The Curler

When you encounter Matt Mielke, ‘13, seated at a comfortable spot overlooking the ice, the guy looks pretty much like any other person in this suburban Boston club—except for the medical textbook splayed open in front of him. He’s studying intently while he awaits his turn to play.

Mielke stands out in more than one way. First, he’s a past national junior champion at curling (in 2006, while a student at Princeton), the silent-glide-and-furious-whisk spectacle that most people glimpse once every four years, during the Winter Olympics. And then he hails from the wind-whipped upper Midwest. “I’m generally the first curler people have met and the first person from North Dakota,” says Mielke with his wide, winning smile.

He comes, in effect, from the heartland of passionate curling. Mielke says that although most of the 15,000 curlers in the United States are located in the East, the most competitive players inhabit the Midwest, where they’re used to traveling from club to club across great distances to hone their skills. Canada leaves everybody in the shade, with something like a million players.

Curling, as you might expect, is a good deal tougher than it looks. Curlers work in four-person teams, consisting of a shooter, the one who drops behind the 42-pound granite stone and propels it with a crouching, Zen-like release down the ice; two sweepers, who move in advance of the stone on either side and attack the ice with brushes to direct the disc laterally, slow deceleration and extend its travel as needed; and the skip, who stands at the far end of the course amid the stones already there and guides his team, contemplating options and signaling tactics all at once. This is Mielke’s usual role. The goal is to reach the center of the distant ring with your stone while clearing out those of your opponent most astutely. It’s like chess and fly-fishing combined.

A visitor can’t help noticing how friendly and good-natured these curlers are. Still, as welcoming as it is, the curling life is not for everyone. A week or two ago, Mielke and some buds drove six hours up to Ontario for a curling tournament and invited his wife, a sometime curler, along for the ride. Did she agree to go? “Uh, no,” he says, laughing. “She didn’t want to get into a car with four guys.”
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Cover photographs by Yoon Byun
WONDERFUL MENTOR

The article on Ben Shapero, ’39, and his wife, Rosalie (“The Centenarian,” Fall 2012), was special and warmed the cockles of my heart. When I began my radiology career in Bangor, Maine, in 1967, Ben was one of the first to welcome me.

The medical staff was shocked as 12 new physicians arrived on the first of July that year. The hospital had lost its internship and its affiliation with Tufts that year, and had attracted only two new doctors since the 1950s. The medical director at Eastern Maine General Hospital had recently committed suicide, and the only way for things to go was up. Ben became the mentor for all of us and remains an inspiration to me. And wow, did things change for the better.

Ben was the host to all of us “newbies” and deserves credit for much of the wonderful improvement that occurred. He was a major factor in getting the family practice residency started in the mid-1970s. I vividly remember his tennis skills as I was on the receiving end of his successful volleys on many occasions.

If I am not mistaken, Ben began his practice in Bangor as a GP, and with time and experience, he morphed into the most sought-after pediatrician in Bangor. He really taught me that being older and experienced was going to better youth and enthusiasm every time.

ROBERT ANDREWS, A59, M63, A94P
RYE, N.H.

THE QUESTION OF PURPOSE

“Science Denied” (Fall 2012) was an excellent discussion of the risks of science denialism. I have seen misguided parents put their children (and others) at risk by not getting needed immunizations. The difficulty in communicating complexity in simple sound bites and the power of certainty (even if dead wrong) over the uncertainty inherent in science was also insightful.

My only concern was Sean Carroll’s statement that “if you have been told that you have been specifically created by a higher being with some plan for your life, that can be a bit more reassuring than thinking that you’re just one of billions of genetic combinations that has come about at this moment in time after millions of years of hominid evolution, with no plan and no explicit purpose.”

I infer that Carroll believes the latter to be true. Of course, this is where science may merge into philosophy and a place in which intimate knowledge of the trees may blind the observer to the existence of the forest. It also suggests the sort of dualistic thinking from which we all suffer in our oversimplified political discourse.

