. He graduated high school in 1941, just shy of 15, and fled his parents’ home one night to see Orson Welles’ production of Richard Wright’s *Native Son* on Broadway. Geiger was so enamored with Canada Lee’s performance that he talked his way backstage and struck up a friendship with the prominent black actor. For a time, he considered Lee’s Harlem penthouse a second home. There, Geiger met Wright, Billy Strayhorn, Adam Clayton Powell Jr., and other lions of the Harlem Renaissance. “I was probably the only shrimp, nerdy kid from the Upper West Side to be mentored by Langston Hughes,” Geiger said.

He went on to study journalism at the University of Wisconsin, served for three years as an officer in the U.S. Merchant Marine—the only racially integrated military service at the time—and then studied premed at the University of Chicago. He was active in the civil rights movement all the while, helping to form an early chapter

Cleveland’s poor, and he had an epiphany one day while standing on the steps of the medical school, looking out over the city: “It occurred to me that out there, who got sick and who didn’t—and why they got sick and what happened to them in relation to the health-care system—were not merely biomedical phenomena. They were racial, political, economic, and social phenomena,” he said. “And I started thinking about how could you make medicine an instrument of social change.”

Geiger told Warren Weaver, vice president of the Rockefeller Foundation—whom he had met on a committee—about the pivotal moment on the hospital steps. Weaver sent Geiger information about a project in South Africa the foundation was funding: Health centers in Pholela and Durban, started by community-oriented primary care pioneers Sidney and Emily Kark. Intrigued, Geiger sought and received a scholarship from the Rockefeller Foundation to spend four-and-a-half months of his senior year working with the husband-and-wife physicians.

“I decided that if social medicine was

Georgia native—who could dampen or deepen his Southern drawl depending on the company—told Geiger that if he could find the funds, Tufts would back the project. (A social justice crusader in his own right, Gibson was one of the first physicians to oppose the Tuskegee Syphilis Experiment.)

“I think Tufts has never really had full and sufficient credit for how well it behaved in all of this—the kind of risks it took and the kind of investments it made were really striking for a medical school,” Geiger told me.

Geiger and Gibson decided to pursue two health community centers: one at Boston’s Columbia Point housing project and one in Mississippi. Once Geiger scored a \$1.2 million grant from the newly formed U.S. Office of Economic Opportunity—a hard-won battle that involved Geiger sitting-in at OEO director R. Sargent Shriver’s office—they started their work closer to Tufts, at Columbia Point.

Before Columbia Point Health Center opened in December 1965, residents reported traveling two to five hours round trip to get medical care—only 28



Clockwise from top left: Dr. H. Jack Geiger with patients at the Tufts-Delta Health Center; transporting a patient to the center; workers in the lab; Geiger and John Hatch (right) surveying construction at the health center.

percent of the 6,000 people living in the housing project had ever had a general medical check-up. In the center's first year, residents saw a doctor an average of four times. And a study of 54 families continuously on public assistance showed the health center reduced hospitalization by 80 percent in two years.

In 1966, U.S. Senator Edward Kennedy visited Columbia Point to see firsthand what Geiger and Gibson had accomplished. Shortly thereafter, he drafted an amendment to the Economic Opportunity Act asking for \$100 million to start a national network of health centers. The legislation passed the same year, although the funds were reduced to \$51 million.

STARTING THE COMMUNITY health center in Mound Bayou, Mississippi proved more difficult. When Geiger and Gibson began scouting sites in late 1965, white politicians and civic leaders, as well as local doctors, balked at the plan. However, that was when the Tufts connection had an additional benefit: It turned out that,

according to federal law, the governor could not veto an OEO project if it was backed by an institution of higher learning. After conceding that point, the governor refused to bestow Tufts-Delta Health Center with a nonprofit corporation charter—so it opened in 1967 as a charitable trust, with six Tufts University trustees signing on to support the effort.

By then, Geiger had joined the Tufts staff as a professor in the Department of Community Medicine. While Gibson stayed up north to oversee operations at Columbia Point, Geiger became director of the Tufts-Delta Health Center, recruiting some white doctors from the North to come to Mississippi with him and convincing black doctors and health professionals from the region to return and get involved. John Hatch, an African-American activist and former assistant director in the Boston Housing Authority who had done much of the original outreach and scouting in the Delta, stayed on as community organizer. Two African-American physicians—Aaron Shirley and Bob Smith—also joined the staff on a part-time basis, each commuting 130

miles from Jackson to Mound Bayou a few times a week. (Smith, a leader in the MCHR, put out the call during Freedom Summer to Northern physicians for help.) Sanitarian Andrew B. James, obstetrician Helen Barnes, and Sister Mary Stella Simpson, a Catholic nun and nurse-midwife, rounded out the team.

From the moment they launched the center, Geiger and his colleagues tackled the social determinants of health from the ground up—literally. They dug wells for clean water and improved sanitation. Construction crews patched roofs and walls and built porches. After realizing pregnant women were suffering miscarriages after repeatedly jumping a few feet off their stoops to the ground, the workers constructed steps, too. A transportation system was set up to shuttle far-flung patrons in north Bolivar County to receive primary care in Mound Bayou, though nurses also traveled to patients. In the first two years, the center provided free medical care to 8,000 people, and made more than 10,000 home visits. And while the center was open to all patients, few whites came through the door.

To further ensure community participation among the roughly 14,000 African-American residents of the 500-square-mile area served by the center, 10 health associations were formed to assess and address local needs. Each association elected representatives to the North Bolivar County Health Council, which had say over all initiatives and decisions made by the center.

“As our original proposals indicate,” Geiger wrote in a 1970 progress report, “we believe it is unlikely that the cycle of poverty can be interrupted by health services alone . . . we did not attempt to organize the community around health services—our priority as health professionals—but we said, instead, ‘What are your priorities?’”

One of the main priorities was nutrition. Families in Bolivar County had a median income of less than \$900 a year, or less than \$3 per day per family—not nearly enough to put food on the table.

To address malnutrition, the center’s physicians wrote prescriptions for food for sick families and paid local African-American-owned grocery stores to fill them, using funds from the pharmacy budget. Later, the team received an OEO grant to finance this innovative approach, specifically to improve the diets of pregnant mothers, infants, and young children.

In 1968, Geiger and Hatch established the North Bolivar County Farm Cooperative. Eventually growing to 600 acres, it yielded a million pounds of beans, squash, collard greens, potatoes, and other vegetables in the first six months. And it provided hundreds of jobs: Co-op members who worked in the fields earned \$4 a day in wages and \$6 in produce. Reflecting on his time running the operation in a 1969 *Life* magazine article, farm manager John Brown said, “Workin’ here for this farm has just brought daylight into my life.”

THE TUFTS-DELTA HEALTH Center and its related projects dramatically improved health outcomes for Bolivar

County residents. Better nutrition and access to care and clean water, employment opportunities, and housing upgrades—coupled with the advent of social programs such as food stamps, Medicaid, and Medicare—all led to decreases in incidences of fetal losses, infant mortality rates, infectious disease, and chronic illnesses.

And empowerment went beyond the North Bolivar County Health Council and the farm co-op. “The ultimate goal was to establish pathways out of poverty and into a better life,” Geiger wrote in his foreword to Thomas J. Ward Jr.’s history of the project, *Out in the Rural: A Mississippi Health Center and its War on Poverty*. To that end, the center instituted an educational and college prep program, accredited by local junior colleges. Geiger also opened a pipeline between the Deep South and Tufts University School of Medicine. One of the first graduates, high school science teacher Willie B. Lucas, returned to work at the Tufts-Delta Health Center, eventually becoming the clinical director.

Through these efforts, the educational program produced seven doctors, five Ph.D.s in health-related disciplines, three environmental engineers, two psychologists, several registered nurses and social workers, and the first 10 registered black sanitarians in Mississippi history during its first decade.

L.C. Dorsey, for one, was a sharecropper’s daughter who grew up on a plantation and dropped out of high school to engage in civil rights activism and raise her kids. She enrolled in the GED program at the Tufts-Delta Health Center then became the deputy director of the farm co-op before leaving to get a master’s in social work at the State University of New York-Stony Brook and later, a doctorate in social work from Howard University. (She went



This page: Chatting with residents during a house call, top; living conditions in North Bolivar county, bottom. Opposite page: A Tufts-Delta Health Center nurse makes a home visit.



on to serve as executive director of the Delta Health Center from 1988 to 1995, long after it parted ways with Tufts.) Each of her six children has a college degree—one of her grandchildren, Aisha Nyandoro, earned a Ph.D. in community psychology from Michigan State University and is cofounder and CEO of Springboard to Opportunities, a nonprofit that gives voice to residents of affordable housing in Mississippi.

