

Tufts

Medicine



A CHANGE OF FOCUS

Considering where our patients
live, work and play



RIDING THE WAVE

He was a kid growing up in Newton, Massachusetts, with nary a breaking wave in sight. But one summer when he was 17 or 18, he came across a discarded surfboard during a summer vacation on Cape Cod. That lit the spark. Thirty-some years later, Andrew Nathanson, '90, carries a reputation among surfers as a physician who both surfs avidly and has made himself into something of an expert on the physical maladies that go with the sport.

Nathanson is co-author of *Surf Survival: The Surfer's Health Handbook*, published in 2011. He appears regularly at surfing conferences around the world as an easy-going and authoritative medical voice. For his regular job, he is a clinical professor of emergency medicine at the Alpert Medical School at Brown University.

Despite its reputation, surfing is safer than soccer for the average person, Nathanson contends. Even with big waves, it's about equal to college football in its risk level. The most common surfing injuries by far, he says, are lacerations that come from being whacked by your own surfboard.

Our guy lives in Bristol, Rhode Island, and gets out on the water around Little Compton four or five times a month in all weather. New England surfing has boomed over the past few decades. Wetsuits have improved, for one thing. Now, says Nathanson, "if we get good waves in February, there'll be 30 or 40 guys out there on the water." Luckily, the doctor has managed to stay ahead of the crowds by venturing farther and farther afield, to Mexico, Costa Rica, Peru . . .

Oh, and Hawaii, too. "My wife, Cheryl, is Hawaiian, so we go there every so often. That was strategic on my part," he says with a laugh.

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A DIFFERENT ERA IN MEDICINE

As I got into Constance Brinckerhoff's article about her family ("Father, Brother, Son," Summer 2014) and read how her father, Maurice Kamm Lurensky, '37, changed his last name to Laurence, I immediately knew, even before she noted his office was in Swampscott, Massachusetts (on Humphrey Street!), who it was.

My father, Elliot Strauss, '43, was one of the first, if not first, cardiologists up in the Lynn area.

He and Maury Laurence were best friends.

I can still remember going to Dr. Laurence's office for a physical before I went off to Bowdoin for college. We chatted about my folks and my plans, while he did the full history, review of systems and exam. It was all very relaxed and leisurely—I thought because I was the son of a good friend. When I left, I realized it had only taken 20 minutes, but I had had his full attention throughout. My father was a cardiologist, but when I was in medical school, I realized he had a number of patients for whom he booked appointments just so they could come in and talk. He was their therapist. Truly these men were from a different era in medicine.

I also enjoyed the article on Louis Weinstein ("The Boss Who Barked,"

Summer 2014). I remember being a third-year student and one evening walking through the hospital corridor with my wife-to-be, who had heard me gush about Dr. Weinstein. Around the corner comes a short, rotund physician in a white coat. I whispered, "That is Louie Weinstein," only to hear her respond in a louder voice, "THAT'S Louie Weinstein?" We ducked around the corner.

WILLIAM E. STRAUSS, '72
MARBLEHEAD, MASSACHUSETTS

The article about Dr. Maurice Laurence, '37, hit a home run with me. I, too, was raised in Swampscott, Massachusetts, and Dr. Laurence was the revered and respected physician for my family.

I remember vividly his kindness and empathy to us at the time of my father's death. I also remember when I was home on vacation at the end of my first year of medical school (Georgetown), that he invited me to make rounds with him at Lynn Hospital. I was impressed, but not surprised, not only at his expertise but also at his ability to relate to his patients. It was with him that I saw my first surgery and my first delivery.

LEONARD F. SMITH, M.D.
CLINICAL PROFESSOR EMERITUS,
OBSTETRICS AND GYNECOLOGY
TUFTS UNIVERSITY SCHOOL OF MEDICINE

OUR NEW LOOK

Generally speaking, I'm not the kind of person who likes rearranging furniture in a room, but I do tend to see the value of such changes, once made. You will notice a slight rearranging of editorial furniture in the pages of our magazine. I hope you like the results. The underlying mission hasn't changed at all. We're still in the business of providing you with thoughtful reporting and timely updates on your beloved alma mater—we've just added some oxygen to the room. We've broken up a few of the compartments at the back of the magazine and merged them into a new section called "From All Corners," for example. Please let me know your impressions.

BRUCE MORGAN, EDITOR, Tufts Medicine, bruce.morgan@tufts.edu

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Medical Editor **JOHN K. ERBAN, '81**

Editor **BRUCE MORGAN**

Editorial Director **KAREN BAILEY**

Design Director **MARGOT GRISAR**

Designer **BETSY HAYES**

Contributing Writers
BRENDA CONAWAY, MARJORIE HOWARD, RICH MANCHANDA, M.D./M.P.H., '03, JACQUELINE MITCHELL, MIRANDA ROGERS, '17, HEATHER STEPHENSON

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CHANGES NEAR AT HAND



BASED AS WE are on an academic calendar, fall always has something of a special feeling to it. Like students all over the country, we return to school with high hopes for whatever the coming year may entail. In effect, we enter a classroom that's been spruced up and made new.

This year is no different. A series of improvements to the Boston campus should give us a better return on our collective efforts to master the challenges of science and medicine and advance our research. When we make these moves, they reflect a vision. You may recall that it was only a few years ago, in 2009-10, that we rebuilt the Sackler Center from top to bottom to meet the needs of our new curriculum.

Let's consider two recent examples. Over the summer, the medical school received permission from the Boston Public Health Commission to open the Arnold 8 Biosafety Laboratory. This is a newly configured research facility that will investigate better ways to detect, prevent and treat tuberculosis.

For a veteran infectious-disease specialist like me, I'm happy to see our focus in this area. The World Health Organization estimates that TB infects as many as one in three people. As you may know, we have seen a rise in drug-resistant forms of TB in recent years, and contemporary medicine needs to come up with smart new strategies to meet this resurgence.

Our 1,700-square-foot lab is located within the medical school's Biomedical Research and Public Health Building on Harrison Avenue. Among the leading scientists based in the new space is Bree Aldridge, who will tap her combined skills in microbiology and engineering to uncover the survival strategies of the

bacterium that causes TB. The goal is to find faster, simpler, more effective treatments.

That's one real-world problem we are tackling head-on.

Another facet of our ambition is reflected in our effort to develop therapies for Alzheimer's and Parkinson's diseases. Along those lines, in July 2013, we struck a three-year deal with AstraZeneca, the global pharmaceutical firm based in Britain, to pursue joint research in neuroscience. Under the terms of the deal, we have assembled a team of neuroscientists, led by Professor Stephen Moss, to partner with AstraZeneca investigators who are exploring neurological pathways involved in brain disease.

Personal relationships were the basis for the AstraZeneca initiative and give us an excellent chance of success. Both Moss and Phil Haydon, chair of our Department of Neuroscience, who will be actively involved in the research, have enjoyed good prior research relationships with the company's current executives when all of them were in previous positions in Britain.

Finally, I'd like to end with a brief comment on the new signage that has sprung up around our health sciences campus. The medical school first moved to this downtown Boston location in 1950, reclaiming former factory and warehouse space where we could get it. We have been largely invisible to the general public since then, owing to our lack of prominent signs declaring who we are and the relative shortage of maps showing visitors how to get around on our campus.

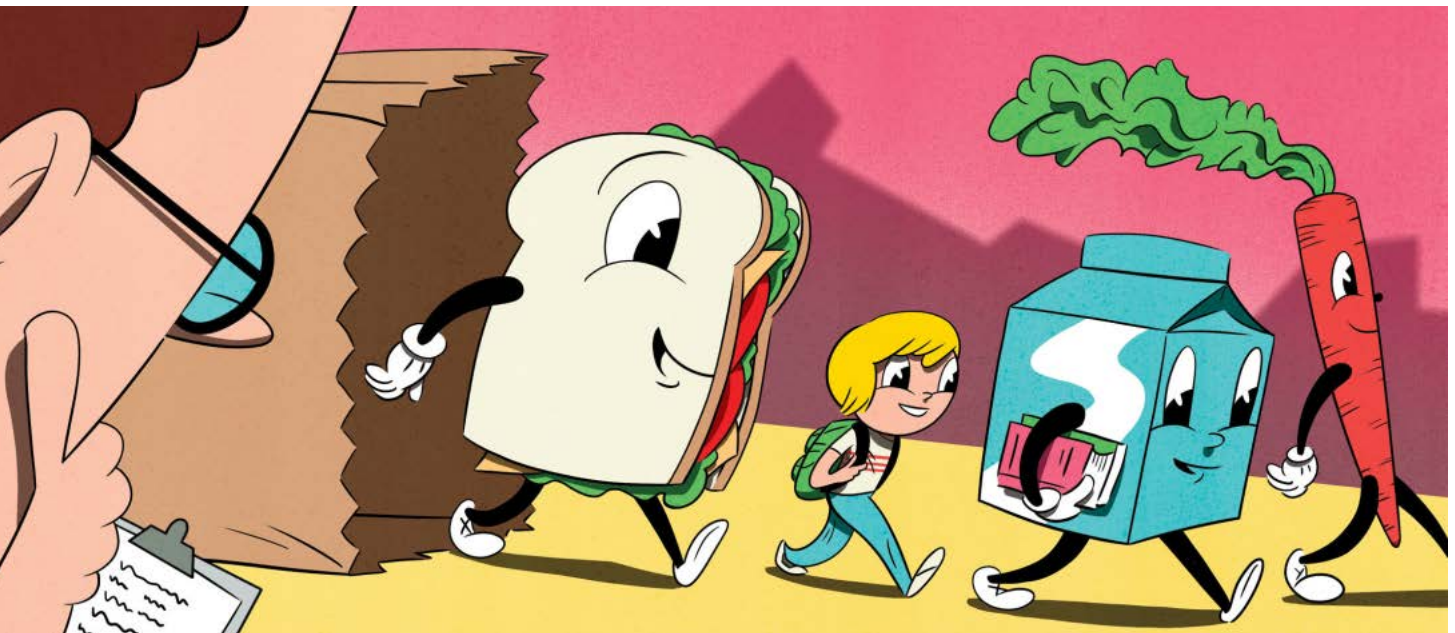
That has changed. The campus now has a new system of signs and maps, raising our visibility (see "Lost and Found," page 27). I invite you all to swing by the medical school and take note of the difference.

Wishing you and yours a happy holiday season.

A handwritten signature in black ink that reads "Harris A. Berman".

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

Pulse



What's in the Bag?

Students' lunches packed at home are heavy on snacks and sugar

KIDS HAVE BEEN bringing bag lunches to school forever. In 2014, in fact, more than 40 percent of kids brought their lunch on any given day, according to data from the U.S. Department of Agriculture's Food and Nutrition Service. But lately there's more societal concern than ever about the nutritional content of those midday meals. What exactly is in those brown paper bags?

A recent study led by Jeanne Goldberg, G59, N86, a professor at the Friedman School, was among the first to investigate the kinds of food that U.S. schoolchildren routinely bring from home. The Tufts researchers looked at lunches of third- and fourth-graders in 12 Massachusetts schools and assessed how the contents stacked up against National School Lunch Program (NSLP) and Child and Adult Food Care Program (CAFCP) standards. These are federal guidelines that promote healthful diets, including foods from five categories: vegetables, fruits, whole grains, lean protein and dairy.

Most food brought from home failed to meet the mark. The majority of kids had a sandwich, a bottle of water and some packaged snack

food in their bags—not too bad, right? But just 11 percent of lunches contained vegetables, and only 17 percent contained a dairy item. A mere 3 percent of kids brought milk along as a beverage (another 11 percent planned to buy their milk at school). Nearly a quarter of the lunches included a sugar-sweetened drink.

All in all, just over a quarter of the home-packed lunches met three of five NSLP standards, and only 4 percent met two of four CAFCP guidelines. "Parents serve a lot of packaged foods," Goldberg notes. "At the extreme, there were kids whose lunches contained four or five packages of snack foods with nothing at the core."

Enough with the Demons

Robin Williams' much-remarked suicide in late summer prompted the usual talk of a person struggling with "personal demons." In a letter published in the *New York Times* on August 13, Ronald Pies, clinical professor of psychiatry at the medical school, noted that this recurrent terminology should be more carefully considered because of its likely interpretation.

"While the 'struggle with demons' metaphor may be helpful for some people dealing with depression, it may also invite the unfortunate conclusion that the person has 'given in' to her 'personal demons' owing to a weak character," Pies wrote. "This could discourage the diagnosis of a highly treatable illness that has complex biological, psychological, social and cultural causes."

AH, YOUTH...

"PARENTS ARE OFTEN shocked when I tell them that children reduce our stress, but it's true . . . particularly for grandparents," Roger Landry, '72, recently wrote in the online edition of *U.S. News & World Report*.

Without all the stress of imposing discipline and order that goes with parenting, older adults have a chance to experience what Landry calls "the juxtaposition of unbridled optimism and experiential skepticism, of boundless energy and growing fatigue, of curiosity and experience, and of innocence and wisdom. The result of this recipe is not always predictable, but it is healthy, satisfying and stress reducing."

Landry, who is the author of the book *Live Long, Die Short: A Guide to Authentic Health and Successful Aging* (Greenleaf, 2014), lamented that the shrinking of village society in recent years has left many older adults disconnected, "either because they have no grandchildren of their own or they live too far away."



ONE GOOD DEED



Professor of Psychiatry Lewis Cohen, who works with the Psychiatric Consultation Service at Baystate Medical Center, the western campus of Tufts Medical School, has been chosen to receive the prestigious 2014 Eleanor and Thomas P. Hackett Memorial Award from the Academy of

Psychosomatic Medicine. The award recognizes his outstanding achievement across an entire career in psychosomatic medicine, in training, research, clinical practice and leadership. Warmth, humor and intellectual curiosity are among the personal traits valued in the award recipient.

"This is a great honor for Dr. Cohen, as well as for Baystate," said Benjamin Liptzin, chair of the Department of Psychiatry at Baystate. "It is especially fitting since [Cohen] trained and worked with Dr. Hackett."

Cohen is director of Baystate's Renal Palliative Care Initiative.

DUAL PATHOLOGY HONORS

Barbarajean Magnani, pathologist-in-chief at Tufts Medical Center and professor and chair of anatomic and clinical pathology at the



medical school, has earned two major awards in her field. She was honored with the Gene

and Jean Herbek Humanitarian Award and the Distinguished Patient Care Award by the College of American Pathologists (CAP) at its annual conference in Chicago this fall.

“The humanitarian award recognizes Dr. Magnani for her unflagging leadership, compassion and dedication to providing women in underserved communities with direct patient service and health screenings through the See, Test & Treat program,” said CAP Foundation President Lewis Hassell at the ceremony. During a See, Test & Treat effort, women receive a pelvic and breast exam, a Pap test with same-day results, a mammogram with same-day or otherwise prompt results and connection to follow-up care.

Magnani’s CAP award for patient care recognizes her expertise in toxicology, as well as “her success in improving pain management and patient care.”