Perhaps a truly dispassionate and non-biased (truly scientific?) approach would consider the possibility that the billions of genetic combinations are indeed part of a plan and have a purpose. Remaining open to the distinct possibility that a greater power than the scientist himself exists in the universe and acknowledging that all humans (including scientists) are affected by societal biases and their own personal belief systems could really get us somewhere.

JOSEPH W. GRAVEL JR., A82, M86
NORTH READING, MASS.
Strengthening Our Research Potential

Questions such as these are not limited to undergraduate education. Medical schools everywhere are facing the same kinds of conflicts—in our case, between rising tuition and generally reduced funding for medical research.

Your medical school has already taken measures, including the creation of several master's and certificate programs, not only to meet societal needs but also to increase revenue without further pressure on our students' tuition. We have trimmed expenses. The general approach around our campus of late has been to do more with less. One thing is clear: We can't keep running things the old way.

Tufts is proud to be a research university, with all that that means for bettering the public welfare through our hard work in the classroom and in the laboratory. We have always had, and strive to continue to have, a positive impact on the society of which we are a part. We have no intention of abandoning that historic mission.

Yet given our institutional goals and budget constraints, how should we position ourselves as a medical school for the days ahead? Any answer must be collaborative. We have been consulting with basic-sciences faculty—first with a faculty retreat in March 2012 to pose the problem and then with a faculty committee to frame a new vision for research, launched last spring. This was followed by multiple small gatherings of faculty members in November and December to explore the details in depth. The conversations in these meetings have been thoughtful, frequently passionate, but constructive.

A number of overarching questions have guided our discussions. What strengths does our medical school have that set it apart from its peer institutions? How can we build on what we have, rather than veer off course into total reinvention? And a related, pragmatic question: What kinds of research are most apt to be funded five, 10 or 15 years from now? Finally, a question that reminds us why we entered medicine in the first place: How, through our research, can we deliver the greatest positive impact on the health of the world?

These are some long-term issues. But consider a question that pertains more immediately to the way the school has been organized for decades: If we trim the total number of basic science departments within the school, which themes for our research make the most sense? For example, we have a proven strength in cancer research here at Tufts, especially breast cancer. Cancer research could supply a strong natural focus, or theme, to organize ourselves around.

Neuroscience and microbiology have already been successfully reorganized. We have recruited star faculty in recent years, created state-of-the-art laboratory space for them, added support staff and drawn national attention to these programs. It makes sense to proceed from strength to strength in these areas.

And so after months of sustained discussion and analysis, in settings large and small, we at the medical school envision a likely future organization built around three or four such major themes. Inevitably, any reorganization will mean some realignment of faculty and departments. The new model will be leaner and more attuned to funding opportunities than ever before.

Change is always difficult. I understand that. We are in the early stages of a dramatic transition as a medical school. Most agree that change is necessary, but that doesn't make the day-to-day process any easier. I am confident that when this process concludes, Tufts University School of Medicine will be a strong, vibrant and focused research institution, poised to have an even greater impact on curing disease and promoting health.

HARRIS A. BERMAN, M.D.
DEAN, TUFTS UNIVERSITY
SCHOOL OF MEDICINE
Diabetic employees of a wood-products company in Guilford, Maine, had the chance last fall to sit down for one-to-one consultations with an eminent diabetes specialist from Tufts Medical Center. But no one had to take time off from work to make the eight-hour trip from central Maine to a doctor’s office in Boston and back in order to see the medical expert. It was all done online, using video conferencing technology in what’s being called the first time a Maine business has brought telemedicine into the workplace. The story appeared in the Bangor Daily News in early November.

Hardwood Products & Puritan Medical Products Co. employs about 420 people, manufacturing products such as Popsicle sticks and wooden skewers (on the Hardwood side of the business) and medical swabs and tongue depressors (on the Puritan side). The company is self-insured and has used Patient Advocates, a consulting firm in Gray, Maine, to manage the company’s health plan and help employees navigate the health-care industry.