“One thing I learned from Dr. Geiger is that the most important legacies of the community health center movement are education and intergenerational transfer,” said Tony Schlaff, director of public health programs at Tufts. “Not just of education, but of hope.”

All incoming medical students at Tufts watch a 45-minute video of Geiger telling the story of the community health centers, filmed at the School of Medicine in April 2008. “It brings me to tears every time,” Schlaff said, adding that it ends with Geiger talking about children of center patients and staff who are now health-care leaders around the globe.

As for Geiger, he left the chair of the Department of Community Medicine at Tufts in 1971 to helm the Department of Community Health and Social Medicine at SUNY-Stony Brook, and then went on to chair the same department at the City University of New York Medical School. He was a founding member of the Committee for Health in South Africa, Physicians for Human Rights, and Physicians for Social Responsibility—the latter two

organizations both shared in the Nobel Peace Prize.

In 2016, Geiger received an honorary Doctor of Public Service degree from Tufts. “Long before the words ‘access to care’ became part of our national conversation, you understood that health care is a basic human right,” the citation read. “With unswerving dedication to the underserved, you called attention to the interwoven issues of injustice, poverty, and health.”

TODAY, COMMUNITY health centers care for more than 27 million low-income Americans—about one in 13 citizens—regardless of whether they have insurance or the ability to pay. Offering a range of services, from eye exams and pap smears to mental health counseling and dental work, they treat both urban and rural vulnerable populations, including homeless people, agricultural workers, and public-housing residents. The centers reduce the need for emergency room, inpatient hospital, and specialty care, saving the national health care system an estimated \$24 billion a year, according to research from George Washington University. To receive federal funding, the majority of a center’s governing board must be made up of its patients.

The movement celebrated its 50th anniversary in 2015, and both centers started by Geiger and Gibson are still in operation. Long separated from Tufts, Columbia Point Health Center was renamed the Geiger Gibson Health Center in 1995 and is now part of Harbor Health Services.

The North Bolivar County Health Council voted to follow Geiger to SUNY-Stony Brook in the early 1970s, cutting ties with Tufts, and then to merge with the Mound Bayou Community Hospital. (Funded by an OEO grant, the hospital arose from a merger of two area fraternal hospitals and relied on surgical residents provided by Nashville’s traditionally black

Meharry Medical College.) The hospital closed in 1983, however, and the Delta Health Center floundered until Dorsey took over as executive director in 1988, restoring it to financial health.

Delta Health Center still serves the poorest of the poor in the Mississippi Delta at 10 facilities in five counties, said CEO John Fairman. While the North Bolivar County Farm Co-op became the Alcorn State University Demonstration Farm years ago, the Mound Bayou center is again farming eight acres, growing okra, hull peas, cantaloupe, and other fruit through an arrangement with Delta Fresh Foods forged in 2012—patients can pick the produce. The center has been operated by a nonprofit community board for decades, and it’s now reinstating the health associations from Geiger’s time to engage citizens and solicit feedback.

“I tell people unabashedly that we are trying to return back to the future,” Fairman said. “[Geiger and Gibson] were so far ahead of their time; everything they did then would be progressive today.”

In 2014, the Delta Health Center opened a new state-of-the-art facility in Mound Bayou, funded by a \$5 million grant from the U.S. Department of Health and Human Services. The light-filled, 26,000-square-foot building houses a pharmacy, social services, a certified diabetic clinic, and more. Its name? The Dr. H. Jack Geiger Medical Center.

Although a “wonderful cadre of folks” was involved in starting and running the Tufts-Delta Health Center, such as Hatch, Gibson, Shirley, Smith, and others, Fairman said, “We wanted Geiger to stand alone because he was, to me, probably the most consequential figure to emerge in a whole field of all-stars.” Geiger’s portrait hangs in the entryway.

“He was absolutely brilliant,” Fairman added. “He remains brilliant, in spite of his age. I love Jack’s line that he’s living proof that you can lose your sight, but not your vision.”

Contact **COURTNEY HOLLANDS**, the editor of this magazine, at courtney.hollands@tufts.edu.

Trailblazers

TUSM faculty and alumni who made their marks. **BY MOLLY McDONOUGH**



PSYCHIATRY PIONEER

Morton Prince

Professor of psychiatry at Tufts from 1902 to 1912, founder of the American Psychopathological Association, president of the American Neurological Association, and creator of the *Journal of Abnormal Psychology*, Morton Prince explored hyp-

nosis, multiple personality disorder, and the relationship between mind and body. A thought leader among psychologists in Boston at the turn of the last century, Prince critiqued psychoanalysis, arguing that mental disorder did not stem from sexual repression alone, but also from negative experiences. That didn't earn him favor with his contemporary Sigmund Freud—who supposedly called Price an “arrogant ass”—but it did help lay the foundation for modern cognitive therapy.



FIRST LADY OF RADIOLOGY

Alice Ettinger

In 1932, Berlin native Alice Ettinger sailed for the United States with valuable technology: a device developed by her German mentor that allowed radiologists to record gastrointestinal X-ray images on film for the first time. She planned

to demonstrate it at Tufts School of Medicine during a six-month stay; instead, she joined the faculty and taught at Tufts for the next 53 years. Ettinger is known for being a radiology leader in Boston and beyond (she was appointed roentgenologist-in-chief at the Boston Dispensary and at the Pratt Diagnostic Hospital in 1939, and later chaired the Tufts Department of Radiology), for her award-winning teaching style, and for setting the standard of compassionate patient care.



DOCTOR ON A MISSION

Dorothy Boulding Ferebee, M24

Despite graduating at the top of her Tufts School of Medicine class, Dorothy Boulding Ferebee, an African-American from Norfolk, Virginia, couldn't obtain an internship in Boston's hospitals.

Undeterred by this blatant racism, she moved to Washington, D.C., and embarked on a lifelong career of bringing health care to underserved populations. After founding a clinic for African-Americans and day care for working mothers in the capital, she directed medical-relief missions to Mississippi during the Depression, providing much-needed immunizations and treatment in rural black communities. Ferebee went on to direct health services at Howard University Medical School (now College of Medicine) and to lead the National Council of Negro Women.




ANESTHETIC INNOVATOR

Benjamin Etsten, A31

Before the mid-1950s, anesthesiologists had to estimate the amount of gas delivered with each squeeze of the breathing bags they used to ventilate patients. But Benjamin Etsten, who had worked in New York and

Wisconsin before returning to his undergrad alma mater to teach, had a better idea. As he assumed the role of professor and chairman of Tufts' anesthesiology division (later department) in 1949, he developed and tested a more precise bellows device that let practitioners deliver known amounts of gas to patients: the Etsten Ventilator. He retired in 1974, after helping the department grow from one staff anesthesiologist and four residents to 10 staff members and 15 residents.

<p>1890</p> <p>1893 TUFTS COLLEGE MEDICAL SCHOOL opens at 188 Boylston Street in Boston. The first-year class is more than 25 percent women.</p>	<p>1894 THE BOSTON DISPENSARY—the city's oldest hospital, founded by Paul Revere and Sam Adams—and SUFFOLK DISPENSARY become the FIRST TEACHING AFFILIATES.</p>	<p>1900</p> <p>1900 After a stopover at the corner of Rutland and Shawmut avenues, Tufts College Medical School moves to 416 HUNTINGTON AVENUE. The cost of the building and land was \$167,000.</p>	<p>1910</p> <p>1905 JOSEFA ZARRATT, M1905, one of the first African-American women admitted to medical school at Tufts, graduates.</p>	
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GASTROENTEROLOGY STAR

Joseph Kirsner, M33

School of Medicine alum Joseph Kirsner had an impressively long career: At the age of 95, the gastroenterologist was still seeing patients; at the age of 100—two years before his death in 2012—he

gave his last lecture at the University of Chicago. The Boston native and son of Jewish-Ukrainian immigrants was a preeminent authority in the field of gastroenterology, publishing more than 700 academic papers and authoring six editions of *Inflammatory Bowel Disease*, the gold-standard textbook on the subject. He also received the lifetime achievement award from the Crohn's & Colitis Foundation of America . . . twice.