DECODING THE ITCH

PEOPLE WORRY WHEN certain parts of their bodies start itching. That’s just the nature of things, and it’s understandable, Alan Rockoff, assistant clinical professor of dermatology, observed recently in *Psychology Today*.

An itch can be just an itch, or it may be something more. “Many times what bothers people is not the itch itself but what the itch might mean. Cancer, for instance,” Rockoff wrote. “If you scan the Internet, you’ll get the idea that a mole that itches can be trouble. Well, maybe it can, but I don’t remember the last time I saw an itchy mole that actually was trouble. I spend a lot of my days reassuring people that the itchy spot they’re worried about just got irritated or rubbed and doesn’t need to be taken off.”

The cause of most scratching is harmless, says dermatologist Alan Rockoff.

New spots and freckles and all “those nasty barnacles we collect as we age” tend to make people especially uneasy, Rockoff says. Signs of change and maturation in the body naturally perturb the mind. “People troop in all the time complaining, ‘My back itches,’” the doctor relates. “[But] what they’re really wondering is, ‘What the devil is going on back there?’ For most of them, my answer is, ‘Not much. Forget about it.’

“My profession is good at asking certain questions about itch: Which diseases cause it, what caliber of nerve fibers carry itch impulses, what treatments blunt it. These are good questions, but often they’re not the most important ones—to the patient who itches.”

“I have had the privilege to meet people who taught me a lot about life, how to live it and how to leave it. In this book I share all that.”

Retired radiation oncologist Stuart Gilbert, '66, author of *When You Hold a Patient's Hand . . . Don't Wear a Glove* (2014)

WORLD TOPPERS

This fall, five Tufts researchers were named to Thomson Reuter's 2014 list of the World's Most Influential Minds, based on how frequently their work was cited by others between 2002 and 2013. The researchers included Jeffrey Blumberg, Bess Dawson-Hughes, '75, David Kaplan, Andrew Levey and Dariush Mozaffarian.

BLUMBERG is a professor at the Friedman School of Nutrition Science and Policy and director of the Antioxidants Research Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA) at Tufts. His research has focused on antioxidant nutrients.

DAWSON-HUGHES, '75, an endocrinologist, is director of the Bone Metabolism Laboratory at the HNRCA. Her areas of expertise are metabolic bone disease, calcium and vitamin D nutrition and osteoporosis.

KAPLAN is the Stern Family Professor of Engineering and chair of the Department of Biomedical Engineering. His research focuses on biopolymer engineering and regenerative medicine.

LEVEY is a professor of medicine and chief of the William B. Schwartz Division of Nephrology at Tufts Medical Center. He is involved with research groups at Tufts and around the world studying ways to gauge kidney function and better understand the burden of chronic kidney diseases.

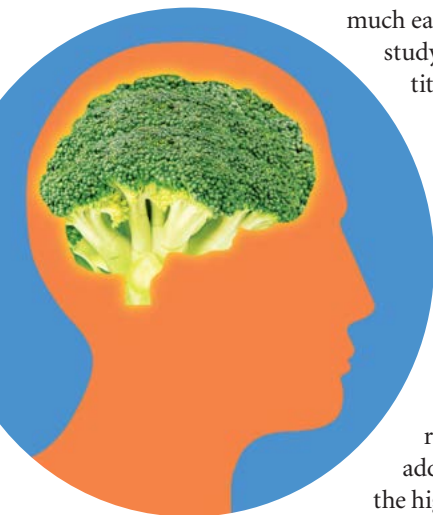
MOZAFFARIAN is dean of the Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy at Tufts. A cardiologist and epidemiologist, he has done research on the links between lifestyle and heart disease.

Broccoli on the Brain

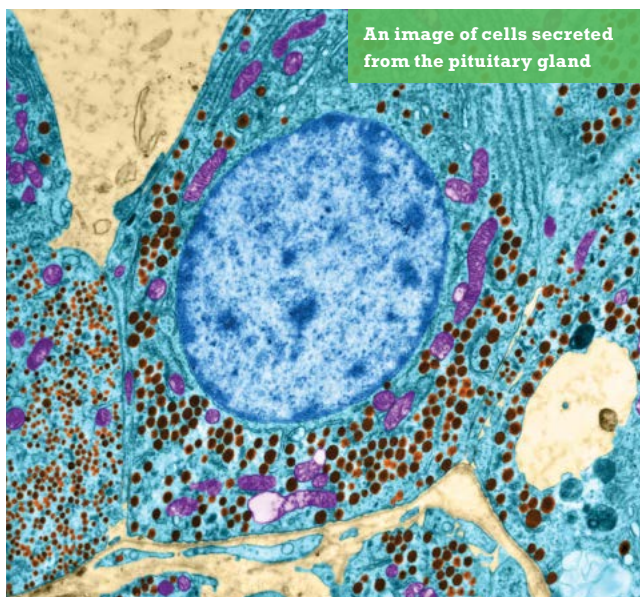
PEOPLE TEND TO assume that they were born with a hunger for high-calorie junk food, because it's so much easier for us to turn down a serving of broccoli than a batch of french fries. But a small study done at Tufts this fall, published in *Nutrition and Diabetes*, showed that our appetites are formed in response to learned behavior.

“This conditioning happens over time,” says Susan Roberts, director of the Energy Metabolism Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging. Once established, patterns can last a lifetime. To determine if the same process of conditioning can train our brains to select healthy food, Roberts' team studied 13 overweight and obese men and women, eight of whom were already enrolled in a weight-loss program at Tufts and five of whom were in a control group.

Participants in the weight-loss program were put on healthier diets at the same time they were being educated about better food choices. The idea was to build up an association in their minds between healthful foods like broccoli and living a better life. Results after six months were impressive. MRI brain scans of the test subjects revealed changes in the area of the brain reward center associated with learning and addiction, showing an increased sensitivity to healthy choices and decreased sensitivity to the high-calorie options the study subjects formerly craved.



Research



POTENTIAL LIVER CANCER BREAKTHROUGH

An obscure finding from the 1940s leads researcher to a hormone that may help prevent the disease

BY MICHAEL BLANDING

IN THE BATTLE of humans versus disease, the latter usually gets the upper hand in the end. For patients with terminal diseases, the pace of biomedical research can seem glacial. It takes years—if not decades—to understand how disease spreads in the body and to develop a drug to treat it. Then there are countless more years of testing in the lab and animal studies before a drug can be approved for clinical trials in humans.

So it's as exciting as it is rare when a breakthrough occurs that may lead to more immediate relief for patients. Such may be the case with liver cancer, thanks to research by Arlin Rogers, an associate professor and head of pathology at Cummings School of Veterinary Medicine at Tufts, who has found that prolactin, a hormone that helps nursing mothers produce milk, may help prevent the disease.

Liver cancer is relatively

uncommon in the United States, where lung, breast, prostate and colorectal cancers are most commonly diagnosed. But worldwide, liver cancer is the second leading cause of cancer deaths after lung cancer, according to the World Health Organization (WHO). The disease is particularly prevalent in Southeast Asia and sub-Saharan Africa, where it is associated with the hepatitis B and C viruses, as well as toxins in the food and water supply.

The number of U.S. patients with the disease is growing, too, particularly in those who received blood transfusions in the 1970s and 1980s, before hepatitis C was discovered and routinely tested for in blood donors. "A lot of hemophiliacs wound up with hep C, and those patients are now getting chronic liver disease, which can progress to cirrhosis and then cancer," says Rogers. "Another wave looms on the horizon as well, as individuals suffering from obesity and type 2 diabetes develop chronic liver diseases that increase the risk of cancer."

Rogers, a veterinarian with a Ph.D. in experimental pathology, began studying liver cancer as a researcher at MIT, where he became intrigued by an odd phenomenon. In all the studies of liver cancer in mice, researchers

used only male animals. "That's because males got it at a higher rate, so it was cheaper to just use males," Rogers says. "Few seemed interested in understanding why that was the case."

Liver cancer in humans is also far more prevalent among males, who get it at a rate two to eight times higher than females, depending on the country, according to WHO data. Diseases that disproportionately affect males, such as cardiovascular disease, share a common thread of chronic inflammation—a state in which the body's immune response causes tissues to swell with blood cells and chemicals. Rogers thought that might be the case with liver cancer, too.

But what influences those different degrees of inflammation between men and women? The obvious answer would appear to be sex hormones such as testosterone and estrogen. However, while reviewing scientific literature, Rogers found evidence in an obscure paper from the 1940s that the root may lie in a different area of the body: the pituitary gland, which releases growth hormone and prolactin.

In the laboratory, Rogers and his colleagues exposed liver cells to pituitary hormones. Growth hormone showed little effect. However, prolactin

significantly dampened certain inflammatory responses. Building on that surprising discovery, Rogers surmised that prolactin may play a role in protecting women against liver cancer. “I think a single-minded focus on estrogen and testosterone is too simplistic,” he says. “It’s not a sex hormone story; it’s a pituitary story.”

To test this hypothesis, Rogers ran a series of experiments with mice, including one using both female and male animals that could not produce prolactin. The female mice without the prolactin gene developed cancer at dramatically higher rates—75 percent, compared with 10 percent in normal female mice with prolactin. There was even an effect in the male mice, though not as pronounced. The male mice with prolactin developed cancer at around the same rates as those without prolactin, but showed only about a third of the tumors. “I thought we might see an effect in the females,” he says, “but I wasn’t expecting to see a response in males. The prolactin is even helping them.”

That finding holds promise for human patients, because drugs that can artificially amp up levels of prolactin already have been approved by the Food and Drug Administration. These medications, most

commonly used in patients with psychiatric or gastrointestinal disorders, are sometimes used “off label” to spur milk production in new mothers who are having trouble producing breast milk. Rogers tested one such drug in mice exposed to a chemical that induces liver cancer. He found that only 22 percent of male mice taking the drug contracted cancer, compared with 100 percent of those not taking the drug.

Rogers published his findings in the August 5 edition of the *Proceedings of the National Academy of Sciences*. He hopes his research might one day help patients not only in the United States, but also in developing countries, where about 83 percent of liver cancer cases occur, according to World Cancer Research Fund International.

“If the targets we identified in mice also work in humans, we could start shipping drugs to Africa and Asia tomorrow,” he says. “The drugs already exist, and they are already approved. The hurdle would be acceptance by physicians and patients.” Currently, Rogers is collaborating with statisticians at Tufts Medical Center to determine whether there is evidence of lower liver cancer rates in patients who already are taking these drugs for

other ailments.

If using prolactin-inducing drugs as a treatment pans out in clinical trials, it may be only a matter of years, instead of the usual decades, before such drugs could be prescribed for people at high risk of developing the disease. “We don’t think this is going to cure liver cancer,” Rogers says, “but it might help prevent it.”

MICHAEL BLANDING is a Boston-based freelance writer and author of *The Map Thief* (Gotham, 2014).

YOUR BRAIN ON LUTEIN

Green, leafy vegetables carry multiple benefits

BY JULIE FLAHERTY

RESEARCHERS HAVE KNOWN for a while that getting enough lutein in your diet seems to be a good thing for eye health; people who



consume more of this deep yellow pigment found in dark green leafy vegetables and brightly colored fruits are less likely to develop age-related macular degeneration, for example. But lutein may have a special role in brain health as well.

In an article she wrote for the journal *Nutrition Reviews*, Elizabeth Johnson, a scientist in the Antioxidants Research Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts, makes a case for studying lutein’s cognitive benefits. She points out that the brain absorbs more lutein than it does other carotenoids (including beta carotene and lycopene). One study found that having a lutein-rich brain was associated with better marks on a wide range of cognitive measures, including executive function, language, learning and memory.

Unfortunately, most Americans don’t get enough lutein. While there is no recommended dietary allowance for lutein, it takes 6 mg per day to lower the risk of age-related macular degeneration. The average adult gets less than 2 mg per day. Kale, collards and spinach are the lutein powerhouses, but you can also find it in broccoli, eggs and avocados, among other foods.

BUGS FOR BETTER HEALTH

Chemicals produced by the microbes in the gut may determine how healthy we are

BY JACQUELINE MITCHELL

THE WORD METABOLISM gets tossed around a lot, but it means much more than whether you can go back to the buffet for seconds without worrying about your waistline. In fact, metabolism is the set of biochemical processes by which cells turn food into energy, biological building blocks and—inevitably—waste products. Every living cell does it, but not every cell does it in the same way.

Among his many projects, Kyongbum Lee, chair and associate professor of chemical and biological engineering at Tufts School of Engineering, studies these complex cellular reactions and the role they play in the body. His goal is to be able to coax cells' metabolic processes so they produce what the body needs or detect disease in its earliest stages.

These days, Lee and his colleagues are busy identifying the chemicals produced when the bacteria that live in mammals' guts metabolize food. In addition to cataloging those chemicals, called metabolites, the researchers

are testing each one to determine their impact on the body. Can the products produced by bugs in your gut affect your health? Your weight? Your mental health? Our reporter spoke with Lee to see what his findings have shown so far.

TUFTS MEDICINE: What does your lab do?

KYONGBUM LEE: In one of our projects, we're looking at the interaction between mammals and the chemicals produced by the microbes that reside in their digestive tract. There are microbes everywhere on our bodies, but we're primarily focused on the microbes in the gut.

While other labs are looking at the composition of the collection of microbes known as the microbiome—and which species of bacteria are present and in what numbers—we are looking at the metabolites, the compounds they produce as they metabolize food. We are first interested in what these chemicals are. How can we differentiate

between the chemicals derived from bacterial metabolism versus the chemicals we mammals make as we metabolize the food we eat? The follow-up questions are, What do the chemicals do? And which species or strains of bacteria are responsible for producing these chemicals?

Do scientists know the functions of any of these chemicals?

It's already well known that there are certain complex sugars our bodies cannot metabolize on their own. Instead, they are broken down and fermented by the microbes. The resulting small molecules are then used as fuel by the cells that line our intestines.

That's one well-defined function of a microbial metabolite, but that's only scratching the surface. Depending on the individual, there could be several hundred to several thousand different species of bacteria present. So there's a huge range of chemical

products they could be making.

Right now, we are looking at chemicals that we think have an impact on systemic inflammation. We are screening about 50 metabolites. We are looking at those metabolites one at a time.

What can you do with that information?

Once we identify the range of products that normally occur in a healthy animal, we can start to ask how they would change if the animal had disease or was subjected to a change in diet. And this is the ultimate chicken-and-egg question: If we were to change the profile, would that make the healthy animal sick? Or does disease cause the changes to the microbial and chemical profile?

Are you studying a specific health concern right now?

Some of the work in my lab deals with obesity and inflammation. One hypothesis about the negative health consequence of obesity has to do with inflammation, not like when you have a fever in an acute response to an infection, but chronic, systemic inflammation, such as what you get in type 2 diabetes, for example.

We think the profile of the bacterial metabolites may be altered in obese individuals, and that may have an impact on inflammation, not just in the gut



but in other parts of the body, too. Those metabolites can get out of the gut and can be found in different tissues. So we are looking first to identify bacterially derived metabolites in the fat tissue, and, second, to see if they contribute to inflammation.