At the telemedicine consultation in early October, seven employees were able to sit in a private room at Hardwood & Puritan and, guided by a Patient Advocates nurse, and consult virtually with Richard Siegel, co-director of Tufts Medical Center’s Diabetes Center, about their respective medical conditions. Following the sessions, Siegel, an associate professor at Tufts Medical School, arranged to send his notes and recommendations to each employee’s local primary-care physician. The link had special value given that access to medical specialists is rare in rural areas.

The trend of using telemedicine in the workplace is steadily gaining steam. “It’s very much a hot topic among large employers,” says one software consultant quoted in the story. The airline industry has used telemedicine to connect pilots and flight attendants with physicians because of their irregular schedules, and large financial services firms have deployed the technology to save employees a trip to the doctor and an afternoon lost at work.

In 2013, some 17 percent of midsize and large U.S. companies plan to offer telemedicine, and another 27 percent are considering it for 2014 and 2015, according to experts in the field.

Some critics harbor doubts on the real value of the approach. “Just connecting patients to specialty resources doesn’t necessarily promote the continuity of care or health-care delivery that we want to see in rural areas,” says Andrew Coburn, associate director of the Muskie School of Public Service at the University of Southern Maine. “The question is: Can technology be used to create more of a system than an occasional contact with a specialist?”

Siegel and others are hopeful that the emerging telemedicine program eventually will include more local resources such as nutritionists and pharmacists—and grow from there.
OVERHEARD

“Given the large and increasing number of deadly mass shootings and the enormous number of military-style assault weapons available, it stands to reason that we must find ways of reversing the trend, and as physicians, this task should be part of our professional responsibility.”

—Dr. Jerome P. Kassirer, University Professor, in “Weapons of Mass Destruction,” JAMA Internal Medicine Online, Dec. 21, 2012
Could you lessen your chance of getting cancer by taking a multivitamin every day? Most investigations of that question have yielded “decidedly mixed results,” according to a recent article in the *New York Times*.

Boston researchers announced last fall that one of the largest long-term clinical trials of multivitamins in the United States, encompassing 14,000 male physicians ages 50 and older and lasting a decade, found that taking a combination of essential vitamins and minerals on a daily basis decreased the incidence of cancer by 8 percent, compared with a placebo pill. But some earlier trials using high doses of nutrients thought to be cancer fighters actually drove up cancer rates instead of reducing them.

“There’s a mystique about vitamins, that vitamins are some type of magical ingredient,” said David Schardt, senior nutritionist for the Center for Science in the Public Interest, an advocacy group in Washington, D.C. “There is a kernel of truth in that, because vitamins are essential to life. But that people will live longer or healthier lives if they take vitamins or eat foods fortified with vitamins—that’s difficult to prove.”

Deficiencies of certain nutrients can be harmful; in some cases, an excess can also be bad. In two separate studies, smokers who were given high doses of beta carotene—a naturally occurring compound that converts in the body to vitamin A, and which is thought to be protective against cancer—unexpectedly developed more lung cancers than smokers who were on placebos. The high doses caused DNA damage instead of blocking the cancer as intended, according to Marji McCullough, a nutritional epidemiologist with the American Cancer Society.

Generally speaking, Joel Mason, professor of medicine and nutrition at Tufts, argues for a middle path. Like some medications, certain nutrients and vitamins may need to be delivered within an optimal range to confer benefit, he says. He and others in the field have labeled this concept the “Goldilocks phenomenon.”

ROSENBERG NAMED TO FEDERAL SAFETY BOARD

Beth Rosenberg, an assistant professor of public health and community medicine, won Senate confirmation in early January to become a member of the Chemical Safety and Hazard Investigation Board (CSB) for a five-year term. The CSB is an independent federal agency charged with investigating the cause of industrial chemical accidents in the U.S.

Rosenberg served as a member of the Massachusetts Toxics Use Reduction Scientific Advisory Board from 2000 to 2008. Since 2005, she also has been studying the health and safety conditions at former U.S. nuclear weapons production sites. Increasingly, the CSB has considered fatigue, long hours and other working conditions in its investigations, areas that Rosenberg has focused on in her research.