HEMATOLOGY HERO

Jane Desforges, M45

Jane Desforges was equally at home in the exam room, laboratory, and lecture hall. As a world-renowned hematologist specializing in sickle-cell disease and Hodgkin's lymphoma, Desforges was widely

admired for her exacting standards and commitment to patients. As a professor of medicine at Tufts, she inspired a generation of young doctors, particularly women. (For proof, look no further than the 13 Outstanding Teacher Awards she won during her tenure.) In 1988 Desforges was the first female awarded the American College of Physicians Distinguished Teaching Award; today, the award is named after her.

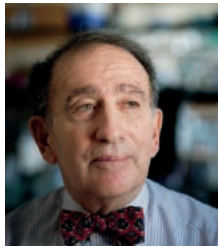


MODEL MENTOR

Vivian Pinn, H93

While growing up in the segregated South, Vivian Pinn was determined to be a doctor. And she pursued the path despite all odds; she was the only female and only African-American in her graduating class at the University

of Virginia School of Medicine in 1967. As associate professor of pathology and assistant dean of student and minority affairs at TUSM from 1970 to 1982, she encouraged women and minorities to pursue careers in the field. Later, while directing the Office of Research on Women's Health at the National Institutes of Health, she advocated for the inclusion of female subjects in studies. In 2011, the medical school gave Pinn a Dean's Medal and dedicated the Vivian W. Pinn Office of Student Affairs in her honor.



RESISTANCE FIGHTER

Stuart Levy

Public awareness of antibiotic resistance has increased in the last few years—but Stuart Levy has been sounding the alarm for decades. Shortly after joining TUSM as assistant professor of medicine and of molecular

biology and microbiology in 1971, he began unraveling the mechanisms leading to bacterial resistance, and presented the first evidence that low-dose antibiotics in farm animals encouraged the proliferation of resistant bacteria that can transfer to humans. He went on to establish and lead the Alliance for the Prudent Use of Antibiotics, and is the director of TUSM's Center for Adaptation Genetics and Drug Resistance, as well as an advisor to the World Health Organization, the FDA, and the EPA.

1920

1929

The Boston Dispensary, Boston Floating Hospital (founded in 1894), and the Trustees of Tufts College form an alliance to establish the **NEW ENGLAND MEDICAL CENTER**.

1930

1931

The first regional medical program in the country brings physicians and patients from rural **MAINE to NEW ENGLAND MEDICAL CENTER** and sends students and faculty to Maine hospitals.



1943

In the middle of **WORLD WAR II**, four out of five students are funded by the government and wear either an Army or Navy uniform.

1940

1948

SAMUEL PROGER is appointed chair of the Department of Medicine at Tufts and physician-in-chief at the New England Medical Center; he held both positions until 1971.

FIRST PERSON

TE-WEN CHANG, M84P, on solving the mystery behind deadly colitis.

When humans take antibiotics, they develop diarrhea, and some develop a more severe form—colitis. No one knew why.

In 1977, my colleague John Bartlett began to study antibiotic-associated diarrhea in animals. After feeding the antibiotic clindamycin to hamsters, the animals developed severe diarrhea and eventually died. I became interested in his data at a research conference and asked him to give me a small stool sample for my tissue culture study. After inoculating the tissue culture, I found that the hamster stool specimens caused damage to the tissue culture cells. I kept asking myself, *What could be doing the damage?* A virus was ruled out because the agent could not be propagated to fresh tissue cultures. *If it's a bacterial toxin, what kind of bacteria is it?* After extensive testing, I learned the bacterial strain responsible was *Clostridium difficile*, or “*C. diff.*” It was the first time *C. diff* toxin was isolated.

Around that time, an article appeared in the *British Medical Journal* describing an unknown bacterial toxin from patients with antibiotic-associated diarrhea. I sent a piece of filter paper coated with antitoxin to the author, and within

a week the report came back positive for *C. diff* toxin. This was the first time *C. diff* toxin was detected in humans with antibiotic-associated diarrhea. In other words, I had found the cause of this disease in humans.

Since we did not have any data to prove the British study, Marc Gurwith collected stool samples from his patients at the Boston VA hospital, and Bartlett transferred them to Tufts New England Medical Center, where I carried out the toxin studies. Bartlett wrote the paper, published in the *New England Journal of Medicine* in 1978. After that, we were able to use *Clostridia* antitoxin to make a diagnosis of *C. diff* disease, because of a hidden *C. diff* antitoxin I detected in *Clostridia* and *sordellii* antitoxins. We performed more than 800 tests for physicians across the U.S., with specimens arriving from every state. Before, we didn't know what caused this potentially life-threatening disease in humans. Now we knew. —As told to Francis Storrs



CHANG, an associate professor emeritus of public health and community medicine, received a Dean's Medal in 2015.

When Bigotry was a Science BY SOL GITTLEMAN



JUST A CENTURY AGO, THE PRESIDENTS OF MIT, STANFORD, CORNELL, AND HARVARD ALL SUPPORTED RESEARCH IN eugenics, an academic discipline based on the notion that controlled breeding would improve the human race. Presidents Theodore Roosevelt and Woodrow Wilson, meanwhile, spoke and wrote about “racial suicide” if the nation permitted racial mixing. But even as the movement for racial, ethnic, and cultural purity swept through American society, it found no traction at Tufts. Nowhere in the curricula of any Tufts school was a course on eugenics ever found. It's true that Tufts College yielded to the pressures for ethnic quotas in the 1920s and 1930s, but the medical school, with a tradition of accepting immigrant and first-generation applicants, held its ground, receiving a warning from the Council on Medical Education and Hospitals. One Tufts physician became an outspoken critic of eugenics: Abraham Myerson, M1908, chair of neurology from 1921 to 1940. But it was not until the brutality of Adolf Hitler and his plans for a master race became clear in the 1930s that American science and social science finally heeded Myerson's words and abandoned eugenics. **To read more, visit go.tufts.edu/eugenics**

1950

1949

The school renovates former **GARMENT FACTORIES** at 120 and 136 Harrison Avenue for its new home.

1954

Tufts College Medical School becomes the **TUFTS UNIVERSITY SCHOOL OF MEDICINE** and **POSNER HALL** dormitory opens.



1960

1957

TUSM's affiliation with **ST. ELIZABETH'S MEDICAL CENTER** starts.

1965

The Tufts-sponsored **COLUMBIA POINT HEALTH CENTER**—the country's first community health center—opens at Columbia Point in Boston. A second site in **MISSISSIPPI** follows in 1967.

1970

1970

SOUTH COVE building is bought for research, and affiliation with **MAINE MEDICAL CENTER** begins.



AS GOOD AS HIS WORDS

LONGTIME SACKLER SCHOOL DEAN LOUIS LASAGNA—HE LED THE SCHOOL from 1984 to 2002—started his career in pharmacology, conceptualizing controlled clinical trials and proving that the placebo effect was real and demonstrable. And in 1964, while an associate professor at Johns Hopkins Medical School, Lasagna suggested a modern take on the Hippocratic oath in *The New York Times*. His rewrite was quickly adopted by medical schools across the country—33 percent of 135

schools polled in 2009 reported administering Lasagna’s words.

Here, alumni and current students reflect on some favorite lines of the oft-recited oath.

“I will remember that there is art to medicine as well as science, and that warmth, sympathy, and understanding may outweigh the surgeon’s knife or the chemist’s drug.”

As a radiation oncologist, I see fear in people’s eyes every day. I see people fight for their lives. I see high motivation to cure cancer, and I see people who are weary from seemingly endless treatments that prolong an existence they don’t wish to continue. It is tempting to press an individual to do what you think is best for their cancer. However, I am reminded every day that it is not my decision—it is the patient’s decision . . . there is truly an art to understanding the mindset, goals, and ultimate desires of a patient. —Sandra Sha, M97

“I will not be ashamed to say, ‘I know not,’ nor will I fail to call in my colleagues when the skills of another are needed for a patient’s recovery.”

As a first-year medical student, I could not imagine a more accurate or appropriate statement. —Christian Sleeper, M21

“I will remember that I do not treat a fever chart, or a cancerous growth, but a sick human being.”