What does the future hold? Probably the next frontier—I don't know how many generations of graduate students down the road—would be looking at the axis of communication between the gut and the brain. The obvious thing here is appetite, but more broadly, it's going to be fascinating to understand the link to behavior. There have been reports linking autism spectrum disorder (ASD) with altered gut microbial metabolite profiles. A really intriguing mouse study found increased levels of two microbiota metabolites in a model of ASD. Remarkably, injecting one of those metabolites into a mouse-induced, anxiety-like behavior. The cool thing is that our screening found that the other metabolite may play a role in modulating the immune system.

We know that neurotransmitters such as serotonin and dopamine are present in the digestive tract. Both these chemicals affect brain function. There are reports that people with post-traumatic stress disorder have an altered gut microbial

profile. So we know there is some relationship between the gut and the brain.

What other problems could you tackle?

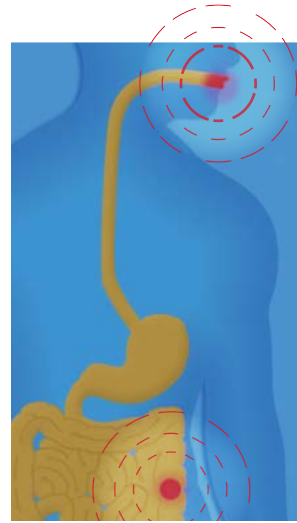
I think you could design microbes that heal and take care of the body. We could go about doing that by identifying key chemicals that you need to have in your system to stay healthy, say, to ward off infection. Once we identify those molecules you want to have, it could come down to eating the right kind of food; for example, more broccoli. We know broccoli's a healthy food, but we don't really know why. Maybe it has all those chemicals you need. But we can also imagine engineering microbes to produce those needed chemicals.

We can even imagine engineering microbes with additional functions, like having a sensor that can say, "Oh, this person doesn't have enough vitamin B." And then it produces enough to replenish us.

Or we could think about engineering microbes that would indicate the onset of disease or let us know how effective a given treatment is. That could be a game-changer for global health.

Broadly speaking, we'll be able to find ways to treat and prevent disease by promoting gut health. There's so much potential here.

JACQUELINE MITCHELL can be reached at jacqueline.mitchell@tufts.edu.



DOUBLE TROUBLE

Is there a link between mouth ulcers and gastrointestinal disease?

BY JULIE FLAHERTY

THEY ARE SMALL, painful and can turn your favorite lemon sorbet into a world of hurt. They are canker sores, and if you are one of the 20 percent of people who get them, you know that these noncontagious mouth ulcers can make eating, drinking and even talking a feat.

A number of things tend to trigger them, from trauma to the mouth (think of an accidental bite to the cheek or a toothbrush jab) to a diet lacking in certain vitamins and minerals. But surprisingly, we don't really know why they develop.

At least one researcher is looking beyond the mouth for answers. Joel Weinstock, professor and chief of the

gastroenterology/hepatology division at Tufts Medical Center, is conducting a study that will look at the colons of people who get canker sores to see if they have similar lesions in their intestinal lining.

While the connection may not seem obvious, canker sores often show up in patients who have illnesses such as inflammatory bowel disease. People with Crohn's disease, for example, often develop canker sores during a flare-up of their gastrointestinal symptoms. Weinstock has seen many patients with ulcers both in their mouth and in their intestinal lining. "They look very similar," he notes.

Like canker sores, the cause of Crohn's disease is unclear, but it is believed to be the result of the immune system overreacting to the organisms that live in the gut. "If you get a break in the epithelium, you start reacting way beyond what you should," Weinstock says. "Maybe the same process is happening in the mouth." The mouth and intestine, after all, are really two distant parts of the digestive tract.

"The question is then, is this common mouth ulcer that we see really more of a manifestation of the general tendency for the whole [digestive tract] to overreact?" he asks.

JULIE FLAHERTY is the editor of *Tufts Nutrition* magazine.

Miranda Rogers and Tania Strout are working together over the next few years to conduct a first-ever health survey of Maine's lobstermen.



Dockside Medicine

Born into a lobstering family, I worry about the well-being of my father, my uncles and their friends in a special way. With any luck, I'll be able to do something about it **BY MIRANDA ROGERS, '17**

THE MORNING WAS hushed and cold. I wore the grubbiest clothes I could get my hands on—the kind of clothes that had cycled through the wash and still stank of bait juice and mud. The boots were way too big for me. At that point in my life I had yet to be introduced to coffee, and sometimes it took a few hours aboard the boat before I would really wake up. The sky and the sea often mirrored each other, and today was one of the

good days, the type of June day when the clouds were small, the swells were minimal and the boat smoothly rocked in the waves. The burly sternman paced the deck, tending the rope and traps. My father stood silently at the wheel, guiding the bow of the boat into the wind.

As a 14-year-old, all I was thinking

about was how cold I was, the smell of bait rankling my nose, and the time that had to pass before we would be done hauling traps for the day. I would count the strings of traps as we went, banding lobsters tossed in my direction and adding bait to the long, metal needles that allowed the sternman to change the bait as each trap was pulled aboard. The bait needles would click, and one by one a new tray of bait would replace the one I'd emptied. Sometimes the conversation aboard the boat would be ribald—a free academy of expletives, attendance mandatory—and at other times it would be a mix of silence, the protesting slap of lobster tails and the occasional shout as a school of tuna caught the crew's attention.

How different my life attending medical school is from when I was a kid back on Orr's Island, Maine. Growing up the oldest daughter of a lobsterman and the niece of three lobstering uncles in many ways made me who I am.

No question, lobstering can be a hard way to make a living. The income is seasonal and often unpredictable.

Beyond the financial insecurities inherent to the industry, these fishermen (and a handful of women) spend year after year facing one of the harshest working environments imaginable. The ocean may be tolerant, but it is not welcoming of people. Routinely, my father drives his boat into a blinding fog bank to get to work, and with the prices of lobster dropping precipitously, he now fishes through the icy Maine winter months in addition to his regular summer rounds.

NO OUTSIDER HERE

My own world consists of well-lit Boston classrooms. I spend my days collaborating with some of the most intelligent people I have ever met. Still, I can never forget that knowledge comes in many forms. The fishing community in which I was raised is home to some of the most savvy and quick-witted outdoorsmen

you could ever meet. These people spend their lives harvesting what they can from the ocean—making a living using the tools and faculties available to them. Their knowledge of the open water is unparalleled. They are stoic, self-preserving and self-sufficient.

These same qualities cause many lobstermen to view health care as a choice of last resort. Lobstermen consistently cancel appointments with doctors; from their perspective, missing a day of decent fishing weather to sit in a doctor's waiting room makes little sense.

Small injuries—ones that would send you or me screaming to the doctor—are pushed aside or ignored. Even chronic ailments, such as skin cancer from constant sun exposure and repetitive-use injuries from years of hard physical labor, are addressed only when they become debilitating. Whole families and communities live without health insurance because they can't afford it.

These are the types of public health issues that I've been thinking about in a new way, now that I'm training to be a doctor. I've been weighing all the community and individual concerns plaguing a hardworking industry that is essential to the Maine way of life. But my observations so far are anecdotal. More information is needed to address the problem.

Over the next three years, my goal is to serve as a conduit between the medical and fishing communities. This past summer, I launched a project that I plan to continue throughout medical school. The initial phase is focused on gathering data. In collaboration with Tania D. Strout, Ph.D., R.N., M.S., the lively and compassionate director of research in the emergency department at Maine Medical Center in Portland, I have come up with a survey that will explore various health issues among Maine's commercial fishermen. Strout's experience in clinical research and her boundless energy have proven invaluable. Our 15-page survey includes topics

such as chronic disease, addiction, injuries and attitudes toward health providers and will give us the most recent needs assessment of the state's commercial fishing population.

One of the most challenging elements of this project involves successfully reaching out to the fishermen. Outsiders are not always welcomed with open arms, but I'm no outsider here. When the project began in June, the *Portland Press Herald* covered the story. The response I received to that newspaper article was heartwarming. Doctors, nurses, social workers and chiropractors volunteered their time; advocates from the wider fishing community in Maine reached out with interest, and nonprofit organizations offered to support the effort.

I have collaborated closely with the Maine Lobstermen's Association (MLA) to reach fishermen through its monthly newsletter and email communications. The MLA is one of the largest voices representing Maine lobstermen, and the monthly newsletters are scattered on countertops in the homes of most lobstermen. My father regularly flips through it, keeping up with an industry that seems to be perpetually changing.

We've made a decent start, I think, but the most difficult work lies ahead. During late summer, I drove around to various fishing neighborhoods to meet with as many fishermen and their families as I could. Maine has approximately 6,000 licensed lobstermen living in cooperatives and small communities dotting the coast and coastal islands. Meeting and shaking hands with these people will be more than half the battle, I believe. Hopefully, the fishing community and the medical community can learn from each other and evolve together as my project continues.

MIRANDA ROGERS is a second-year student in the medical school's Maine Track program. This is the first in a series of articles in *Tufts Medicine* about her efforts to bring more effective health care to Maine's commercial fishing population.

Professor Dan Jay synthesizes the chemist and the artist within

Periodic Table of Art

BY MARJORIE HOWARD

WHEN HE WAS A BOY, DAN JAY'S FATHER would hoist him onto the counter in the family's grocery store in Toronto, hand him some butcher paper and a pencil and let him draw. "It was cheaper than babysitting," Jay says. When he was a little older, his parents bought him a chemistry set, setting up a rival interest. He still loved to draw, but science excited him, too.

He went on to earn a Ph.D. in biochemistry and molecular biology from Harvard and is now a professor of developmental, molecular and chemical biology at Tufts University School of Medicine. He identifies proteins on cancer cells that are important to both metastasis and drug resistance; the

work could produce potential targets for developing drugs to counteract both processes.

Still, art beckons. When Jay travels to scientific conferences, he sketches outdoor markets or street scenes in places such as Istanbul and Japan. He has a partnership with the Urbanity Dance Company in Boston's South End to sketch their rehearsals. And every Sunday for the last 30 years he has attended a studio class in Cambridge, making drawings of live models.

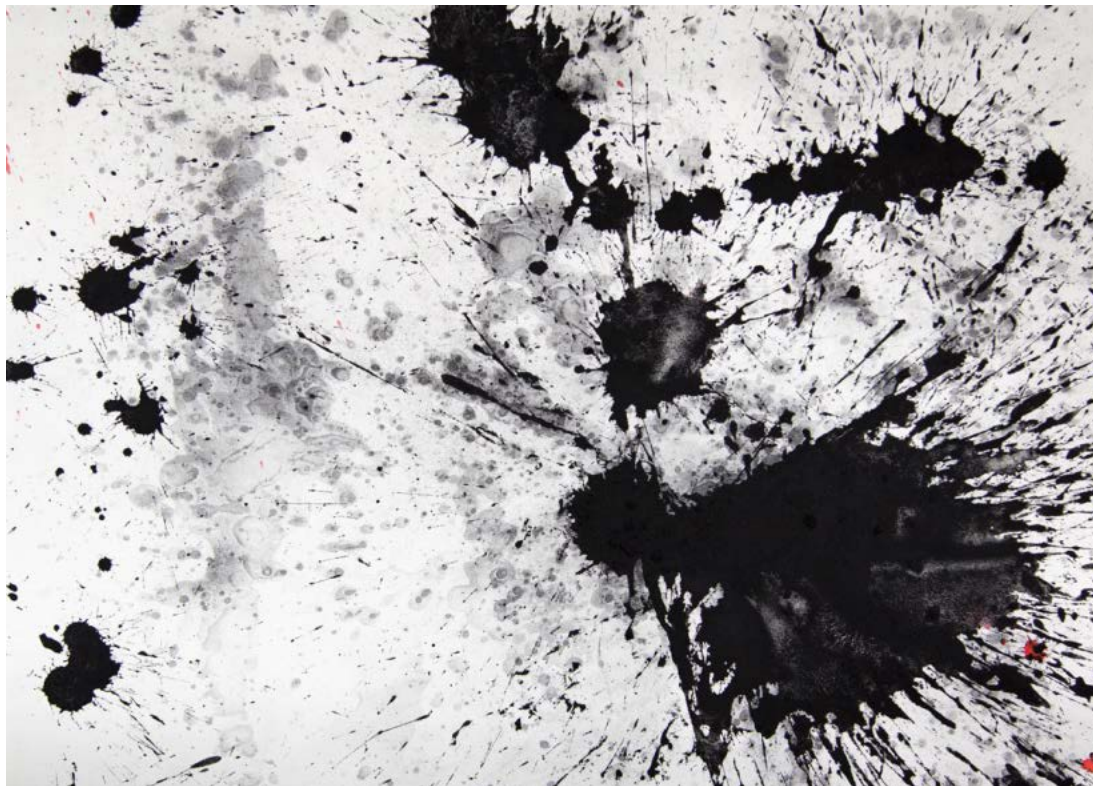
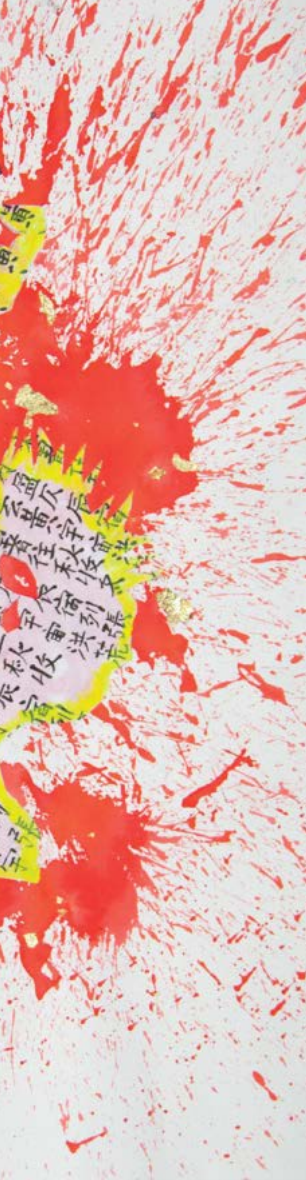
Now he has found a way to combine science and art in a new set of drawings made with liquid nitrogen and chemicals grouped together alphabetically by their symbols on the periodic table of

elements. The work, *Archemy: Chemical Drawings by Dan Jay*, was exhibited at the Slater Concourse Gallery in the Aidekman Arts Center on the Medford/Somerville campus earlier this fall.

Jay's inspiration for the work came during a summer art workshop in Provincetown, where he had made some 30 drawings. The instructor put one on the wall and said to the class, "This is a beautiful drawing, but there are 10 million people who can draw like Dan. What is his unique voice?"