She earned a B.A. in anthropology from Wellesley College, an M.P.H. in health law from Boston University School of Public Health and a Sc.D. in work environment policy.
Helping Hand

“My background is in starting not-for-profit health plans. I started and ran the first HMO in New Hampshire back in 1971, and that’s where I had my first exposure to physician assistants. A real problem is that we just don’t have enough people doing primary care out there. And part of the problem is that we don’t pay them enough. If Medicare and Medicaid decided they were going to take the same pie and divide it separately, giving less money to specialists and more to primary-care doctors, it would attract more people into the field. While health reform did some to reward primary-care people better, it wasn’t a major shift. You’ve got to double the amount they’re going to make if you’re really going to attract people’s attention.

“We see the physician-assistant program as a supplement to what primary-care doctors do. So if we can help primary-care doctors, pediatricians, internists organize a team of people to take care of their patients, they could see many more patients. We think that we can create a model where many more patients can be seen by the doctors we’re producing.

“There’s a huge demand for physician assistants. When we came up with this program, we went around to the various hospitals to see if they would be interested in training these people. And every one of them said they would be delighted to do it, because they hoped that after they trained them, these people would want to work there and help them solve workforce problems.”

EDITOR’S NOTE: THE BOSTON GLOBE MAGAZINE OF OCTOBER 28, 2012 HAD DEAN HARRIS BERMAN SPEAKING WITH RACHEL DEAHL ABOUT THE MEDICAL SCHOOL’S NEW PHYSICIAN-ASSISTANT TRAINING PROGRAM, WHICH MATRICULATED ITS FIRST CLASS OF 30 STUDENTS IN JANUARY. WE REPRINT THOSE REMARKS WITH PERMISSION HERE.

day in the life

By Michael Schecht, ’14

“Wanna grab some Italian later?”

“The truest gift

For a long time now, first-year medical students at Tufts have held an annual memorial service on campus to honor their first patients—the generously donated cadavers they have studied in gross anatomy lab. Three years ago, students began inviting families of donors to the service. And this year, some 135 family members attended. Together with students and faculty, more than 400 people were on hand.

“Anatomy is a physically and emotionally demanding rite of passage, forcing many students to confront their feelings about death for the first time,” Robert Willson, who directs the clinical anatomy course, told the AAMC Reporter last October. “We emphasize the humanity of these donors and show respect for the spirit of kindness that made them give their bodies to medical education.”

Gratitude takes many forms. Often, there is music played. Students compile poetry and personal essays, along with photos of themselves, in a memorial book that they share with families of the donors.

Students get a chance to meet donor families at a reception. Here they are able to hear firsthand stories about their living, breathing donor and gain a fuller sense of the person they only met once breath was gone. Following the service, students carry long-stemmed red roses back to the lab and place them on the empty dissecting tables.
**LETHAL EXHAUST**

Research leads to designation of diesel fumes as a known carcinogen by Gail Bambrick

SQUEEZED AMONG tractor-trailers creeping through the Callahan Tunnel on the way to East Boston, you know those nasty-smelling diesel fumes can’t be good for you. Now a landmark study has found that prolonged exposure to that noxious exhaust increases the risk of developing lung cancer.

The study, co-authored by Mary Davis, an associate professor of urban and environmental policy and planning at Tufts, was published in *Environmental Health Perspectives*, the monthly journal of the National Institute of Environmental Health Sciences, in June. The research was so conclusive that later in the summer, the World Health Organization’s International Agency for Research on Cancer (IARC) reclassified diesel exhaust from a “probable” to a “known” carcinogen.

“Our study has allowed the IARC to say that now the science is finally there,” Davis says. That may lead to changes in the way diesel exhaust is regulated around the world.

“The difference in the designation may seem small, but it is huge when it comes to regulations,” says Davis. That’s because governments use such classifications to support new emissions standards. In the U.S., for example, the Clean Air Act of 1970 deemed diesel a probable carcinogen and mandated vehicle emission reductions.