It seems as tools and technologies grow more advanced, this becomes easier to neglect . . . At Tufts, however, recognizing and cherishing who we treat—not what we treat—is so strongly emphasized. That is something I deeply appreciate as a student at this medical school. —Jonathan Williams, A16, M20



MY FAVORITE THING ABOUT TUSM . . .

To feel included, to feel that I belong to a place, to feel home, and to be part of the community. —Tara Ahmadi, M21



FIRST PERSON

NAHID BHADELIA, J99, F04, M05, on fighting Ebola

I didn’t realize how dire the Ebola epidemic was in West Africa until I landed there in 2014. It ravaged communities, and many of my colleagues became ill or passed away. Most people believe they wouldn’t make the trip, but when you know how much need is there, you feel beholden to help. I ended up traveling from Boston to Sierra Leone four times. It was very hard for me and my family. But this experience allowed me to put my skills to good use and helped improve the training I provide to U.S. healthcare workers. It has drawn me into a lot of policy discussions and scientific areas. It heartens me to see growing awareness about how to confront infectious disease threats better and earlier with initiatives such as the Coalition for Epidemic Preparedness Innovation and the Global Health Security Agenda. The world is hopefully waking up to the threat of emerging pathogens and everyday infectious diseases.

—As told to Molly McDonough

BHADELIA is medical director of Boston Medical Center’s special pathogens unit and director of infection control and medical response for Boston University’s National Emerging Infectious Diseases Laboratories.

1980

1980 The **SACKLER SCHOOL OF GRADUATE BIOMEDICAL SCIENCES** opens with **DR. MURRAY BLAIR** as dean. The next year, **TUFTS ASSOCIATED HEALTH PLAN** is founded by the Department of Community Health.

1985 **ARTHUR M. SACKLER BUILDING** opens, housing a modern library and classrooms.

1990

1986 **PROBLEM-BASED LEARNING** and **SELECTIVES** are introduced into the curriculum and **MD/MPH DEGREE PROGRAM** is established.



1994–5 First-in-the-nation **MS IN HEALTH COMMUNICATION, INDEPENDENT MPH**, and **FOUR-YEAR MD/MBA PROGRAMS** are launched.



1997 Medical students start **THE SHAREWOOD PROJECT**, a pop-up urban treatment center offering free care.

THE DEANS' LIST

The leaders of our school, with the year each took up the mantle.

- 1893** Albert Nott
- 1896** John L. Hildreth
- 1898** Harold Williams
- 1913** Charles F. Painter
- 1921** Frank G. Wheatley
- 1922** Stephen Rushmore
- 1927** A. Warren Stearns
- 1945** Dwight O'Hara
- 1953** Joseph M. Hayman
- 1966** William F. Maloney
- 1974** Lauro F. Cavazos
- 1980** Murray R. Blair Jr. (interim)
- 1981** Robert I. Levy
- 1983** Henry H. Banks
- 1990** Richard M. Ryan Jr. (interim)
- 1992** Morton A. Madoff
- 1995** John Harrington
- 2003** Nicolaos E. Madias (interim)
- 2003** Michael Rosenblatt
- 2009** Harris Berman

 **MY FAVORITE THING ABOUT TUSM . . .**

I felt that I was an individual and was treated as such.

—Richard Binder, M64, A87P

First in the Field

How Charles Dinarello cloned interleukin-1. **BY GENEVIEVE RAJEWSKI**



IN THE THREE DECADES SINCE CHARLES DINARELLO AND HIS TEAM AT TUFTS cloned interleukin-1, there have been numerous discoveries about the molecule's myriad effects in the body—and research on it continues to hold promise for managing difficult-to-treat medical conditions.

One of the first cytokines identified, interleukin-1 (IL-1) is a protein produced by cells that plays a critical role in inflammation, fever, and other ways the body responds to injury and infection. Before interleukin-1 was known by that name, Dinarello set out to learn more about a protein that produced fever in the absence of an infection. He wasn't alone: Researchers in several fields were all searching for the same protein because of its effects on nearly every tissue and organ system.

Brought to Tufts in 1977 by Sheldon M. Wolff, chair of the Department of Medicine, Dinarello continued the research on IL-1 he had started with Wolff while at the National Institutes of Health. In 1979, he and Wolff published an article positing that the fever molecule Dinarello had isolated and the protein that immunologists were hunting were actually one and the same. But, Dinarello recalled, most scientists argued that it was impossible for a single protein to have so many biological properties. The only way to prove it was to clone the molecule so a pure form was available for controlled study. After three years of research, Dinarello and his team reported the first cloning of IL-1 beta in the *Proceedings of the National Academy of Sciences* in 1984.

Dinarello's work on IL-1 "was really the ground floor of a whole new field dedicated to understanding how cytokines control the immune response in people," said Linden Hu, vice dean of research at the School of Medicine. Close to 70,000 reports have been published on IL-1 since 1984, and Dinarello—now a professor at the University of Colorado School of Medicine and at Radboud University in the Netherlands—has received many awards. Upon accepting the Ernst Jung Prize in 1993, Dinarello endowed the Sheldon M. Wolff Professor in the Department of Medicine at Tufts; he used other prize winnings to create the Interleukin Foundation for Medical Research.

IL-1-blocking meds were some of the first biological products for treating rheumatoid arthritis. Today, blocking IL-1 helps treat gout, as well as periodic fever syndromes and other rare conditions. Cardiologists recently found that using an IL-1-blocking medication to reduce systemic inflammation lowered the rate of recurrent cardiovascular events in people—it also appeared to reduce lung cancer incidence. "So often basic science discoveries do not change the way we care for patients," said Edouard Vannier, an assistant professor at the School of Medicine. "Some patients already benefit from Charles' groundbreaking discovery—and the IL-1 saga is far from over."

2000



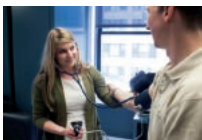
2003
Tufts-trained doctor **RODERICK MacKINNON, M82, HO2**, shares in the Nobel Prize in Chemistry for his work on the selectivity and structure of ion channels.

2008

TUSM and Maine Medical Center partner on the **MAINE TRACK MD PROGRAM** and Tufts forms the **CLINICAL AND TRANSLATIONAL SCIENCE INSTITUTE (CTSI)**.

2010

2012
PHYSICIAN ASSISTANT PROGRAM launches.




2020

2017
The state-of-the-art **MICHAEL JAHARIS JR., M87P, H15, ANATOMY LABORATORY** opens, made possible by a \$15 million gift from the Jaharis Family Foundation.



Connect



At the White Coat Ceremony in September, members of the Class of 2021 received their coats, recited the modern Hippocratic oath (learn more about the oath on page 25), and listened to keynote remarks by Dawn Gross, M96, SK96. Here, Joyce Sackey, dean for multicultural affairs and global health, suits up student Arome Obende.



Students Amir Molaie, Varsha Pramila, Raheem Lawrence, and Nathaniel Mizraki with their new stethoscopes.

For Each Student, a Stethoscope

Thanks to a new program, the Class of 2021 received gifts and notes from the heart.

BY COURTNEY HOLLANDS

IT'S ONE OF the most enduring symbols of modern medicine: the stethoscope. Thanks to the School of Medicine's new Stethoscopes for Students program, alumni, parents, and friends donated \$31,165 to provide the Class of 2021 with their timeless instruments. "It's one of the major tools that physically connects patients to a doctor," said Amy Kuhlik, dean for student affairs at the medical school. "Receiving one's first stethoscope is a rite of passage that all doctors seem to remember and cherish," added Kristin Hill, director of the Fund for Tufts Medicine who oversaw the initiative.

When students opened their stethoscopes at orientation in August, they were touched to find personal notes from the donors

in the boxes. Some included jokes ("I hope they don't ask me to show the student how to use it. I'm a urologist."), others were short and sweet ("Happy heartbeats!!"), and all were, well, heartfelt.

Ahead, check out a few of the handwritten messages that accompanied the stethoscopes.

COURTNEY HOLLANDS, the editor of this magazine, can be reached at courtney.hollands@tufts.edu.

A note from your Stethoscope sponsor:

Richard P. Keeling, M.D.

Next to your mind, your hands, and your heart, a stethoscope is the most basic tool in medicine - use it in good health and with my good wishes.