The comment surprised Jay, and got him wondering what distinguished his art. Perhaps it was his understanding of science that set him apart as an artist, so like any scientist,





A sampling of Dan Jay's recent compositions includes a fusion of liquid nitrogen and charcoal powder (above), created at the Fine Arts Work Center in Provincetown; *And I Wept for Both People's Shame*, using vermillion acrylic paint mixed with liquid nitrogen, handmade calligraphy and gold leaf on paper (far left); and *Co-Cu-Ca-C*, which combines four elements whose atomic symbol begins with the letter "C," cobalt, copper, carbon and calcium.

he began to experiment.

In his lab at Tufts, he uses liquid nitrogen to rapidly freeze cells to suspend their metabolism for long-term storage; he wondered what would happen if he mixed liquid nitrogen with charcoal and other art materials. So last summer, he loaded a four-liter tank of liquid nitrogen into his car—don't worry, it's safe—and drove to a workshop in Provincetown on experimental drawing with the idea of exploring how different chemicals would interact with drawing materials.

He poured the liquid nitrogen onto a canvas, mixing it with charcoal powder, the black sumi ink used in East Asian calligraphy and acrylic paint.

The results were striking.

Summoning the researcher within, Jay wrote up his efforts as a scientific experiment, complete with rationale, aim, preliminary data and results; it was published in the online journal *Impact*. "Liquid nitrogen does provide a novel way to make interesting marks, and the use of it bears further investigation," he notes in the paper.

He went on to create art using chemical elements as the media, works that were included in the *Archemy* exhibition. They "utilize a deep understanding of the chemical properties and uses of elements not usually applied to making art," he says. He grouped them alphabetically by

chemical symbol, such as a piece that uses silver, gold and aluminum (Ag, Au, Al) to create striking images.

While our society encourages specialization, he notes there are many examples of scientists whose lives encompass two passions: Alexander Borodin was a chemist and a composer, and Thomas Huxley was a biologist and a humanist.

"Science and art," Jay says, "are two worlds, but I feel comfortable in both and have a wonderful sense of community in both. Each can enrich the other."

MARJORIE HOWARD can be reached at marjorie.howard@tufts.edu. See more of Dan Jay's art at www.danjayart.com.

OLD-SCHOOL DOC

Herbert Levine, beloved cardiologist at Tufts for nearly a half century, left his mark on the place in countless ways

BY BRUCE MORGAN PHOTOGRAPHS BY KATHLEEN DOOHER

MY FIRST IMPRESSION OF HERB LEVINE WAS THAT I HAD SOMEHOW GOTTEN THE WRONG guy. It was the summer of 2006, and Levine (rhymes with wine), then 78 years old, was an eminent cardiologist who had just stepped down after serving for 45 straight years at Tufts Medical Center. “Eminent” often means distant, cool. But this spry gentleman with the wispy white hair and the utterly relaxed and genial manner looked like nothing so much as a man about to step through the office door, plunk a canoe into the stream that was waiting there and glide away, laughing. His physical ease and his lightness of bearing were uncanny.

Others were struck by the man in a similar way. Dean Harris Berman has known Levine as a friend and colleague—and as an astute specialist when he suffered a heart attack at age 48 and needed a cardiologist. Berman notes that it didn’t matter whether you were junior staff, or a resident, or a patient, or someone passing on the street, you got the same impression of Levine: “This is a wonderful person who cares about you.” By all accounts Levine never deviated from that model, regardless of the circumstance.

In the early 1970s, Deeb Salem fell under his spell. Now chair of the Department of Medicine at Tufts Medical Center, Salem was, back then, scouting out places for a fellowship early in

his career. He happened to come to Tufts and encounter the man who served as chief of cardiology here from 1961 to 1987. “At other places, the cardiologists were sort of sourpusses,” Salem remembers. “But within seconds, Herb put on this big smile and started asking me questions.”

Marvin Konstam, chief physician executive of the CardioVascular Center at Tufts Medical Center, had a parallel first impression. As a young physician poised for a job interview back in 1981, and as someone who was relatively seasoned in the hunt, he knew the drill. “I was used to a certain manner of interaction,” he says, “but what I found was a very different approach. You go in, you’re pretty nervous,” Konstam points



"Medicine spun my wheels," Levine told this magazine in 2006.

out, “but he [Levine] made me feel at ease. I came away thinking this is somebody I wanted to work with.”

Salem and Konstam were not the only ones. A long stream of young cardiologists came to Tufts to study with Levine and never left, smitten as they were with his special qualities—his brimming intelligence, his resolute character, his disarming human touch. Levine “was the first cardiologist at Tufts Medical Center, and he really set the tone,” Salem told the *Boston Globe* after Levine died this past summer.

To more than one person, Levine came across as an old-fashioned charmer. Sandra Yenkin was a young woman from Columbus, Ohio, recently graduated from Wellesley College, when she met Levine on a blind date. “Well, it was a short date,” she says, looking back. “We spent the evening with the couple who had introduced us, and I thought Herb was very nice and wanted to know him better.” Sandy and Herb were wed in 1958 and had 55 years together, raising a son and a daughter in their home in Newton, Massachusetts. In late life Herb would have three grandsons to adore.

Salem recalls Levine as “a Renaissance man who loved to ask questions. Even in areas where he wasn’t an expert, he would often ask the best questions.” Salem tells of being at medical conferences with Levine where a group of cardiologists would be seated around a table, sounding off on this or that. “The other cardiologists would be thinking highly of themselves,” Salem relates. “Herb would be there, listening and smiling, and then, when he finally spoke, he’d offer some of the more interesting insights.”

The low-key, steady-as-you-go approach paid off in many ways. Levine’s patients loved him, of course. His research had an original flavor. And his personal example of the friendly, unassuming way you could carry yourself as a physician left a mark on cardiology at Tufts that has lasted

50 years and is still going strong, by all accounts. Meanwhile, “he was known nationally and internationally,” Salem says. “He was one of the household names in cardiology.”

Navigating that balance between personal modesty and public acclaim would be a tricky business for just about anyone. But Levine embodied and thrived on that balance. Sandy Levine saw her husband as “a highly intuitive person,” and as someone who had ample stores of confidence without a hint of arrogance. “He wasn’t frightened by things,” she reflects. “I thought it was wonderful.”

FISHING A MOUNTAIN STREAM

Herbert J. Levine started from an advantaged spot. His father, Samuel Levine, was a world-renowned cardiologist based at Peter Bent Brigham Hospital in Boston, one of two giants in the field that the city offered, together with Paul Dudley White at Massachusetts General Hospital. The young Levine had a job working one summer when he was 14 years old as an EKG technician at the Brigham, where he felt the excitement of the big medical questions early on. “Medicine spun my wheels,” he told *Tufts Medicine* in 2006. “I guess I never looked back after that.”

Levine attended Johns Hopkins Medical School and afterwards landed a fellowship at the Brigham at a time when the visionary Tufts physician Sam Proger was recruiting fresh talent for what was then called New England Center Hospital (now Tufts Medical Center). Proger wanted Levine, whom he had known since he was a child, to be chief of cardiology. “I was very excited. Of course, I didn’t realize until I got here that the division of cardiology was one other guy and myself,” Levine later told a reporter with a laugh. He was then 33 years old.

From the start, his focus was on the patient in the room. He would ask questions and get the patient relaxed

enough to trust him with whatever they had to say. He listened intently. He performed a thorough physical examination, taking his time. “Unfortunately,” says Konstam, “many physicians seem to project that they’re coming from a high level. But Herb approached his patients as human beings. He demonstrated that he was interested in them as people. Whatever happened to them, they were confident that they were receiving the best possible care, and that he would be there for them.”

There were virtually no limits to his care. Sandy Levine tells the story that she heard recently from one of Herb’s longtime executive assistants. It seems that Herb had a patient in the hospital who refused to eat and was wasting away in her bed. “What would you like to eat? What appeals to you?” Levine asked the woman in all sincerity. “A cheese blintz,” she answered. At that, the good doctor left the hospital, swung around the corner to a neighborhood shop and bought his patient a blintz—which, on his return, she eagerly consumed.

In 1961, his first year at Tufts, Levine would spend an hour with each new patient, and a half hour with each returning patient, absorbing everything. Amazingly, he persisted in this same way until his retirement at age 78. When Levine was quizzed eight years ago about how he managed to retain this old-school, leisurely habit in a time when patient interactions grow shorter by the day, he responded with a kind of shrug. “Well, you can’t teach an old dog new tricks,” he said. “And I would have resisted it if they tried. I would have said, ‘I’m sorry, there’s no way I can do it.’”

The doctor knew who he was and what he needed. His research interests bore the same original stamp. William Gaasch, now semiretired, first met Levine in the late 1960s, when he was a young physician on a fellowship at Tufts; he later worked beside him for many years as a colleague

in cardiology, first at New England Medical Center and later at the Lahey Clinic. “What I got from Herb was his enthusiasm, which was infectious,” says Gaasch when reached this summer at his vacation home in northern Michigan. “Instead of talking about hypotheses, Herb would say, ‘Let’s try this and see what happens.’ It was always fun and didn’t seem like work.”

One example of Levine’s original approach had to do with how he went about studying the heart’s basic operation. Most cardiologists in his day focused their research efforts on understanding the heart during its contraction; this was the standard approach. But Levine decided to be the contrarian. “While everyone was studying how the heart squeezed, Herb studied how the heart relaxed,” Salem says. “It turns out that most of the heart’s energy consumption is in the relaxation phase.”

According to Konstam, Levine conducted research in multiple areas of the heart, including electrophysiology and valvular heart disease, and contributed “pivotal” work on myocardial muscle mechanics. “Herb had the type of mind that wouldn’t just inhale what other people were thinking,” Konstam says. “He would always investigate things his own way.”

Meanwhile, at home, the doctor was a man of steady habits. He helped his kids, Andrew and Rachel, with their homework and attended their ball games when he could. In domestic life, he retained the calm and patient bearing that he wore like a uniform, even to the point of his wife’s occasional frustration. “Sometimes I’d ask him a question, and he wouldn’t answer right away,” Sandy reports. “I’d think he wasn’t listening. But then he’d say, ‘I’m *thinking*.’”

When a substantial dispute arose, she had a little sign that she would post for his benefit: Save Time, See It My Way. “We had a strong marriage, a good marriage,” Sandy says, reflecting



A long stream of young cardiologists came to Tufts to study with Herb Levine and never left, smitten as they were with his special qualities—his brimming intelligence, his resolute character, his disarming human touch.

on their many years together.

Levine knew how to enjoy himself in the margins of his life. On vacation, he tended a lobster pot or two in Buzzards Bay. He loved fly-fishing, and it’s easy to imagine the doctor flicking his line out over the rippling water of a mountain stream with the same light touch he brought to all his affairs. Humility was central, even essential, to how he lived. “Herb was never drawn to fame and fortune,” says Gaasch. “That was just not him.”

William Grossman confirms that notion. A noted cardiologist and professor of medicine at the University of California, San Francisco Medical Center, Grossman met Levine in Boston in the mid-1960s and knew him as a fellow Boston cardiologist when Grossman served on staff at the Brigham for many years. At one point, Grossman was a member of the search committee looking for someone to fill the plum job of chief of medicine at Beth Israel Hospital. He called Levine to offer him the job.

This would have been a professional “step up,” Grossman notes, but Levine considered the offer for about a day before calling to decline. “You know, Bill,” Levine said, “I really love what I’m doing. I’m good at this, and I’m going to stick with it. For me to take on more administrative work, and maybe see patients less, would be a mistake, I think.”

Among many other distinctions, Levine won a Distinguished Faculty Award from Tufts Medical School, plus the Paul Dudley White Award (given by the American Heart Association) in 1997, the Henry Bouchie Humanitarian Award and the Leonard Tow Humanism in Medicine Award. In his honor, Tufts Medical Center created the Dr. Herbert J. Levine Foundation for Cardiovascular Clinical Research in 2001.

The same untrammelled spirit that led Levine to turn excitedly to a colleague and ask, “Well, what do you think?” when conducting an experiment also found its expression in a few of the whimsical sayings the quietly great man lived by. Grossman remembers one of these in particular. “Herb used to say, ‘God has given each of us just so many heartbeats. The slower we play them out, the longer we live.’”

Herb Levine’s personal supply ran out on July 11, 2014. He was 85 years old.

BRUCE MORGAN is the editor of this magazine.

WIDE-ANGLE HEALING

U.S. medicine needs to take a step back and consider patient complaints from a broad social perspective if it is ever going to get better at delivering optimal health

BY RISHI MANCHANDA, M.D./M.P.H.'03 ILLUSTRATION BY BRIAN STAUFFER

IT WAS AN UNSEASONABLY WARM SPRING DAY IN SOUTH-CENTRAL LOS ANGELES IN 2011. Veronica, a 33-year-old woman, sat in my exam room, her head in her hands. Her other-wise tall and formidable figure was slouched over in pain. This was not the first time she had felt this way. For more than a year her headaches had come and gone. And each time, the pain would ripple through her life, disrupting her family and work. This episode was no different. She had missed about seven days of work as an office manager at an auto parts dealer in the past month.

Veronica's employer, who was understanding, would see her in pain and insist that she leave early and seek help. But the headaches kept coming, straining her relationships at work. Her home life started to suffer. It was hard for her to sleep. Veronica often had to call on her elderly mother to care for her two sons when she needed to visit the doctor or simply rest. At her sons' school activities, Veronica was often unable to focus. Usually a stoic woman, she considered herself unflappable in the face of adversity. But these days, she admitted, she was fatigued and often irritable.





Three weeks earlier, Veronica had gone to a local emergency room to seek relief. After a battery of tests, a doctor prescribed her some pain medications. Then she gave Veronica instructions to return to the emergency room if the pain worsened or persisted. The medicines helped for a short while, but they often left her drowsy and unfocused. The pain persisted. So, following instructions, she returned twice more to a local emergency room. All told, she underwent at least a dozen blood tests, two CT scans and a spinal tap. But for Veronica, each visit to the emergency room ended the same way: She was told her test results were “normal,” sent home with more pain medication and advised to seek a primary-care physician.

When I met Veronica, she was exasperated. A \$1,200 bill for her first hospital visit had arrived at her home. At work, her boss was growing concerned. Veronica was concerned about losing her job. Without a steady income, she worried about paying the rent, roughly \$850 per month. She fought back tears as she described the toll this was taking on her family.

And she grimaced often. On top of everything else, Veronica was still in pain.

Her story is far too typical in our health-care system. Her experience has become commonplace, not just in low-income neighborhoods but in middle-class and more affluent communities as well. Access to quality care is a problem. And even when care is available, it is often poorly coordinated, expensive and stressful.

When Veronica came to our clinic, though, we did things slightly differently.

The clerk checked Veronica in. The medical assistant recorded vital signs

and collected standard information about her health. This is a typical process for many clinics. But then the medical assistant ran down a simple checklist, asking Veronica a few routine, evidence-based questions about her housing. Veronica indicated that her apartment had some problems with mold, water leaks and roaches. These answers went into her chart, along with other important data. I briefly reviewed the chart and opened the door to greet her.