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Pulmonary metastases in a 79-year-old man.

Most of those regulations were in effect by the 1990s and were reinforced by the 2005 Diesel Emissions Reduction Act, which funded development of new clean diesel technologies, including emissions controls, engine and vehicle replacements and alternative fuel options.

So even though you can still detect fuel odors when you’re behind a big rig on a U.S. highway, federal regulations have kept diesel fumes from becoming a dire health threat in this country.

But some trouble spots remain, such as the ports in Los Angeles and Long Beach, Calif., where there is tremendous diesel truck traffic, and the sheer volume of vehicles coming and going can create an exposure problem, Davis says.

The study’s challenge was to determine how lung cancer deaths are linked to diesel exposure. The researchers needed two things—people regularly exposed to that noxious exhaust and a model to quantify exposure over time. Based on data gathered in field research at 36 truck terminals nationwide, Davis and her colleagues extrapolated how much diesel exhaust 31,150 trucking industry workers nationwide were exposed to between 1985 and 2000, and then cross-referenced the data with death certificates. They counted the incidence of lung cancer as the primary or underlying cause of death and adjusted to account for cancers caused by smoking.

The results showed that drivers and dockworkers on the job for five to 10 years had their risk for lung cancer increase by 15 to 40 percent above the average person who did not work in the industry. For those with 20 years in the industry, the risk nearly doubled.

Davis first identified the amount of exposure occurring for each kind of trucking job. To do this, the researchers took a series of road trips over several years, making five-day air-quality sampling trips to 36 terminals randomly chosen to represent the 139 large truck terminals owned by the four major trucking companies studied. Davis, who took part in two of the trips, and her colleagues at Harvard monitored the air on the docks, in offices and in truck cabs with windows opened and closed, sometimes attaching monitors to the workers themselves.

She used the data to create a statistical model of the health effects of diesel exposure depending on what jobs workers performed over the course of their careers. In developing the model, Davis factored in changes in regulation, ambient air pollution and types of fuels and trucks over 50 years—“thousands and thousands of data points to fit a scenario no one had ever tried to model before,” she says.

Gail Bambrick, a senior writer in Tufts’ Office of Publications, can be reached at gail.bambrick@tufts.edu.
ANTIDEPRESSANTS AND PREGNANCY

Study shows need for caution, as drugs like Prozac can have adverse effects on babies by Jacqueline Mitchell

DEPRESSION, ONE OF the most crippling and costly illnesses in the United States, is the leading cause of disability among people ages 15 to 44. Since Prozac hit the market in 1987, many Americans have relied on antidepressant medications to control their symptoms. One in 10 of us takes antidepressants, making them the third most common prescription drug, after painkillers and high blood pressure pills, according to a 2011 report from the National Center for Health Statistics.

Thought to be linked to increased rates of diabetes and heart disease, depression is also widely believed to adversely affect pregnant women by increasing risks for early delivery and low birth-weight babies, as well as interfering with a child’s intellectual and emotional development. So it has become standard practice to treat the roughly 13 percent of pregnant women with symptoms of depression with selective serotonin reuptake inhibitors (SSRIs), the class of drugs that includes Prozac, Celexa and Zoloft. Physicians often assume that the benefits of these medications, which carry fewer side effects than the previous generation of antidepressant drugs, outweigh the risks.

But in fact, for most women, the opposite is true. Depressed mothers-to-be who take the drugs—as well as their babies—fare much worse than those who do not, according to Tufts researchers who reviewed the latest science about SSRI use during pregnancy in a paper published in October in the journal Human Reproduction.

Adam Urato, a perinatologist in the division of maternal/fetal medicine at Tufts University School of Medicine and ob/gyn department chair at the MetroWest Medical Center, and his colleagues found study after study showing that the medicated moms have increased risk for a number of things: miscarriage, pregnancy-related high blood pressure, birth defects and premature delivery. The researchers also found studies linking fetal exposure to the antidepressants with cardiac and respiratory problems, growth and developmental delays—and even autism.