Richard P. Keeling
M73

Write a note to your student and we'll detach this panel and include it with your stethoscope.

A note from your Stethoscope sponsor:

Alan E. Geller, M.D.

This low-tech device can yield a world of useful information.

Good luck in your new career!

Sincerely,
Alan Geller

Write a note to your student and we'll detach this panel and include it with your stethoscope.

A note from your Stethoscope sponsor:

Kimberly J. Duir, M.D., M80

37 years later and I have never been bored, never been sorry. May you look back in 37 years and be able to say "I have loved this life and all its infinite improbable intimacy." May the force be with you! Love + hope, Kim Duir MD

Write a note to your student and we'll detach this panel and include it with your stethoscope.

A note from your Stethoscope sponsor:

Abigail H. Scully, M.D., M15

Congratulations on starting your journey in medical school! Soak it all in, work hard, and enjoy it. You'll remember the first time you hear a murmur, have a difficult exam etc. - learn from all of your patients and remember all the highs and lows. Best of luck!!

Write a note to your student and we'll detach this panel and include it with your stethoscope.

A note from your Stethoscope sponsor:

Deirdre Burns, M.D., M.P.H., M14, MG14

Good luck on your journey of medicine. What they say is true, your patients will be your greatest teachers. Listen well :)

Deirdre Burns

Write a note to your student and we'll detach this panel and include it with your stethoscope.

A note from your Stethoscope sponsor:

Elizabeth J. Glazier, M.D., M.P.H., J95, M99, MG99
Michael Piesman, M.D., M98

We are so excited to give you this very special first stethoscope. Mike and I are still using our first stethoscopes after 19 and 20 years in practice! Good luck in all of your future endeavors.

Dr. Mike and Liz
198 199

Write a note to your student and we'll detach this panel and include it with your stethoscope.



Berri Jacque listens to a lesson on infectious diseases at East Boston High School.

Teaching the Great Diseases

A Bingham Trust grant will help the Tufts-designed STEM curriculum reach more students. **BY DAVID LEVIN**

MAKING COMPLEX BIOLOGICAL and medical concepts accessible and compelling to young people is a passion for Berri Jacque, director of the Center for Translational Science Education (CTSE) at Tufts.

Since 2009, Jacque and CTSE co-director Karina Meiri have been developing the “Great Diseases” STEM curriculum in collaboration with Boston Public School teachers. Largely funded by the National Institutes of Health and the National Science Foundation to date, the curriculum includes four modules that each span six weeks—infectious disease, neurological disorders, metabolic disease, and cancer—and uses real-world medical examples to explain difficult scientific concepts to high school students.

“You could teach all about biology in a vacuum, or you could teach how it relates to the flu, or to cancer,” Jacque said. “In our curriculum, students learn about molecular dogma—like RNA, DNA, and proteins—in the context of disease.”

And now, thanks to a \$1 million grant from The Bingham Trust, the Tufts-designed “Great Diseases” curriculum will reach even more

budding scientists and empower them to manage their own health.

While CTSE faculty and postdoctoral fellows have been training teachers one-on-one either in person or through online mentoring—about 850 teachers have completed the training so far—these methods aren’t scalable, especially as demand for the content is quickly growing. That’s where The Bingham Trust grant comes in: It will fund the “Teaching the Great Diseases” program, allowing CTSE to enrich the curriculum online and hire three William Bingham 2nd Fellows (as well as a fellows mentor) to both develop content and remotely guide educators around the world through the curriculum’s nuances via online minicourses. Teachers who complete these courses, which are flexible to fit busy schedules, will receive graduate or continuing-education credits—“as far as I know, we are the only medical school with a graduate program specifically designed for teachers who want to teach about health and biomedical sciences,” Jacque said.

“The grant is a massive, transformative contribution that will let us focus on the teaching program itself,” he added. “We plan to chunk topics into minicourses, so teachers can zero in on something for a few days then bring it back to their classrooms.”

The fellows, meanwhile, will be required to conduct original research to gauge how well their processes are working, Jacque said. Ultimately, they will produce publications in peer-reviewed journals related to improving online teaching and learning.

“We’ll provide space for them to become experts on online teaching, so they can bridge the divide between science-speak and education-speak,” Jacque said. “Depending on their career goals, they may go on to work in higher education, and may want to run similar programs of their own, doing nonprofit or STEM-outreach work. We hope to equip them with the skills to do that.”

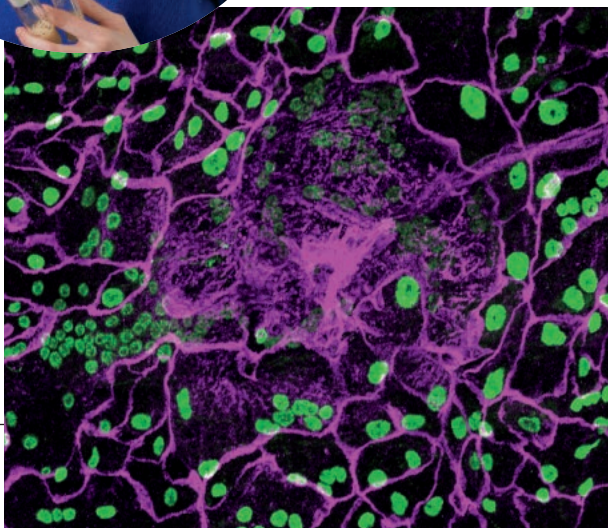
HEALING INSIGHTS

It has long been thought that healing happens primarily through cell division. Vicki P. Losick, SK08, has revealed an alternative player: polyploidy, or cell enlargement. Losick, a scientist at the MDI Biological Laboratory in Bar Harbor, Maine, has found that polyploidy—a condition in which a diploid cell acquires one or more additional sets of chromosomes—can arise in response to injury and repair wounds. To further this research, the NIH's National Institute of General Medical Sciences recently granted her an Outstanding Investigator Award for Early Stage Investigators (about \$1.7 million over five years). "I am thrilled," Losick said. "It's a great honor to have my work recognized."

Her research, conducted on fruit flies, promises to yield a deeper, more nuanced understanding of polyploidy, which has been studied mostly in insects and plants—it drives strawberries, for instance, to become large and plump. In the body, polyploid cell growth has been largely associated with cancer and other degenerative diseases, including heart and liver diseases. But Losick hopes to identify the factors that regulate the creation of these extra-large cells "so we can harness their healing potential" and limit the degenerative consequences, she said.

—LAURA FERGUSON

Vicki P. Losick, top; enlarged polyploid cells are required for wound repair. Epithelial nuclei (green) and epithelial cell boundaries (magenta), bottom.



WHY I GIVE

Jessica Bennett Shah, M10, MG10

A PEOPLE PERSON Shah, a pediatrician at Tufts Medical Center, grew up in the tiny town of Jackson, New Hampshire, graduated from Colby College, and launched a career in a social work. Inspired by doctors she met while working at a women's reproductive health clinic, she set her sights on medical school. "I have always been drawn to advocate for vulnerable people, and that history of service, I think, gave me the potential to be a good doctor."

FIND YOUR SUPPORT A dismal grade on her first biochemistry exam proved a valuable failure. "All of us who did poorly had to meet as a study group—that's where I met some of my best friends! That's what I appreciate about the School of Medicine. It welcomed and supported me as a nontraditional student because it has a holistic view of what it means to be a doctor; you need the science, but it's also about a love of people."

TAKING THE LEAD She chaired her five-year reunion committee and considers the medical school one of her philanthropic priorities. For giving every year since graduation, she is a member of the Dean's Inner Circle. "Your education is your foundation for your life; I certainly would not be where I am today without Tufts." Gifts for financial aid are particularly important, so the school "can attract students from a wide range of backgrounds who want to go into a wide range of fields."

WORLDLY AMBITIONS Shah was asked to join the School of Medicine's volunteer leadership committee for *Brighter World: The Campaign for Tufts*. "When I reflect on my life, I hope that I am a good role model who honors the institutions that helped me succeed; giving back is an important part of my mark on the world." —LAURA FERGUSON



EVERY GIFT COUNTS. Did you know that nearly 75 percent of donors to Tufts give \$250 or less each year? Learn more at giving.tufts.edu.

QUESTIONS OF LIFE AND DEATH

Lessons from writer and surgeon Atul Gawande.