Knowing where Veronica lived made a world of difference. I asked her to tell me more about her home and her headaches. She lived with her sons in a two-bedroom, ground-floor apartment in South Los Angeles, not far from the clinic. Veronica insisted that she kept her home as clean as possible, but persistent leaks had led

to chronically damp, moldy conditions and the roach infestation. Her landlord hadn't helped, and she couldn't afford to move. As she talked, I followed up with more questions and began a targeted physical exam.

Within 15 minutes, I felt pretty confident in my diagnosis: Veronica had migraines related to chronic nasal allergies and sinus congestion. These conditions are often caused or made worse by dampness, mold, roaches and other markers of substandard housing. I asked about her sons' health. Her eldest was under a pediatrician's care for severe asthma, another health problem often related to bad housing. I explained my concerns and prescribed her medicines to help with the symptoms. Then I referred her to a program run by our clinic in partnership with two local organizations to help make her housing healthier. One of the partners was a tenants' rights advocacy group long active in South Los Angeles. The other was a community development agency that created affordable housing and trained residents to become community health workers.

Within a few days, a community health worker from our clinic visited Veronica. She taught her new techniques for controlling dampness in her home.

Then, with the help of our partners, she helped Veronica contact the landlord, this time with a doctor's note and information about local housing codes that the landlord was obligated to meet.

Veronica came back to the clinic a few months later for a routine follow-up visit. She hadn't been to the emergency room. Her home was healthier. Her allergies lingered but had improved, and her headaches were gone. Her son's asthma was less active. Veronica and her family had gotten better.



WE HAVE TO SEE PAST THE IMAGINED BOUNDARIES OF THE CLINIC WALLS AND THE ROLE OF THE CLINICIAN. THEN WE'LL SEE THAT HEALTH CARE CAN BE BETTER.

SYMPTOMS VS. CAUSES

To improve Veronica's headache, the health-care system had to address where she lived. Why did Veronica go so long before she got that type of care? Did she have to suffer as long as she did? The great irony is that many of the health-care professionals who had cared for her provided what is generally considered adequate care. On each occasion, doctors and nurses initiated a diagnostic workup involving expensive machines and procedures. They prescribed medications to help relieve her pain and instructed her to seek further evaluation if required.

The problem, of course, is that the current standard of care isn't working. Instead of addressing the cause of disease, health care in the U.S. has long focused on just treating its symptoms. We fixate on the headache and ignore the home. Once upon a time, interacting with patients in their homes and communities seemed like an obvious, integral part of doctoring. But in the last century or so, the culture of medicine has largely been shaped by an exuberant overemphasis on the biologic and molecular phenomena of disease. Improving the social conditions that shape health has become an afterthought.

And that's the irony. When clinicians ignore the home—or any of the other factors that shape our health—their treatments are often less effective. In clinics and hospitals across the nation, we repeatedly miss precious opportunities to understand and improve people's health in the context of their social and physical environments. These opportunities are often

obscured by the transactions of pills and bills that have come to define the health-care experience for many patients and providers. For patients like Veronica, the medical system fails to reduce suffering because it simply doesn't collect the right data or equip providers with the right tools to address the factors that shape our health where it begins.

This disconnect is striking, especially when one considers the forces that determine how healthy we are as a society. As the *New England Journal of Medicine* reported in 2007, medical care accounts for only about 10 percent of the variation we see in health outcomes.

When we think about what really shapes our health, medical care is just one relatively minor force. Experts often think of five general health-defining forces: genes and biology, behavior, medical services, social environment (the ways in which we relate to each another) and physical environment. The latter two, often referred to together as the social determinants of health, are significantly more powerful drivers of wellness than is medical care.

The social determinants are shaped by the power and resources that people have, all of which are influenced by the policy choices we make as a society. These policies, in turn, influence the behaviors and choices you and I make every day. For instance, a growing body of research indicates that how close people live to affordable, healthy food outlets or safe, green parks plays a role in their choices to eat healthily or to exercise.

I would argue that the future of health care depends on growing and supporting more of what I call "upstreamists." These are the rare innovators on the front lines of health care who see that health (like sickness) is more than a chemical equation that can be balanced with pills and procedures administered within clinic walls. They see, rather, that health begins in our everyday lives, in the places where we live, work, eat and play.

The nature-vs.-nurture debate can no longer be viewed as a battle between equals. The impact of nurture—in the form of the social and environmental settings that surround us—is far more powerful than we've ever imagined. These are the forces that shape or distort our genes, our behaviors and the landscape of opportunity in our communities.

Our current standard of care often ignores these forces. This lack of attention leads to missed opportunities to effectively alleviate suffering and can sometimes even contribute to more suffering. Think of the costs for Veronica. While bouncing in and out of the health-care system, Veronica stacked up major opportunity costs. Instead of spending time at work or with her family, she spent days in a hospital or clinic looking for help. The direct economic costs were just as bad. Just one of her three emergency room visits resulted in a bill roughly equivalent to one month's rent.

Then, ironically, this experience with the health-care system took its own toll on her health. Each time a hospital or a clinic discharged her

IN THE LAST CENTURY OR SO, THE CULTURE OF MEDICINE HAS LARGELY BEEN SHAPED BY AN EXUBERANT OVEREMPHASIS ON THE BIOLOGIC AND MOLECULAR PHENOMENA OF DISEASE.

with nothing more than pain medicine, the system unwittingly sent Veronica—without adequate warning, protection or tools—back to her home, the place where her illness first started. Besides Veronica, I've cared for many other individuals who suffered health problems caused or worsened by factors in their home, work or school. In each case, these patients had received care from clinics for weeks, months and even years, only to have the social or environmental context of their disease ignored. It's like mistakenly and repeatedly sending someone suffering from radiation exposure back to a home near the site of a nuclear power plant meltdown, without protection or help.

EXPENSIVE AND INEFFECTIVE

I would suggest that the current standard of care itself is simply unacceptable, from a moral and an economic perspective. No matter how you look at the performance of our medical system, what has come to pass as the standard of care is far from cost-effective. In the U.S., health-care spending represents 18 percent of our gross domestic product. That comes to about \$8,000 per person every year, more than any other nation has ever spent on health care.

But the return on that investment is pretty poor. Among all nations, the U.S. ranks 37th in health status. In fact, Americans—both rich and poor, minority or not—are experiencing a widening health disadvantage compared with citizens of other wealthy

nations. The Institute of Medicine, established in 1970 as the health arm of the National Academy of Sciences, recently completed an exhaustive 405-page review of this gap. The authors put it plainly: Comparing the U.S. with 16 other wealthy nations, they say, “we uncovered a strikingly consistent and pervasive pattern of higher mortality and inferior health in the United States, beginning at birth.”

Recent changes in the law have made health care more accessible and affordable for millions of Americans. The Patient Protection and Affordable Care Act of 2010, aka Obamacare, will increase the number of insured Americans by around 27 million by 2017 through a combination of mandates, tax credits and subsidies to employers and individuals. One of the law's lesser-known benefits is a major national expansion of community health centers like the one I worked in when I met Veronica. Up to 20 million additional Americans will access care at these sites in the next few years. Many clinicians, including me, have welcomed and even championed these reforms, knowing that far too many people have lacked access to health care for far too long.

But the major problem with the current standard of care still looms

large. In a 2011 survey, the Robert Wood Johnson Foundation found that four out of five doctors in America believed that their patients' social problems—those social determinants of health—were as important as their physical health problems. But only about one in five doctors felt confident in their ability to help patients with social ills.

The good news is that it's a problem with a solution. I called Veronica recently to see how she was doing. It had been nearly a year and a half since her first visit with me. Her allergies and migraines were under control, less frequent and less severe. Many of the problems at home had abated, but she was still working to get the landlord to make additional repairs.

To reach the solution, though, we must first acknowledge the shortcomings of our own assumptions about the nature of the problem itself. We have to see past the imagined boundaries of the clinic walls and the role of the clinician. Then we'll see that health care can be better. And it will take the upstreamists to get us there.

RISHI MANCHANDA is the founder and president of **HealthBegins**, a Los Angeles-based startup focused on improving care for patients with medical and social needs.



This article is adapted from *The Upstream Doctors: Medical Innovators Track Sickness to Its Source* (TED Books, 2013), available as an e-book from Amazon, Barnes & Noble and Apple Books. The title was selected as a Common Reading Book to be read and discussed by members of the first-year medical class at Tufts and culminated in the author's visit to campus this fall (for more, see page 30).



Chason poses with a few of his soccer team players, in Gabon. Created on an impulse, the team went on to do great things.



Goal Keeper

Mattia Chason, A07, M14, ventured to Africa to care for children at the Albert Schweitzer Hospital. But on a dusty soccer field, he learned that caring goes both ways **BY BRUCE MORGAN**

THE SMALL BUS is rocking along a dusty rural road, its young teen occupants tossing their arms in the air and laughing, clapping and yelping their joy at being alive. They are headed to a soccer game. The man looking back at them from the front of the bus, and capturing the wild excitement for posterity on his cell phone, is fourth-year Tufts medical student Mattia Chason, who is in the middle of a three-month fellowship in

the West African country of Gabon, a former French colony. Although he went there to do pediatrics, he had brought a whistle with him, too, and that's where things got interesting.

Medicine came first. Last spring, Chason, A07, M14, was one of four U.S. medical students chosen as Albert

Schweitzer Fellows and assigned to the Albert Schweitzer Hospital in Lambaréné, Gabon. This is the village where the legendary theologian, philosopher and physician first set up shop and began his life-saving work in 1913. A century later, the work continues. Despite its fame and the line of pilgrims who regularly visit the place in a spirit of homage, the hospital itself is not much to look at. It is air-conditioned in the doctors' offices, but nowhere else; it is filled with frequently malfunctioning equipment. Many of the most basic lab tests are unavailable, Chason reports.

His days there had a fixed routine. Every morning, he would move through the jammed pediatric wards, seeing about 25 children in two hours. Malaria, gastroenteritis and dehydration, mysterious high fevers, TB, malnutrition and pneumonia were among the most common diagnoses. And snakebite? "I had no idea what to do about snakebite," Chason says. So for that case he ventured to the hospital research center and taught himself the basics. After seeing his pediatric patients, he would be sent to the maternity ward to examine newborns. Chason considered this interlude, as he later wrote, "my moment of peace for the day." His hours at the hospital extended from 7:30 in the morning to 5 in the evening.

One Saturday, he noticed some local kids playing on a soccer field. "If you want me to coach you, be here next week at five o'clock," he told them, after showing off some of his skills. Chason was no amateur, poking at the ball with a clumsy foot. He grew up in Rome, Italy, and played soccer passionately as a young boy. His skills were such that Milan, 350 miles away, recruited him at age 14 to play for the city team. His parents dissuaded him, urging him to stick with his books instead. Later, as an undergraduate biopsychology major at Tufts, he was a star striker on the varsity team, regularly draped with laurels, such as team MVP and all-New

England player. "He was a very skillful player and always very popular," his coach, Ralph Ferrigno, remembers. "He was one of those boys who got along with everybody."

Charisma counts in a foreign land. When Chason appeared a second time at the soccer field with a brand-new \$5 soccer ball and a whistle around his neck, he found 11 kids waiting, all between 13 and 16 years old. The coach and his players spent the next two hours dashing back and forth across the field, running drills and loving their time together. At the end of the session, the kids demanded a second practice later in the week.

Word quickly spread through neighboring villages about "le blanc," the white coach eager to teach soccer. Each week more kids showed up. Eleven original players quickly grew to 14, then 18, then 28, then 32. Before long there were more than 40 kids dashing over the bare dirt of the soccer field—so many players that Chason began jotting down their names, home villages and preferred positions on bits of scratch paper to keep their identities straight. The practices soon drew a crowd—hospital workers, pediatric nurses, middle school and high school teachers.

Chason imagined them thinking: Who was this white kid out there running the show? "Meanwhile, I was having the time of my life," he says.

Other observers began pitching in. Two young Gabonese men volunteered to help run the team. After observing Chason's devotion, and the kids' boundless enthusiasm for what he was doing, the hospital offered to supply the team with new soccer jerseys, shorts, socks and soccer balls, as well as a bus and driver to transport the team to games beyond the hospital grounds. The coach raised his ambitions for the team as well. He wasted no time finding an opponent, selecting 25 players from among his total of 43, and escorting his new team to a nearby stadium. "We lost, 3–1, but

you could tell my players felt proud to be part of this team," Chason says.

That team feeling wasn't limited to the game. On the week of his 28th birthday, the coach went for a three-hour walk accompanied by a dozen young players eager to show him around their respective villages. More new soccer recruits joined in as the team swept by, creating a laughing, darting cavalcade that raised dust along the way. The coach later called the experience "one of the best birthday presents I could have ever asked for."

During Chason's last week in Africa, while he was busy organizing a farewell team banquet and filming a movie about his players, the coach caught wind of an upcoming regional tournament that he wanted his team to compete in. This was a bigger deal than the previous matches. The tournament required pictures, birth certificates, sports physicals and entry fees for each player. Chason began scrambling to put the package together in advance of his departure. Tracking down team members' birth certificates in this or that small African village was anything but simple. "Some of them, they'd show up with a crumpled, wadded-up piece of paper," he says, laughing. Ultimately, all 25 members of the team qualified to play. They won the first two games in the series and reached the semifinals.

By then, their coach had already boarded his plane to America. He was gone. But you can see his love, and his legacy, in the short film he made while there. At one point in the film, teenage boys are swarming over a newly cleared field. Then, with a kind of surprise, you notice that the American medical student with his silver whistle is dashing among them, blended in and altogether inseparable from the joy they feel.

MATTIA CHASON has begun his residency in pediatrics at Children's National Medical Center in Washington, D.C. He can be reached at mattia.chason@gmail.com.

From All Corners

UNIVERSITY, SCHOOL & ALUMNI NEWS

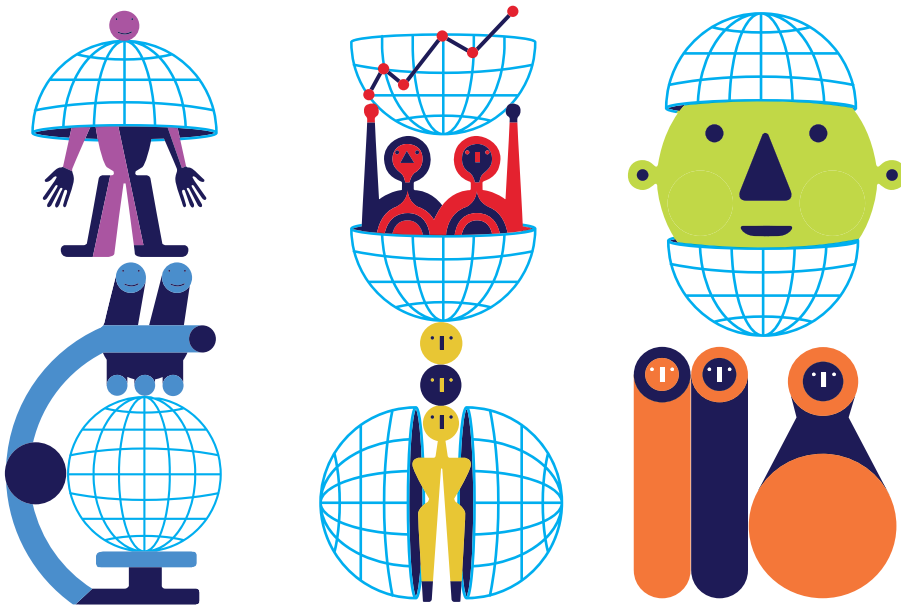
Tufts

Health Sciences Campus

LOST AND FOUND

For many years, since the medical school decamped to its current location in 1950, visitors to the area have had trouble getting their bearings. Now, even tourists going by on buses will know where they are. The new signage around campus has made the difference through a system of maps and 'Tufts' markers on the sides of buildings.