Because there is mounting evidence that nonpharmaceutical treatments for depression, specifically cognitive behavioral therapy and/or exercise, work as least as well as drugs, Urato and his colleagues want women and their doctors to have more information about their options.

Tufts Medicine: You and your colleagues write that many doctors have assumed that depression poses more of a risk to a pregnancy than antidepressants do. Where did that assumption come from?

Adam Urato: There is a dominant paradigm out there that treats depression and pregnancy as analogous to, say, diabetes and pregnancy. So people think, just like you can improve a diabetic woman’s pregnancy by giving her insulin, you can improve a depressed woman’s pregnancy by giving her antidepressants.

The trouble is that is totally false. When you look at the scientific evidence, women who get treated with antidepressants don’t have better pregnancy outcomes. They actually do worse.

That’s the big story here. Why isn’t the public aware of these risks that we cite? We’re not making this stuff up. We cite all these studies that demonstrate this. The important thing is making patients, pregnant women, women of childbearing age and their ob/gyn providers aware of the risks. There’s a general lack of awareness.

PREGNANCY, continued on page 10
**PREGNANCY, continued from page 9**

Where does that lack of awareness come from?

I think it’s partly wishful thinking on the part of doctors, patients and the public. A depressed pregnant woman is a sad situation, and we all wish there was something we could give her without any risk.

Another reason that I think the public has an incorrect assumption on this issue is that a lot of the leading researchers and research centers are funded by the antidepressant makers. It’s self-evident why that’s problematic. When most of your leading centers and researchers who are supposed to be studying this are being funded by drug makers, it pushes the research, the findings and the interpretation in a certain direction. I like to believe in the goodness of my fellow man and scientists, but heavy funding creates a pressure on the scientific system in terms of what kinds of results and what kind of warnings the public gets.

It also takes a while for harm to show up when drugs are being used in a widespread fashion. We’ve seen this in other products. It took a long time to realize the risks of DES, which was given to pregnant women to prevent miscarriage from 1938 to 1971. [The synthetic estrogen actually caused birth defects and infertility in the adult children of DES moms.]

Prozac was launched around 1987, so we’ve been using it only for about 25 years, and now this information is beginning to come out.

**What are some of the findings?**

There’s an increased risk of miscarriage. There have now been more than 40 studies looking at the relationship between SSRIs and preterm births, and something like 90 percent of those studies show increased rates of early delivery. There is a steady flow of findings pointing in the direction of increased risk.

Shortly after birth, some babies of mothers on antidepressants have jitteriness, crying, difficulty feeding. In the worst-case scenario, babies have seizures or respiratory distress so severe it requires intubation. That may be withdrawal from the drugs, or it could also be something called serotonin syndrome, which happens when an excess of the neurotransmitter builds up between neurons in the brain. One study estimated as many as 30 percent of babies exposed to SSRIs during gestation experience this syndrome.

Four studies linked SSRI use to preeclampsia, dangerously high blood pressure in pregnant women. We’ve seen evidence of decreased fetal growth and decreased fetal head size. About 10 percent of babies exposed to antidepressants in utero will manifest cardiac changes we can measure on an EKG.

The conventional wisdom is often that risks of complications from these drugs are low. The rates are not low. A number of studies have shown the miscarriage rate among women who take SSRIs in the range of 12 to 15 percent; preterm birth rate has been reported to be as high as 20 to 30 percent. One study put the risk of preeclampsia higher than 25 percent. Among the general population, the risk of miscarriage is less than 10 percent; preterm birth occurs about 11 percent of the time, and just 7 percent of women experience preeclampsia.

Are there long-term consequences for the babies?

That’s the big unknown. Fetal development is a pretty complex process. The developing embryo is loaded with serotonin receptors, and serotonin plays a crucial role in fetal development. Serotonin is the major neurotransmitter that drugs like Prozac act on to alleviate the symptoms of depression and other mood disorders.