BY COURTNEY HOLLANDS

HOW CAN DOCTORS help their patients better prepare for end of life? It's a question that Atul Gawande grappled with in his 2014 *New York Times* best seller, *Being Mortal*, and explored during his Dr. Maurice Segal Lecture at the Sackler Center on September 15. *Being Mortal* was the Common Reading Book Program selection for all incoming medical students this fall.

In addition to being a surgeon at Brigham and Women's Hospital and a staff writer for *The New Yorker*, Gawande is cochair of the Massachusetts Coalition for Serious Illness Care, which seeks to ensure that medical treatment aligns with patient "goals, values, and preferences at all stages of life and in all steps of their care." The group has reached out to School of Medicine Dean Harris Berman and the state's other medical school deans to collaborate on curriculum changes around these issues. Here are a few things we learned from Gawande's talk.

THE GOAL IS NOT A GOOD DEATH; THE GOAL IS A GOOD LIFE TO THE VERY END

With *Being Mortal*, "I thought I would be writing about the dying process and the choices at the very end about what kind of death you really want," Gawande said. But as he talked to more than 200 patients and their family members, plus scores of geriatricians and other clinicians, he found that "people have priorities that they want us to help them with serving—priorities besides just living longer. They have reasons they want to be alive and things they are alive for."

TALK IS POWERFUL Gawande cited a 2010 study led by Jennifer Temel from Massachusetts General Hospital that followed two groups of stage IV lung cancer patients. In one group, the patients received usual oncology care, while the other received usual oncology care plus visits with a palliative care clinician. The patients who spoke to a palliative care clinician chose to stop their chemotherapy earlier and had a better quality of life. In addition, Gawande said, they spent more time at home, underwent fewer surgical procedures, and spent less time in the ICU. "And the kicker was that they lived 25 percent longer," he said.

CLINICIANS AS COUNSELORS Starting in the 1980s, medical professionals focused on being as informative as possible, Gawande said: "We wanted to give people clarity about what the facts were in their situations and what their options were." But conversations Gawande had made it evident that there's another role: counselor. "The counselor gets really clear with you what your goals are, what your priorities are, what you're willing to sacrifice and not willing to sacrifice," he said. "And then, yes, we talk about the options and make a recommendation based on our experience about what is most likely to succeed in achieving what matters to you."

AUTONOMY MATTERS Gawande interviewed nursing home residents who were miserable because every aspect of their lives—bedtime, mealtime, medication time—was tightly regulated. As one person running a home told him, it was the adult children who, fearing for their parents' safety, usually made the decision to place their parents in nursing homes. "Safety is what we want for those we love, and autonomy is what we want for ourselves," Gawande said. "Well-being is bigger than safety and survival. Our role as counselors ... is not just to make our case for what the longer-term well-being of people is, but to enable autonomy for those choices along the way."



Rachel Reindorf, M21, meets Atul Gawande after his lecture.

PHOTO: ANNA MILLER



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Village Life: Dordogne

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Iceland Panorama

Waterways of Russia

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Island Life in Cuba

For our 2018 catalog or specific trip brochure, please contact us at travel-learn@tufts.edu or 617-627-0633, or visit our website: tuftstravellearn.org



Travel-Learn

ALUMNI ASSOCIATION PRESIDENT

TUSM ALUMNI PITCH IN



AS PRESIDENT OF your alumni association, I had the opportunity to welcome the incoming medical school class last fall. Preparing my remarks, I was a bit shocked to realize—and later tell them—that 50 years had passed since I sat in their seats, excitedly anticipating the journey ahead. Still fresh in my memory are lectures by some of the giants in medicine—Louis Weinstein, Jerry Kassirer, Bill Schwartz, Jane Desforges, Bob Schwartz—and talks by Jack Geiger and Count Gibson about their community health center projects. What a privilege it has

been to be associated with Tufts for more than a third of its 125-year history!

I am continually impressed by the generosity of the Tufts community. Magnanimous parents of a TUSM student offered a \$25,000 grant to the Fund for Tufts Medicine if 250 others donated on Giving Tuesday; true to form, 402 medical school alumni responded, crushing the goal. Donors were in abundance at the ceremony to kick off the

Tufts Brighter World campaign. And the new anatomy lab opened on December 14, thanks to a magnificent gift from the Jaharis Family Foundation, as well as to the many benefactors who gave by naming spaces and tables.

Another hallmark of Tufts alumni is volunteerism. Medical Alumni Association members facilitate

problem-based learning, lead ethics and professionalism discussions, instruct students in medical interviewing and doctor-patient relationships, and open our practices, research labs, and operating rooms to expose students to the range of medical careers. We help out in safety-net clinics via the MAVEN Project, supervise students at the Sharewood Project, and more. This widespread commitment to growing and fostering the TUSM community makes me proud to be an alumna.

Best wishes for 2018—and a happy anniversary to the School of Medicine!

CAROLE E. ALLEN, M71
President, Tufts Medical Alumni Association
tmaapresident@tufts.edu



Save the Date

.....
MAY 4-6, 2018

medicine-alumni@tufts.edu | 617.636.6770
medicine.tufts.edu/reunion

REUNION

TUFTS MEDICINE : 2018



Class Notes



1980

GEORGIA A. TUTTLE, M80, of West Lebanon, N.H., was honored by New Hampshire Governor Christopher Sununu and executive councilor Joseph Kenney with the keys to Lebanon, N.H. Tuttle is the longest-serving mayor in the city's history; she stepped down in March after serving nine years on the City Council—one year as assistant mayor then eight consecutive years as mayor. On May 6, 2016, Tuttle (pictured at center) also became the fifth recipient of the Josiah Bartlett Award at the New Hampshire Medical Society's 225th anniversary celebration.

1984

CANDACE L. SLOANE, J80, M84, of Needham, Mass., was appointed to a third term on the Massachusetts Board of Registration in Medicine by Governor Charles Baker.

In addition, on September 15, the Massachusetts Medical Society honored Sloane with the Woman Physician Leadership Award at its annual Women in Medicine event.

1987

POWEN HSU, A83, E83, M87, of Manchester, N.H., joined Alice

Peck Day Memorial Hospital's new physiatry program, treating patients with chronic pain and physical impairments and disabilities.

1991

AMY JAWOREK, M91, of Thorndike, Mass., joined Harrington Physician Services in Charlton, Mass. Jaworek, an infectious-disease specialist, will also perform inpatient consultations at Harrington Hospital in Southbridge, Mass., working collaboratively with Harrington's Infection Control Department.

2000

ATHENA M. COUNTOURIOTIS, M00, of San Diego, was appointed to the Board of Directors at Trovagene, Inc., a precision-medicine biotechnology company.

2001

RAHUL SHARMA, M01, of New York, and his Emergency Department Telehealth Express Care Service team won Emergency Care Innovation of the Year from George Washington University School of Medicine & Health Sciences.

2006

PASCAL DABEL, A02, M06, of Los Angeles, is now a member of the International Association of HealthCare Professionals and will appear in *The Leading Physicians of the World* directory.

2011

JOSEPH B. COHEN, M11, of Chicago,



joined the orthopedic team at Loyola Medicine.

2012

SARAH A. FAVILA, M12, of Modesto,

Calif., joined Dignity Health Medical Foundation, a non-profit public-benefit corporation based in San Francisco.

2013

AMEER T. SHAH, A07, M13, and **REENA M. SHAH, E06**, of Boston, are excited to welcome their little Jumbo, Aayan Shah (pictured), to the world.

2014

BECCA M. WOOD, M14, of Eagle Lake, Maine, joined the internal medicine practice at New London Hospital in New London, N.H.

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2015

EMILY W. FRANK, M15, of San Francisco, received the Organization of Resident Representatives Community Service Award at the Association of American Medical Colleges' Learn Serve Lead 2017 annual meeting in Boston in November for her "contributions above and beyond the rigors of residency training to improve the local communities surrounding their training institution." Emily also received the 2017 Anne E. Dyson Child Advocacy Award, which is given to pediatricians-in-training for their distinguished efforts in improving children's health in their communities. (Learn more about Frank's work on page 7.)

RYAN M. KRING, A11, M15, of Brookline, Mass., announces his engagement to Rebecca Dillaway. Rebecca is the daughter of Lance and Beverly Dillaway, of Weston, Mass.; Ryan is the son of Drs. Roy and Shirley Kring, of Bedford, Mass.