THIS ARTICLE CONTINUES ON PAGE 38 >>



Real-World Science

The Tufts Institute for Innovation crosses disciplines to take on global problems **BY JACQUELINE MITCHELL**

FOUR RESEARCH TEAMS at Tufts have set out to solve some daunting public health problems under the auspices of a new university-wide venture, the Tufts Institute for Innovation (TII). The institute, launched on August 28 in new laboratories on the Boston campus, is a major initiative of the university's strategic plan, Tufts: The Next 10 Years (T10).

What distinguishes TII from similar research centers, says Tufts President Anthony P. Monaco, is that "from the outset, findings in the laboratory will be tightly and deliberately coupled with strategies for implementing them around the world. TII is a university-wide commitment to science for social good." To support the institute's start-up, Monaco has allocated funds that were bequeathed to the university; he intends to make the institute a priority in Tufts' next capital campaign.

Four projects addressing the TII's inaugural research theme, "Microbes: Improving the Environment and the Human Condition," were chosen to receive seed funding:

WATERBORNE DISEASES. A team led by Elena Naumova (Department of Civil and Environmental Engineering and Department of Public Health and Community Medicine) and Kurt Pennell (Civil and Environmental Engineering) seeks to reduce the public health burden of waterborne infectious diseases in Ghana and India. They are collaborating with colleagues from Christian Medical College in Vellore, India, and the

Noguchi Memorial Institute for Medical Research at the University of Ghana.

LYME DISEASE. Sam Telford (Infectious Disease and Global Health) and his group are developing an oral vaccine to reduce the prevalence of the microbe in mice that causes Lyme disease. Their goal is to reduce transmission of the Lyme-causing bacterium to humans.

HOSPITAL INFECTION. Xingmin Sun (Infectious Disease and Global Health) and his team are working on a vaccine against a stubborn hospital-acquired infection, *Clostridium difficile*, which kills nearly 30,000 people in the United States alone each year. They're targeting those at highest risk for infection, including the elderly and patients with weakened immune systems.

TB TEST. Gillian Beamer (Infectious Disease and Global Health) and her research team are developing a nearly instantaneous diagnostic test for tuberculosis. The project is addressing the limitations of existing tests, including heat stability, portability and rapid results.

To ensure that discoveries get to those who need them most, each research team will recruit other Tufts faculty who can help surmount the political, cultural, regulatory, infrastructure and economic barriers that can hinder scientific breakthroughs from having significance beyond the laboratory. "When you have an outcome that really addresses a problem, you realize it's not just about the science or the technology," says David R. Walt, a University Professor and TII's founding director. "It's about actually understanding the problem and getting the right people in the room who have experience in those areas."

While TII work will be conducted on all three campuses, the institute's base is in 5,000 square feet of newly renovated laboratory, office, and meeting space in the Biomedical Research & Public Health Building.

The TII research teams—which will include undergraduates and graduate students—will also tap the resources of the Department of Molecular Biology and Microbiology next door in the Jaharis Center, the new Arnold 8 biosafety laboratory upstairs, built to advance research in infectious diseases, and Boston’s world-class hospitals.

INTO THE FIELD

With first-year seed funding and incubator lab space assured, the research teams will seek funding from external sources to complete their work. In an era of tight federal resources, funding agencies typically want a grant application to contain preliminary results produced by highly cross-disciplinary teams, Walt says.

Many of the TII research projects will have both social and commercial value, says Lauren Linton, who joined Tufts in July as TII’s deputy director. “TII is designed to foster continuous waves of discovery and entrepreneurship,” she says.

Future projects might engineer microbes for cleaning up oil spills or harvesting carbon out of the air, according to John Leong, chair of the Department of Molecular Biology and Microbiology and a member of the institute’s executive committee. TII could solve problems in fields such as medicine, engineering, the environment and public health because it fuses strengths across disciplines, he says.

Additional thematic areas of research will be developed in the future, and other Tufts faculty will be invited to submit proposals that support those areas. Says Monaco: “With our expertise in human and animal models of disease, international business and policy, engineering, the environment, the humanities and humanitarian issues, and geopolitical contexts and challenges, Tufts is uniquely positioned to produce discoveries that improve the human condition.”

MEDICAL RESEARCH LAB WINS APPROVAL

Dean Berman hails opening of TB facility as “a landmark event”

Tufts University received a permit from the Boston Public Health Commission in June to operate a new research laboratory dedicated to finding new ways to detect, prevent and treat tuberculosis. The 1,700-square-foot Biosafety Level 3 facility, called the Arnold 8 Biosafety Laboratory, is located in the Biomedical Research and Public Health Building (formerly M&V) on the Boston campus.

“The completion of the laboratory is a landmark event for Tufts University School of Medicine,” said Dean Harris Berman. “This facility will make possible innovative, potentially lifesaving research. It will be an important addition not only to Tufts but also to Boston’s health science research capacity.”

Tuberculosis, the primary focus of the laboratory’s research, remains a serious concern worldwide. The World Organization estimates that the disease infects as many as one in three people. Each year, approximately 10 million people develop symptoms that require months of treatment with multiple drugs.

The laboratory will be home to leading scientists, including Bree Aldridge, an assistant professor of microbiology. She is combining her training in microbiology and engineering to uncover the survival strategies of the bacterium that causes TB in an effort to shorten and simplify treatment for the disease.



Research conducted at the newly approved biosafety lab will deepen the world’s understanding of TB.

Our Ailing Patient

U.S. medicine is not delivering the value it should, says alumnus Rishi Manchanda, who offers a prescription for the future

THE QUALITY OF American health care is not so good: We die sooner and are in poorer health than people living in Canada or France. We also pay a great deal more for medical care than those in other industrialized nations and get less, Rishi Manchanda, A97, M.D./M.P.H., '03, told a Tufts audience recently.

That dire diagnosis was confirmed by the 2013 Institute of Medicine report, *U.S. in International Context: Shorter Lives, Poorer Health*, he said. The report was shocking in its conclusions. “We uncovered a strikingly consistent and pervasive pattern of higher mortality and inferior health in the United States, beginning at birth,” it read. It is possible to remake American medicine, Manchanda said,

by looking beyond the walls of the doctor’s office or clinic.

Manchanda is a visionary young physician who heads HealthBegins, an initiative to improve the health of vulnerable populations in Los Angeles. He is also the author of *The Upstream Doctors: Medical Innovators Track Sickness to Its Source* (TED Books, 2013). He returned to Tufts in October as part of the Common Reading Book Program, co-sponsored by the medical school and the Jonathan M. Tisch College of Citizenship and Public Service at Tufts. The digital book was provided to all members of this year’s entering medical class in an effort to spark discussion about timely and provocative issues affecting medicine.

A central part of the problem with health care in America has to do with how the system is organized, Manchanda said, citing its short-term focus on patient symptoms and its fee-for-service structure that encourages recurrent testing without necessarily getting to the root of a particular problem.

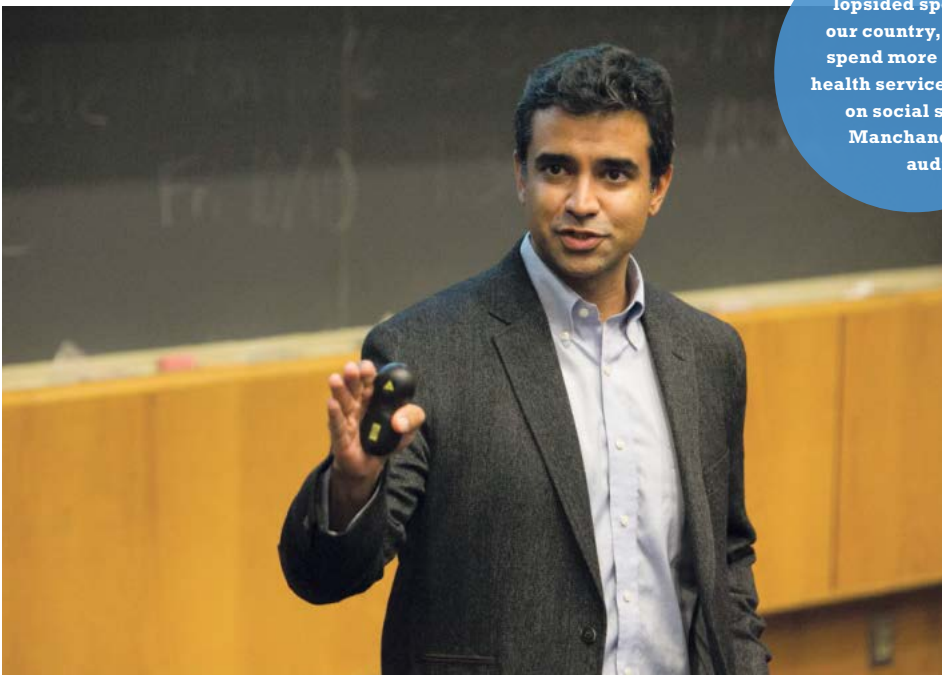
Manchanda cited the case of Veronica, who came into his clinic in South Los Angeles a few years ago complaining of constant headaches. She already had seen a number of doctors, but none of them seemed able to resolve her complaint, and now she was struggling with big bills for the treatment she had incurred along the way. “Veronica was not only still sick, but she was actually worse off,” Manchanda noted. “Now she owes money, and she’s missed time from work, and she’s missed time with her family.”

It was only when Manchanda took time to notice on a supplemental form that her apartment contained mold, water leaks and roaches that something clicked. He realized that because of her subpar living conditions, she was likely suffering from migraines related to chronic allergies and sinus congestion. After he conferred with a local housing organization, which intervened to improve the conditions in Veronica’s apartment, her health began to improve.

How common is a story like this? All too common, Manchanda said, because of the fragmented way that American medicine is set up. Veronica had been bounced from doctor to doctor, test to test, over many months. “I went looking for a villain in this case,” Manchanda said, “but I couldn’t find one. What I found is that people in the system had done fine—everyone was swimming in the lanes. But collectively we were coming up short.”

Manchanda believes that doctors

“We have lopsided spending in our country, where we spend more heavily on health services than we do on social services,” Manchanda told his audience.



need to pay more attention to the social determinants of health as part of routine care. Those with a wider perspective on health than what a brief office visit might suggest he calls “upstreamists.” These are doctors who examine the patient’s entire environment—where they live, where they work, the quality of the air they breathe—in their diagnostic scope. As one example of the wisdom of this approach, he cited a recent British survey of some 40 million patients that found that people who live close to public green spaces are less likely to die from circulatory disease than those who do not.

The narrow focus of medical care prevalent in the U.S. makes neither medical nor social nor economic sense, Manchanda maintained. “The system we’re in right now is this perverse situation,” he said. “We have lopsided spending in our country, where we spend more heavily on health services than we do on social services.” Veronica’s moldy apartment was one consequence of the tilt.

Manchanda’s message may sound revolutionary, and in many ways it is, but he expressed his vision diplomatically, saying the health-care system requires a better “alignment” of existing resources. If American medicine had 25,000 “upstreamists” plugged into the system and exerting their influence, he believes we’d all be better off when we go to see the doctor.

The time may be right in our national conversation for the common-sense perspective of doctors who take a wider view for any diagnosis they make, said Manchanda, who has been meeting and conferring with fellow “upstream” enthusiasts to see what they can come up with to improve American medicine. “Part of the zeitgeist right now has to do with finding value,” he observed. —BRUCE MORGAN



Read an excerpt from Rishi Manchanda’s book, *The Upstream Doctors: Medical Innovators Track Sickness to Its Source*, starting on page 20 of this issue.



Each year since 1997, first-year students have been welcomed into medicine at the White Coat ceremony. The popular event is both festive and meaningful.



THE START OF A MISSION

200 new medical students don their white coats

On September 7, some 200 members of the class of 2018 donned their white coats, one by one, in a formal ceremony symbolic of their entry into the field of medicine. The event, which was held at the Cutler Majestic Theatre in Boston, began with welcoming remarks from Dean Harris Berman and Thomas Hedges, ’75, president of the Tufts Medical Alumni Association.

The keynote speaker was Robert Blackman, ’69, who urged the students to honor the best traditions of medicine as they undertake their studies and launch their eventual careers.

Blackman was a former internist in the U.S. Navy who co-founded California Primary Physicians in 1975. This physician-owned, physician-led organization grew to become one of the largest medical groups in California. It now has a presence in five other states and serves more than 1 million patients.

A longtime supporter of the School of Medicine, Blackman, together with his wife, Joan, endowed the Blackman Foundation Scholarship in 2013 as part of the school’s ongoing Financial Aid Initiative. “Tufts distinguished itself by teaching me an attitude,” he told *Tufts Medicine* at the time of his gift last year. “Medicine isn’t a job; it’s a mission.”



BODY BY SMARTPHONE

Can the thousands of mobile apps on the market aimed at diet and fitness really make us healthier?

WE LOVE OUR smartphones. Since they marched out of the corporate world and into the hands of consumers about 10 years ago, we've relied more and more on our iPhone and Android devices to organize our schedules, our social lives, our finances and now, even our bodies.

Americans are increasingly downloading health and fitness apps designed to help them get in shape, lose weight or manage a variety of health issues. Because our phones are always with us, these apps promise to make it easier to start the long-term

lifestyle changes that promote good health, such as getting more exercise and eating more balanced diets. And now that 91 percent of Americans own a mobile device, health and fitness apps are available to traditionally underserved communities, too. But can these little bits of software really make the difference in the seemingly intractable problem of getting people to eat better and exercise more?

"Thirty-one million pounds and counting." That's how much weight people using one of the more popular weight-loss apps called Lose It! have

lost since its debut in 2008, noted Charles Teague, CEO of the app's parent company, when he spoke as a panelist at a Friedman School seminar on mobile fitness technology at Tufts earlier this year.

Lose It! is like a lot of weight-loss programs, such as the venerable Weight Watchers, in that you need to keep track of what you eat each day and try to meet certain nutrition and calorie goals. "This approach has been around 20 to 30 years; it's not like we have some breakthrough," says Teague. Indeed, many if not most fitness apps, including Calorie Counter, MyFitnessPal and countless others, follow a similar formula.