2016

ALEX DE CASTRO-ABEGER, A11, M16, and **ARISSA C. YOUNG, A11, M17**, of Nashville, Tenn., tied the knot on May 28 in Los Angeles with many Jumbos in attendance (pictured).

RAINA M. MILNE, M16, of Boston, and **JARED R. WORTZMAN, MG12, M16**, of Stoughton, Mass., were married on September 16 in the Berkshires.

In Memoriam

JAMES R. BOYNTON, M71
June 29, 2017
Rochester, New York

ARTHUR D. BRAMBLE, M48
July 12, 2017
Ware, Massachusetts

CLARENCE BROWN, M49
September 30, 2017
Natick, Massachusetts

ANDREW O. CARPENTER, MG15
June 2, 2017
West Hartford, Connecticut

JAMES F. COLLINS, M74
July 9, 2017
West Islip, New York

JOSEPH C. DOWNS, M54, M84P
July 31, 2017
Camano Island, Washington

PAUL L. DRATCH, M64
October 5, 2017
Lexington, Massachusetts

LEROY L. ELDRIDGE JR., M45
October 5, 2017
Hingham, Massachusetts

CYNTHIA J. FAY, M77
October 26, 2017
St. Paul, Minnesota

JAMES S. FISHLER, M48
September 26, 2017
Poughkeepsie, New York

DAVID A. FOLLETT, M64, J97P
September 29, 2017
Bronx, New York

MORRIS FRIED, A46, M50
October 5, 2017
Boynton Beach, Florida

GEORGE D. GOLDMAN, A53, M57
September 4, 2017
Dedham, Massachusetts

GEORGE M. HAZEL, M59
June 1, 2017
Wakefield, Massachusetts

ROBERT M. JOHNSON, M45
July 1, 2017
Worcester, Massachusetts

LEON LANE, M67
September 8, 2017
Atlanta, Georgia

PHILIP C. LARKIN, M50
August 19, 2017
White Plains, New York

BRIAN K. LEWIS, SK71
July 27, 2017
Sarasota, Florida

ARTHUR S. LURIE, A49, M53, J85P, A90P
July 11, 2017
Peabody, Massachusetts

DOUGLAS J. MARCHANT, A47, M51, A81P, A84P, SK91P
October 9, 2017
Maynard, Massachusetts

PHILIP L. MCCARTHY, M47, M82P, J83P, A85P
July 8, 2017
Hingham, Massachusetts

WILLIAM M. MCDERMOTT JR., A51, M58, AG54, A84P
June 6, 2017
Falmouth, Massachusetts

DANIEL MOORE JR., M53
June 25, 2017
Providence, Rhode Island

ROSAMOND MURDOCK, J53, M58
August 24, 2017
Billerica, Massachusetts

ERNEST F. PECCI, A53, M61
November 2, 2017
Walnut Creek, California

MARIO L. PEREIRA, M01
November 11, 2017
Apollo Beach, Florida

JOHN M. RILEY, M55
July 5, 2017
La Jolla, California

HOWARD F. ROOT, M55
July 11, 2017
Mystic, Connecticut

EUGENE D. ROTHENBERG, M57
July 29, 2017
Clearwater, Florida

MARTIN R. SANTIS, A58, M62
June 16, 2017
Acton, Massachusetts

ARTHUR J. SCHRAMM, M51
August 1, 2017
Lexington, Massachusetts

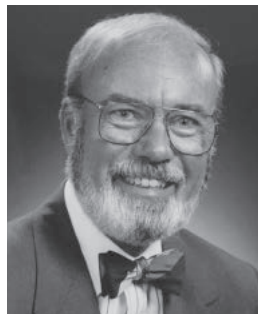
ROBERT L. SCRIBNER, M54
September 16, 2017
Salem, Massachusetts

LAWRENCE J. SHOLLER, M57
October 24, 2017
Minneapolis, Minnesota

GEORGE A. SNOOK, M52
November 4, 2017
Northampton, Massachusetts

DANIEL TASSEL, A50, M54, J83P
October 23, 2017
Lincoln, Massachusetts

DOUGLAS J. MARCHANT, A47, M51



A LONGTIME RESIDENT of Wayland, Mass., Marchant transformed the medical world's approach to women with breast disease. He died October 9 at age 91.

A professor emeritus in obstetrics and gynecology and surgery, Marchant taught at the School of Medicine for 35 years and established the multidisciplinary Tufts Breast Health Center—one of the first centers of its kind in the United States—at Tufts Medical Center in 1978.

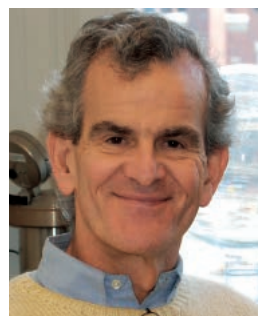
"He was visionary," said John K. Erban, M81, a senior medical oncologist and clinical director of the Cancer Center at Tufts Medical Center. "He brought together

specialists from all aspects of patient care under one roof, and that was totally novel. He saw the value of forming a team that put the patient at the center of everything that they did."

Marchant, who received the Distinguished Faculty Award from Tufts, trained hundreds of medical students. After stepping down from positions at the School of Medicine and Tufts Medical Center in 1992, Marchant established a Breast Health Center at Women and Infants Hospital in Providence, R.I., before retiring in 2002.

He is survived by his wife, Juliette; five children—including Jeffrey Marchant, SK91, associate director of the Department of Medical Education and a research assistant professor of immunology at Tufts—and six grandchildren.

DAVID THORLEY-LAWSON



A PROFESSOR OF integrative physiology and pathobiology at Tufts School of Medicine, Thorley-Lawson, Ph.D., died June 25, in Cambridge, Mass. He was 68 and is survived by his wife, Brigitte Huber, the immunology program director at Tufts.

Thorley-Lawson completed his doctorate under Michael Green at the National Institute for Medical Research in England, and after moving to Massachusetts, continued his training as a postdoctoral researcher at the Dana-Farber Cancer Institute.

He spent 35 years at Tufts investigating Epstein-Barr virus (EBV), an important human tumor virus, which is closely associated with several types of lymphoma. Perhaps his most important work was characterizing, at the level of single infected cells, precisely which viral genes are expressed in specific cell populations. He correlated these findings with patterns of gene expression produced by different lymphomas to provide evidence supporting a causative link between EBV and tumorigenesis. He also developed an elegant model for EBV latency and persistence in the infected host.

Over his career, Thorley-Lawson trained more than 30 students and mentored many others. A daylong symposium at Tufts honoring his memory is planned for April 27 and will include talks centered on host/pathogen interactions.

Remembering John Harrington

A leading kidney specialist, he helmed the Tufts University School of Medicine from 1995 to 2002. **BY LAURA FERGUSON**

JOHN T. HARRINGTON, dean emeritus of the School of Medicine and a leading kidney specialist, died on October 31 at the age of 80. Harrington held the top post at the school from 1995 to 2002.

A gifted nephrologist, Harrington was appointed professor of medicine in 1979 and would go on to inspire countless students, young doctors, and colleagues and win teaching awards 10 times.

“John was a deeply admired teacher and mentor,” medical dean Harris A. Berman said in an email to the Tufts community. “His work as an acid-base physiologist, author, physician, and teacher touched many lives, from the patients he treated and colleagues he worked alongside, to the many physicians he taught during his career at Tufts.

John’s enthusiasm, dedication, and love for teaching were evident with every student he encountered.”

Born and raised in Fall River, Massachusetts, Harrington graduated from Holy Cross College in 1958 and Yale University School of Medicine in 1962. After a residency at the University of North Carolina in Chapel Hill, he pursued further training at Tufts-New England Medical Center (precursor of Tufts Medical Center) in the nephrology division from 1965 to 1968. Following a short tenure at Boston University School of Medicine, he returned to Tufts-NEMC to join its Division of Nephrology.

During the next 20 years, he was a cornerstone of the division’s clinical training and research programs. He developed the medical center’s hemodialysis, peritoneal dialysis, and renal transplant programs, and he served as director of the hemodialysis unit and administrative director of the intensive care unit.