"Studies have shown it's very useful to track diet and physical behaviors," says Jennifer Satchek, N01, an associate professor at the Friedman School and coauthor of the recent diet book *Thinner This Year*, which advocates small and steady lifestyle changes. "Tracking allows you to see how you're progressing. You're more likely to make changes when you get that positive feedback."

Recent research into how people use their mobile devices shows the potential reach of the new market. As of January 2014, nearly 60 percent of American adults owned smartphones, according to the Pew Research Center. Pew figures from 2012 showed that 20 percent of smartphone owners had downloaded at least one health-and-fitness app. African-Americans and Hispanics—two groups that disproportionately lack access to health-care services—were more likely than whites to own smartphones and use their mobile devices to look for health or medical information online.

GAPS IN CONTENT

So how can consumers know which diet apps to choose? Few scientists have had a chance to take a hard look at the crowded field of apps that has sprung

up in just the last three or four years.

In a study published in the journal *Translational Behavioral Medicine* in 2011, public health researchers conducted what they considered the first survey of 204 weight-loss apps available in Apple's App Store in 2009. Scientists from George Washington University and Duke University Medical Center created a list of 13 "evidence-informed" weight-loss strategies endorsed by the federal government, including keeping food records, getting more exercise and eating more fruits and vegetables. The team found the vast majority of apps available at the time incorporated three or fewer of the 13 strategies.

In a more recent study published in 2013, also in *Translational Behavioral Medicine*, public health researchers from the University of South Carolina found that not much has changed. Of the 57 apps they assessed—this time targeting pediatric obesity—the team found that fewer than half included any evidence-based recommendations at all. Among those that did, many suggested healthier eating and getting more exercise, but failed to recommend starting the day with a good breakfast or cutting back on time in front of the television—two proven ways to accomplish both goals.

TIPPING POINT

Putting too much emphasis on an app's diet- and exercise-tracking abilities may overlook the smartphones' real advantage: connectivity.

Lose It!, like many of its competitors, allows its users to form groups with other users, whether they know them in real life or not. These apps also can link to Facebook pages or Twitter accounts so people can crow about their accomplishments to their existing social networks.

It's already catching on. Sacheck reports that she will be using social networking in her effort to get school

kids to exercise more. She's found that one way to encourage kids to walk or run more is to set up an online competition between schools. "The social aspect is a big thing," she says. "It has to be cool to engage in a healthy lifestyle."

Sacheck would like to see the day when an app or fitness monitor not only tells a user what he has done, but suggests why and how he could do a little more. She'd like to see a diet-tracker notice that someone isn't consuming dairy and then offer a web link to alternative sources of vitamin D. She'd also like to see a calorie counter be able to congratulate people on their activity levels, and then suggest engaging in some higher-intensity workouts.

"The technology today is at the tipping point. Initially, it helps people's awareness. But I think the novelty can wear off if there's not going to be more to it," Sacheck says.

And, of course, as useful as linking to the Internet would be for dieters and exercisers, it could be true that smartphones' most useful trick is why Alexander Graham Bell invented phones in the first place—letting us talk to each other. Fortunately, some apps are already moving in that direction.

For an app called Good Measures,

produced by a Boston company of the same name, subscribers have the chance to interact in real time with dietitians and nutritionists who have access to users' dietary logs. The arrangement allows people to use Good Measures technology to make all the changes they can on their own, and then take advantage of an expert's help to make some of the bigger ones.

"We have people we work with who come to us already having learned insights from the app," says Good Measures' Emily Stone, N08. "It's amazing how it forwards the conversation. Then their counseling session can be more focused on deeper behavior change needs."

Maybe the Good Measures model provides a glimpse into the future of health and fitness apps or apps in general for that matter. Their usefulness might lie less in compiling and providing information than in creating powerful connections among people.

"For any meaningful and sustained behavior change, you need not just the expertise of a registered dietitian, but of someone who cares and is supporting you along the way," says Kris Widican, N06, also involved with Good Measures. "That human component is essential." —JACQUELINE MITCHELL

Tufts
Medicine

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IT'S A GREAT WAY TO STAY CONNECTED WITH TUFTS 24/7



“We hope to continue the tradition of giving that our family has found so rewarding,” Lawrence Cetrulo says of the scholarship fund they established at the medical school.

and the accomplishments of Curt Sr., Curt Jr., and Nick “in a way that was in the tradition of the Cetrulo family.” To that end, the family has created the Curtis L. Cetrulo Sr., M.D., Curtis L. Cetrulo Jr., M.D., M99, and Lawrence Nicholas

Cetrulo, M.D., M12, Scholarship Fund. The fund, which will be matched under the university’s ongoing Financial Aid Initiative, will help deserving students gain the opportunity to study medicine at Tufts.

Because Nick and Curt Jr. Cetrulo pursued their undergraduate studies at Harvard and Stanford, respectively, the scholarship will, when possible, support students who are alumni of those institutions. Another family member with Tufts connections, Curt Jr.’s brother Erik Cetrulo, F02, also contributed to the scholarship.

“We hope to continue the tradition of giving that our family has found so rewarding,” Lawrence Cetrulo says. The Financial Aid Initiative match was very important, he says. “It fit with our family’s desire to collaborate with Tufts in helping students achieve their academic goals without assuming crippling debt.”

The Cetrulo family story has its roots in New Jersey, in the early 1900s. “We all grew up in Newark. My father and his seven siblings all lived close together, so we grew up interacting with our aunts and uncles and cousins on a daily basis,” Lawrence Cetrulo says.

Cetrulo siblings and cousins attended the same schools and competed in the same sports. The family would often get together on weekends and holidays. Summer traditions included vacationing together on the Jersey Shore, where adults and kids would enjoy beach outings and meals together.

“We had a very rich family life,” Lawrence Cetrulo says. “The whole focus growing up was education and

Rooted in Giving

A family with deep ties to the medical school has stepped forward to help students pursue medicine without acquiring crippling debt

FAMILY TRADITIONS FREQUENTLY start with one individual. For the Cetrulo family, many important ones began with Gerald I. Cetrulo II, M.D. He was a nationally acclaimed fencing master and prominent hand surgeon in New Jersey who inspired generations of Cetrulos to follow him into medicine and athletic achievement. He also inspired his incredibly close-knit, extended family to give back to those institutions that helped them attain academic and athletic success.

“The Cetrulo family has always been very loyal to our schools, and this

has included financial support and promotion of athletics,” says Lawrence G. Cetrulo, M12P, a founding partner of the law firm Cetrulo LLP. “Dr. Gerald Cetrulo was my godfather [and uncle], and I essentially grew up in the same house with his son, Curt Cetrulo Sr., a professor of obstetrics and gynecology at Tufts University School of Medicine for more than 30 years. We remain very close, as are our sons, Curt Jr. and Nick Cetrulo, both of whom graduated from Tufts Medical School.”

Lawrence Cetrulo said the family wanted to honor the medical school

athletics. Our parents didn't settle for anything less than excellence in both."

The quest for athletic success resulted in several generations of Cetrulo fencing acclaim. Gerald Cetrulo was an outstanding fencer at Dartmouth and coach at Seton Hall University, and his brother, Dean Cetrulo, won a bronze medal in the 1948 London Olympics. Curt Cetrulo Sr. captained an NCAA championship fencing team at Columbia, and Lawrence Cetrulo was a three-sport athlete and three-time All-American fencer at Harvard.

The focus on academic excellence has also resulted in a long line of Cetrulo physicians. Like his grandfather before him, Curt Cetrulo Jr. is a renowned plastic surgeon, specializing in hand surgery. As a researcher and physician at Massachusetts General Hospital, he led the surgical team that performed the first hand transplant at MGH, on a survivor of the 2003 blaze that killed 100 people at the Station nightclub in West Warwick, Rhode Island.

When Curt Jr. was at Tufts School of Medicine, he lived with Lawrence Cetrulo and his family in Cambridge, Massachusetts. "I remember young Curt studying in our house while he was in medical school. He would invariably read himself to sleep in our living room," Lawrence Cetrulo says. "We'd come down and put a cover over him or wake him and give him dinner."

Lawrence's son Nick was a high school student at the time, and decided to become a doctor largely because of his cousin. Nick Cetrulo, who is married to Kayla Wishall, M12, is in his third year of a general surgery residency at Einstein Medical Center in Philadelphia.

"We hope to encourage students to follow the same path that Curt Jr. and Nick did," Lawrence Cetrulo says, "and in doing so, help Tufts School of Medicine, which did so much to help the Cetrulo family." **-BRENDA CONAWAY**

DEBT RELIEF

Getting a medical education is costly these days, but the generosity of others has helped lighten the financial burden for many of our graduates

Often in life, success has a nice way of building on success. It is in that hopeful spirit, and thanks to overwhelming response from alumni, parents, foundations and friends, that Tufts University School of Medicine is extending its financial aid campaign.

The Financial Aid Initiative, which will now continue through June 2016, has matched more than \$4.2 million in endowed gifts at the medical school over the past two years. Through the initiative, the school matches any newly established endowed scholarships of \$100,000 or more, additions of that amount or more to existing endowed scholarships and any four-year term scholarship pledges of \$60,000 or more.

"I'm grateful to our generous alumni and friends," says Dean Harris A. Berman. "They're making it possible for the next generation of promising young doctors to get outstanding medical training and graduate without massive debts that might narrow their professional choices."

The money raised to date will provide scholarship assistance for as many as 30 students each year, depending on their level of need, says Tara Olsen, the medical school's director of financial aid. "That makes a big difference. It allows us to award more scholarships and larger scholarships," she says. "Without these generous gifts, some of our neediest students might not have chosen to attend Tufts."

In the 2013-14 academic year, 227 Tufts medical students received scholarships, averaging \$22,700 each. The current cost for the M.D. program is between \$84,000 and \$89,000 annually, which includes tuition and living expenses. Although debt levels at the medical school are declining, Tufts currently ranks 16th in the country for average student indebtedness. Average student debt among our graduates who borrowed money to get through medical school was \$191,000 in 2013.

The focus on increasing financial aid at the medical school is part of a university-wide effort that will also continue through June 2016, with the goal of raising an additional \$50 million in new gifts across the university. The initiative has raised more than \$35 million university-wide over the past two years.

Tufts President Anthony P. Monaco has ambitious goals for the Financial Aid Initiative over the next two years. "When the initiative concludes, our generous supporters will have greatly expanded endowed scholarships at Tufts," he says. "This will be a landmark achievement that will benefit Tufts students for generations." **-HEATHER STEPHENSON**



For more information about endowing a scholarship through the Financial Aid Initiative, please contact Rebecca Scott, senior director of development and alumni relations, at 617.636.2777 or rebecca.scott@tufts.edu.

You spoke. We listened.

You asked: “Why give to the Fund for Tufts Medicine *and* make a membership contribution to the Tufts Medical Alumni Association (TMAA)?”

Here’s why...

Each contribution strengthens the School of Medicine in unique ways, and each increases the other’s value.

The Fund for Tufts Medicine is the school’s financial backbone. It’s how TUSM ensures a top-quality academic experience—from excellent faculty, facilities and training, to financial aid for deserving students.

TMAA amplifies your voice within the school and will use your membership contribution to represent the interests of all TUSM alumni through the funding of important school initiatives and student projects.

Will you take a few moments right now to make a gift to the Fund for Tufts Medicine *and* your TMAA membership contribution?

ALUMNI ASSOCIATION PRESIDENT

A MEASURE OF PRIDE



I ASSUME THE presidency of the Tufts Medical Alumni Association with great pride in Tufts. I graduated from the medical school in 1975, before much of the development of the medical school campus and at a time when the New England Medical Center was also undergoing many changes. I have been practicing and teaching fulltime at Tufts

since 1981. I have come to realize that although there has been significant growth at the medical school and the medical center in recent years, we have a proud tradition dating back to post-colonial times, when, in 1796, Samuel Adams helped found the Boston Dispensary to care for those in need.

As I'm sure you know, teaching medical students is a costly business. Your alumni association continues to encourage you to do your part to help. During the tenure of my predecessor, Laurence Bailen, the amount of money

raised by the Alumni Association through dues alone has been greater than ever. That's a positive sign. We hope that all alumni can pay their dues and support our students through annual giving to the Fund for Tufts Medicine.

I have taken that challenge personally. As I assume the presidency of the alumni association, my wife and I have made a decision to provide gifts to Tufts Medical School in our wills. We have made a one-time gift for my 40th class reunion in 2015, and we will continue to make our yearly contributions to the Fund for Tufts Medicine.

We all should take pride in our history, the successful development of our campus, the high quality of care provided by our hospitals, the success of our researchers and the superb education that we provide for our students.

THOMAS R. HEDGES, '75
President, Tufts Medical Alumni Association
thedges@tuftsmedicalcenter.org



Save the Date

APR 24-26, 2015

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

REUNION

TUFTS MEDICINE : 2015

Class Notes

1974

ANN THOMPSON of Pittsburgh, Pennsylvania, has been promoted to vice dean of the University of Pittsburgh School of Medicine, where she had been serving as associate dean for faculty affairs. Thompson is a professor in the school's Department of Critical Care.

1976

ROBERT SCHAAF of Raleigh, North Carolina, a radiologist and former president of Wake Radiology, was inaugurated as the 161st president of the North Carolina Medical Society (NCMS) in late October at the society's annual meeting in Greensboro. Schaaf became a member of NCMS in 1981 and has served on its board of directors since 2004.

1983

ALFRED HAMMER of Dover, Massachusetts, an assistant clinical professor of surgery at Tufts, has been named medical director of Newton-Wellesley Hospital's Outpatient Surgery Center in Wellesley. The 17,000-square-foot center, which opened in 2012, features four state-of-the-art operating rooms, along with prep and recovery areas. Over the last two years, surgeons have performed more than 3,500 procedures there. Hammer, whose specialties include minimally invasive joint reconstruction, hip arthroscopy and sports medicine, also is assistant director of the Kaplan Joint Center at the flagship hospital in Newton, Massachusetts.

1984

CANDACE LAPIDUS SLOANE, J80, of Barrington, Rhode Island, has been re-elected for a third time as chair of the Massachusetts Board of Registration in Medicine. She is a clinical assistant professor of pediatrics at Alpert Medical School at Brown University.

2012

KATHERINE ARMSTRONG of Boston wed Stephen Schworer on June 14, 2014, on Kiawah Island, South Carolina. The bride is a resident in obstetrics/gynecology at Beth Israel Deaconess Medical Center and Harvard Medical School. The groom is pursuing a Ph.D. in immunology at the Sackler School of Graduate Biomedical Sciences.

2014

CHRISTIAN PULCINI of Glenshaw, Pennsylvania, and his wife, Nicole, have welcomed a new baby, Juliette, born July 10, 2014. "It has been an exciting few months since graduating as an intern and father," writes Pulcini, who is interning in pediatrics at the University of Pittsburgh School of Medicine. In May, he was selected as a Massachusetts Medical Society Scholar for his outstanding academic performance and community involvement.

WE WANT TO HEAR FROM YOU.
Send your Class Notes Information to
Tufts Medical Alumni Relations, 136
Harrison Ave., Boston, MA 02111.
Or email us at medicine-alumni@tufts.edu.



New signage includes markers on buildings, interior map panels and free-standing kiosks.

MAKING THE ROUNDS

Some places have about them a strong sense of their identity and overall design. Think of a college quad ringed by trim brick buildings, or a snugly walled Italian hill town. In either case, you know where you are and where you stand in relation to the other parts of the locale.

Tufts University's Boston campus, housed in more than a dozen buildings of different sizes, styles and vintages sprawled across several city blocks, has lacked this feeling historically. It's always been the sort of place that's hiding in plain sight, and of course it doesn't help that the borders of the health sciences campus—including the medical, dental and nutrition schools, plus giant Tufts Medical Center and the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA)—are loosely defined.

The vagueness is gone now. A smartly conceived and beautifully installed new system of signage has been put in place by Tufts through a collaboration among its University Relations Division, the Boston campus health sciences schools, the HNRCA, the medical center, Tufts Shared Services, the Boston Redevelopment Authority and members of the surrounding Chinatown community.

In Memoriam

WILLIAM BOYNTON, '42, of Monhegan Island, Maine, died on Aug. 3, 2014, at age 100. He spent much of his career working on public health projects abroad. He is survived by five children, five grandchildren and eight great-grandchildren.

PAUL DUNN, '44, of Fall River, Massachusetts, an ophthalmologist and surgeon who lived his whole life in Fall River, died on June 8, 2014, at age 94. He is survived by his wife, Donna, one son, two daughters and three grandchildren.

JOHN CURRAN, '44, of Dennis, Massachusetts, died on Oct. 17, 2014. He enjoyed a long career as a surgeon in the Worcester, Massachusetts, area. He is survived by his wife, Barbara, six children, 15 grandchildren and one great-grandchild.

MELVIN GORDON, '49, of Newton, Massachusetts, a retired pediatrician, died on July 6, 2014. He is survived by his wife, Lois, four children and four grandchildren.

JOHN BIANCHI, '50, of Shrewsbury, Massachusetts, died on Sept. 22, 2014, at age 93. He was an orthopedic surgeon for 34 years. He is survived by two sons, Alden and John, and two grandchildren, Alden and Gabrielle.

WILLIAM BASSFORD, '54, of Cromwell, Connecticut, died on Feb. 19, 2014, at age 88. He practiced internal medicine. He is survived by his wife, Frances, three children, four stepchildren, four grandchildren and four stepgrandchildren.

STANLEY PARKER, '54, of Taunton, Massachusetts, died on Oct. 15, 2014, at age 87. He was a pediatrician in his hometown of Taunton for 42 years. He is survived by his wife, Phyllis, three children and five grandchildren.



AN EXTRAORDINARY STUDENT

MOHAMMED ("MOE") ZEIDAN, '15, of Somerville, Massachusetts, was killed in a bicycle accident in Medford, Massachusetts, on Sept. 5, 2014. He was 29 years old.

"Moe was an extraordinary person in every regard," Amy Kuhlik, dean of students, wrote in an email message to students. "He came to Tufts three years ago, having graduated several years earlier

from Amherst College, where he was a standout student, an All-American soccer goalie and president of the student body. He quickly embraced life as a Tufts medical student and became a fixture at class events, community service engagements and the hospital. Moe lived life with enthusiasm and joy. He had a terrific sense of humor and a kind demeanor that endeared him to everyone he met."

Zeidan was born in Edina, Minnesota, and grew up in nearby Eden Prairie. He was the oldest child of Ali and Raghda Zeidan (who died in 1993) and stepson of Fatima Zeidan; he had a brother, Rami, and a sister, Zeina. He is survived by his family members and by his fiancée, Karen Axten, '15, who helped plan his memorial service.

ROBERT SEARS, A50, M54, of Longmeadow, Massachusetts, former president of the Tufts University Alumni Association who practiced in Springfield, Massachusetts, for 34 years, died on July 6, 2014. He is survived by his wife, Norma, five children and 11 grandchildren.

RICHARD FRATES, '55, M86P, of Barrington, Rhode Island, died on July 9, 2014. He spent his career in radiology at Rhode Island Hospital and Women and Infants Hospital (both in Providence). He is survived by five children, including **RICHARD FRATES, '86**, and 11 grandchildren.

GEORGE STEWART, '56, of Chelmsford, Massachusetts, died on June 11, 2014, at age 83. He practiced internal medicine in Chelmsford from 1959 to 1986. He is survived by his friends.

JAMES SULLIVAN, '56, of West Roxbury, Massachusetts, died on Sept. 30, 2014. He practiced internal medicine in Medfield, Massachusetts, for 42 years. He is survived by his wife, Mary, nine children, 19 grandchildren and two great-grandchildren.

BENJAMIN KRIPKE, '57, of Cambridge, Massachusetts, professor and chair of anesthesiology at Boston University School of Medicine, died on Oct. 27, 2014. He is survived by his wife, Carol, two children and four grandchildren.

JAMES HOWE, '69, of Washington, D.C., a neurosurgeon with a practice based in Alexandria, Virginia, died of pancreatic cancer on July 9, 2014, at age 71. He is survived by his wife, Rosemarie, two daughters and eight grandchildren.

JEROME BASS, '73, of Chestnut Hill, Massachusetts, a psychiatrist, died on Aug. 29, 2014. He is survived by his wife, Leah, and two children.

RUSSELL DOW, '74, of Acton, Massachusetts, died on Oct. 15, 2014. He was an obstetrician/gynecologist in private practice in Portland, Oregon, for 35 years. He is survived by his wife, Debi, and two children.

Faculty

JAMES SYMES, of Coral Gables, Florida, a professor of surgery who won acclaim for his work with the late **JEFFREY ISNER, '72**, on groundbreaking cardiovascular gene therapy, died on Aug. 31, 2014. He is survived by his wife, Joanne, and four children.



Benjamin and Rosalie met on a blind date in the 1940s.

THE CENTENARIAN

BENJAMIN SHAPERO, '39, M73P, of West Palm Beach, Florida, died on Oct. 12, 2014, at age 102. He was a pediatrician who practiced in Bangor, Maine, for 59 years, serving the children and families in the area while earning a reputation for the scope of his attentive care.

After seeing a regular schedule of patients and completing his hospital work, “Dr. Ben” would often hop in his car and make house calls to visit the bedsides of children too ill or contagious to make it to his office. Only then would he return home to spend time with his wife and family.

Born in Bangor in 1912, Shapero attended public schools and graduated from the University of Maine in 1935. He served as a major in the U.S. Air Force during World War II and was stationed in England. At war's end, acting on a friend's tip, he met his future wife, Rosalie, for lunch. “We seemed to hit it off,” he said later. Shapero was a kind, gentle man whose greatest joys in life were his religion, his work, his family and time spent playing tennis and golf. He is survived by his wife, Rosalie, daughter Suzanne, son Paul Shapero, '73, and five grandchildren, including Kayle Shapero, '18.

HERBERT J. LEVINE

HERBERT J. LEVINE, of West Newton, Massachusetts, a national leader in cardiology and a doctor who established a relaxed and amiable, patient-centered approach within the cardiology department at Tufts that has lasted 50 years, died on July 11, 2014, at age 85. He had served as chief of cardiology at New England Medical Center (now Tufts Medical Center) from 1961 to 1987, beginning when he was 33 years old, and continued on staff there until his retirement in 2006.

“He was one of the warmest, most pleasant and supporting people in academia that I've ever worked with,” Deeb Salem, chair of the Department of Medicine at the medical school, told the *Boston Globe*. “He was incredibly smart, but also humble.” Those who knew Levine universally saw him as the ultimate physician and teacher, moving easily and with confidence among the fields of patient care, education and research. (Read more on page 16.)

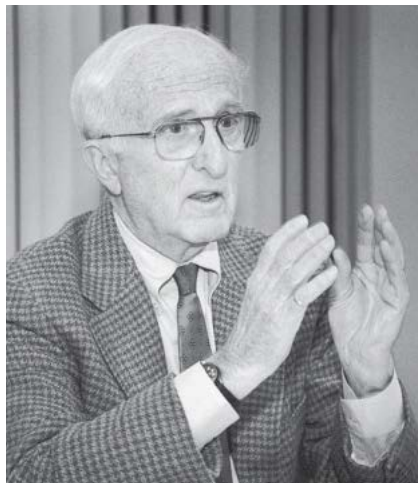
Levine was born in Boston on July 22, 1928, the son of Samuel Levine, an esteemed cardiologist. He graduated from Harvard College in 1950 and earned his M.D. from Johns Hopkins Medical School in 1954, completing his residency at Massachusetts General Hospital and Peter

Bent Brigham Hospital. He was the author of more than 130 papers and several books; his influence was far reaching. Levine served on the editorial board of *Circulation* from 1970 to 1975 and of the *American Journal of Cardiology* from 1984 to 1998.

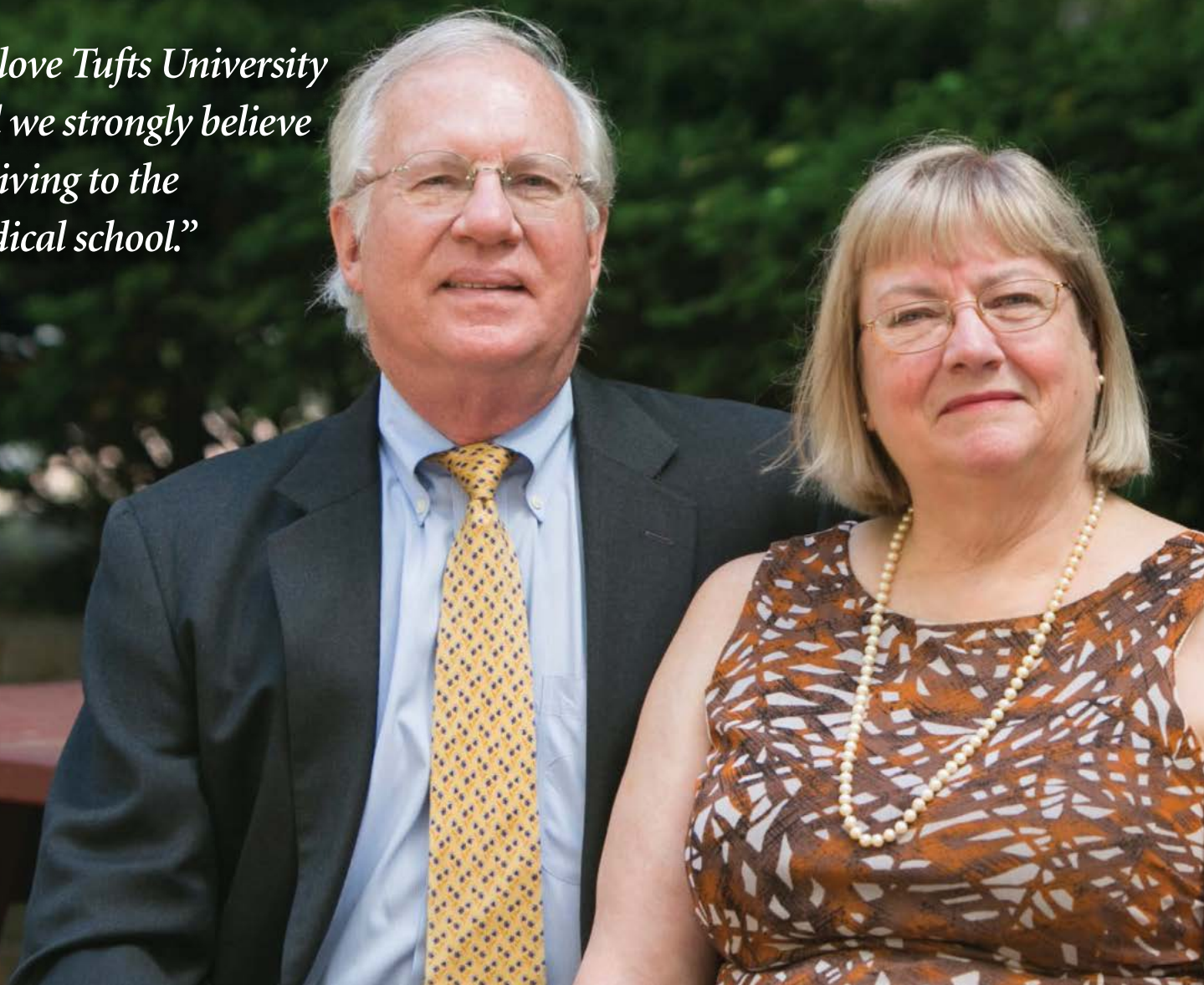
Levine retained his simple, direct approach with patients, regardless of the intensifying time pressures in medicine. “When I started in 1961, I scheduled a full hour for a new patient and a half hour for a returning patient,” he told *Tufts Medicine* in 2006. “I still do it today. You can't teach an old dog new tricks,” he explained, “and I would have resisted if they had tried. I would have said, ‘I'm sorry, there's no way I can do it.’ ”

In 2001, the Herbert J. Levine Foundation for Cardiovascular Clinical Research at Tufts Medical Center was established in honor of Levine's leadership and accomplishments. He won the Distinguished Faculty Award from the medical school in 1992, the Henry Bouchie Humanitarian Award in 1998 and the Leonard Tow Humanism in Medicine Award in 2005.

He is survived by his beloved wife, Sandra, son Andrew and daughter Rachel, and by grandsons Sam, Will and Luke.



*“We love Tufts University
and we strongly believe
in giving to the
medical school.”*



Honoring the School's Past, Providing for Its Future

Thomas Hedges III, M.D., M75, the new president of the Tufts Medical Alumni Association, is on a mission to raise awareness about the school's rich history. “One of the things that makes me so proud to be an alumnus as well as a staff member here is the history of this institution, going back to the founding of the Boston Dispensary, the first civilian health-care facility in New England,” he says.

Tom himself has had a long history at TUSM. He started at Tufts as a transfer student in 1973 and is now the director of the Neuro-Ophthalmology Service at Tufts Medical Center. In addition to seeing patients and conducting research on optic nerve disease, he has taught there for more than 30 years. Students remember him as “the duck hunter guy” for his class on eye movements.

As passionate as he is about TUSM's past, he's also planning for its future. Tom and his wife, **Gail**, have established a gift for the school in their estate plans. The gift honors his upcoming 40th reunion and Tom encourages his classmates to consider including Tufts in their own wills.



For more information please contact Tufts' Gift Planning Office
888.748.8387 | giftplanning@tufts.edu | www.tufts.edu/giftplanning

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➔ Change of address? Questions? Email bruce.morgan@tufts.edu.



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12 **Dock of the Bay**

16 **Master Physician**



MIXING IT UP

Some chemists are content to be chemists and leave it at that. Dan Jay is different. Since he was a boy, he also loved making art. "I have a wonderful sense of community in both," he says. Jay's blend of chemistry and graphic art is something new.

FOR MORE ON THE STORY, TURN TO PAGE 14.