Harrington served as chief of general medicine at Tufts-NEMC from 1981 to 1986, followed by eight years as chief of medicine at Newton-Wellesley Hospital, a Tufts teaching affiliate. In 1994, he was appointed academic dean at the School of Medicine and became interim dean the following year and dean in 1996.

He was a member of the editorial board of the *New England Journal of Medicine* and editor of “Nephrology Forum” in *Kidney International*; the forum served as an

invaluable resource of information and perspective for nephrologists around the world for more than 25 years.

In his eight years as dean, Harrington made a major mark on the medical school, strengthening its financial resources and expanding its research base—an enterprise that included the construction of the Jaharis Family Center for Biomedical and Nutrition Sciences, the first new research center built at the medical school.

University Professor emeritus and former provost Sol Gittleman said Harrington significantly advanced the medical school with his signature energy and optimism. “He tirelessly pursued the building of a world-class research facility,” said Gittleman. “He was the right dean of the medical school at the right time, when

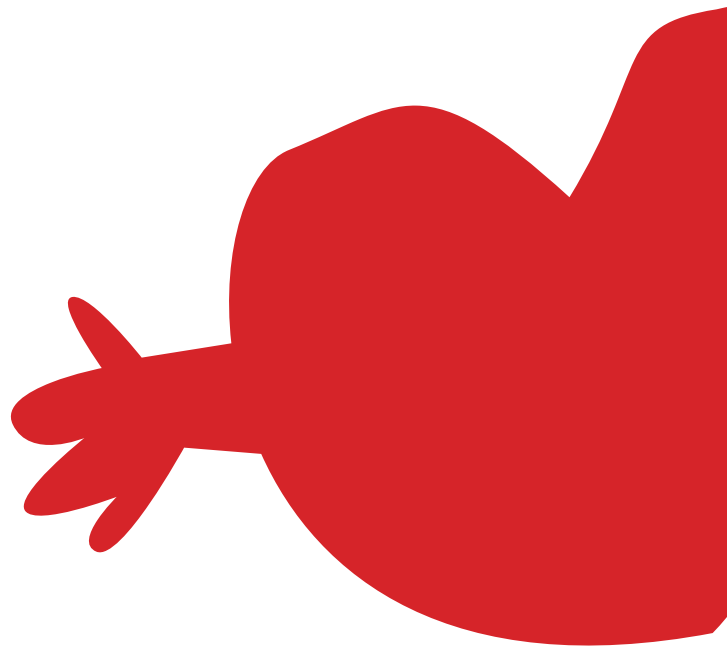
the school needed a steady hand. He was also a terrific clinical doctor. He was a doctor’s doctor—doctors went to him!”

Gittleman noted that Harrington also created important and stronger relationships with each of Tufts’ affiliated hospitals. “That the New England Medical Center chose to place ‘Tufts’ before its name is a fitting tribute to John’s professionalism, interpersonal skills, and disarming Irish charm,” he said, adding he recalled how much Harrington loved Ireland. “He used to keep two books in multiple copies in his office to give as gifts, both by Thomas Cahill: *How the Irish Saved Civilization* and *The Gift of the Jews*—and I got both.”

In honor of Harrington’s 70th birthday, Tufts Medical Center in 2006 created the Dr. John T. Harrington Endowed Fund, in recognition of his vital role in Tufts Medical Center’s Division of Nephrology. The fund supports the continuing medical education of physicians, both young and more senior, caring for patients suffering from kidney disease.



Remembrances may be made to the Tufts University School of Medicine Development Office, 136 Harrison Ave., Boston, MA 02111. Gifts may also be made to the John T. Harrington, M.D. Scholarship at the School of Medicine at go.tufts.edu/harrington.



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Maine Attraction

One of the first Maine Track graduates shares why she's committed to rural care. **BY MARYA GOETTSCHKE SPURLING, M13**

IT SEEMS LIKE just yesterday that my class of 32—the first class to graduate from Tufts' Maine Track Program—was getting off the boat at Cow Island in Casco Bay for team-building orientation. Eager and nervous, we shared tents and built makeshift rafts together, quickly becoming a family that went on to support each other through the marathon of medical school. When we finally reached commencement and scattered near and far toward our next steps, we vowed, “See you back in Maine!” Today, nine of my 14 classmates who have completed their residencies have made good on that promise and are now practicing in the Pine Tree State.

I trained in many rural parts of the state, from the western Maine town of Norway to Fort Kent, on the northern border with Canada. The one-on-one instruction I received from my attending physicians was invaluable. But beyond clinical knowledge, I gained perspective. Medical students and residents are often expected to pursue opportunities at high-resource, technically advanced medical centers; competition and pressure can be fierce. This training prepares physicians to practice in similar settings (larger cities rich in specialty care and the latest innovations) and not in small community hospitals and rural clinics—a pipeline that doesn't address the needs of the resource-poor parts of the country in dire need of improved access to medical care, which represents much of Maine.

After finishing my residency in Alaska—mostly in Anchorage, with turns in rural and bush settings—I began practicing full-spectrum family medicine in Skowhegan, Maine, in October 2016. I'm employed by an independent, critical-access hospital, and my patients

range from prenatal to 95 years old; I even care for five generations of one family! Though I predominantly see people in my office, I also oversee all aspects of my patients' care. If someone goes into a nursing home, I attend to him there; if another person goes into labor, I deliver the baby at the hospital, and so on.

Somerset County is a challenging place to work: One-quarter of the children in our county are living below the federal poverty level, and unemployment rates are tied for highest in the state. Our health outcomes as a whole are the third lowest in the state, and there are fewer health-care workers per capita in our county than the state average. But it's not all grim. In my short time as a physician in the community, I've witnessed several health triumphs, including a patient who altered his lifestyle to reverse diabetes and a father struggling with drug addiction who sought and stuck to a treatment plan to regain custody of his children. On the state level, Maine just approved a ballot measure to expand Medicaid, which will allow physicians to better serve more of the population.

What I like about primary care is the long view—seeing an individual or a family over time, observing health changes and illnesses progress or regress—a view that is so often obscured by the daily frustrations of our current health-care structure. My hope for the future is that doctors and patients will work together to create a truly equitable system offering high-quality care to all, and that Maine will continue to raise, train, attract, and retain dedicated physicians in the places where they are needed most.

MAINE NATIVE MARYA GOETTSCHKE SPURLING, M13, grew up on Little Cranberry Island—which has a year-round population of around 70 residents—and now works for Skowhegan Family Medicine, a department of Redington-Fairview General Hospital.



“With my gifts to Tufts,
I’m honoring Jesse and supporting
a cause that matters to us both.”

After attending the University of Michigan, Jesse Garber received his M.D. from Tufts University School of Medicine in 1941. His wife, Donna Garber, knew that her husband held a special regard for the school where he spent those formative years. “Jesse felt tremendous gratitude to Tufts,” she says, “and my gifts to the medical school are a way of honoring him. He was a very generous person, and this became a way to extend his legacy.”

Donna and Jesse married later in life, after each had raised a family, but they met much earlier, under rather special circumstances: Jesse, who was an OB/GYN, happened to be the doctor who delivered Donna’s first child, Linda Ellman, and his name appears on Linda’s birth certificate as the attending physician.

During his lifetime, Jesse established a charitable gift annuity to provide Donna with a supplemental income stream during her lifetime, and it will ultimately support scholarships for Tufts medical students. In addition, Jesse named the medical school as one of the remainder beneficiaries of his trust. Medical education is also a charitable priority for Donna and, after Jesse passed away, she made a gift to establish the Garber Family Endowed Scholarship.

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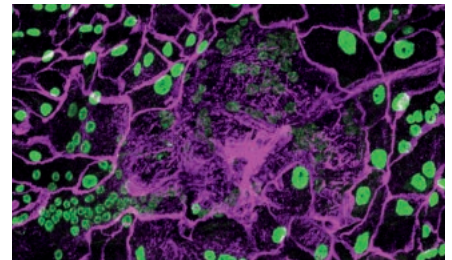
➔ Change of address? Questions? Email courtney.hollands@tufts.edu.



5 Body of Work



6 An Eye to the Future



31 Healing Insights



LEADING THE CHARGE

Spurred by the staggering poverty among African-Americans in the Mississippi Delta in the mid-1960s, Dr. H. Jack Geiger (left) and Tufts created the country's first community health centers—and launched a movement. [FOR MORE ABOUT THE STORY, TURN TO PAGE 16.](#)