What happens when we chemically alter human development this way? The answer is we just don’t know, but animal studies that have looked at bonding and other social behaviors have concerning findings. Study after study shows significant changes in brain development and in behavior.

Now the human data is pointing in that direction as well. A few studies show motor changes; in one particular study, children exposed to antidepressants were learning to sit up 16 days later than their peers and learning to walk 29 days later. A 2011 study from Kaiser Permanente has shown a doubling of the risk of autism.

It goes beyond the brain. Serotonin is also found in the gastrointestinal tract, lungs, blood platelets and bones. It’s a crucial neurotransmitter. Without sounding too alarming, we shouldn’t be surprised that altering serotonin levels could cause complications.

Is it your opinion that pregnant women should not take antidepressants?

Whether pregnant women should take these drugs or not has gotten somewhat confused in the media coverage. The media wants the headline to say, “Do take these drugs,” or “Don’t take these drugs.”

Giving good care to women isn’t about telling them what to do. It’s about providing them with accurate information, and then they can decide what they want to do. They know themselves and the severity of their depression better than anyone.

The key first step in taking care of patients—especially with regards to medication use—is counseling regarding the risks, benefits and alternatives. My own frustration as an ob/gyn is that I see a lot of these women who just have not been adequately counseled. If you’re going to have a woman taking pills throughout her pregnancy, she has a right to know—she deserves to know—what the scientific evidence is regarding the risks, benefits and alternatives to using medication.

That’s what this paper tries to make clear.

 Jacqueline Mitchell, a senior health sciences writer in Tufts’ Office of Publications, can be reached at jacqueline. mitchell@tufts.edu.

**“WHAT HAPPENS WHEN WE CHEMICALLY ALTER HUMAN DEVELOPMENT THIS WAY? THE ANSWER IS WE JUST DON’T KNOW.” —ADAM URAITO**
TOOTH TATTOO

Tiny oral sensor could help assess patients’ oral and overall health by David Levin

GOLD, SILK AND GRAPHITE may not be the first materials that come to mind when you think of cutting-edge technology. Put them together, though, and you’ve got the basic components of a new ultrathin, flexible oral sensor that can measure bacteria levels in the mouth. The device, attached temporarily to a tooth, could one day help dentists fine-tune treatments for patients with chronic periodontitis, for example, or even provide a window on a patient’s overall health.

The sensor, dubbed a “tooth tattoo,” was developed by the Princeton nanoscientist Michael McAlpine and Tufts bioengineers Fiorenzo Omenetto, David Kaplan and Hu Tao. The team first published its research last spring in the journal Nature Communications.

The sensor is relatively simple in its construction, says McAlpine. It’s made up of just three layers: a sheet of thin gold foil electrodes, an atom-thick layer of graphite known as graphene and a layer of specially engineered peptides, chemical structures that “sense” bacteria by binding to parts of their cell membranes.

“We created a new type of peptide that can serve as an intermediary between bacteria and the sensor,” says McAlpine. “At one end is a molecule that can bond with the graphene, and at the other is a molecule that bonds with bacteria,” allowing the sensor to register the presence of bacteria, he says.

Because the layers of the device are so thin and fragile, they need to be mounted atop a tough but flexible backing in order to transfer them to a tooth. The ideal foundation, McAlpine says, turns out to be silk—a substance with which Kaplan and Omenetto have been working for years.

By manipulating the proteins that make up a single strand of silk, it’s possible to create silk structures in just about any shape, says Omenetto, a professor of biomedical engineering at Tufts. Since 2005, he’s created dozens of different structures out of silk, from optical lenses to orthopedic implants. Silk is “kind of like plastic, in that we can make [it] do almost anything,” he says. “We have a lot of control over the material. It can be rigid. It can be flexible. We can make it dissolve in water, stay solid, become a gel—whatever we need.”

Omenetto, Kaplan and Tao created a thin, water-soluble silk backing for McAlpine’s bacterial sensor—a film that’s strong enough to hold the sensor components in place, but soft and pliable enough to wrap easily around the irregular contours of a tooth.

To apply the sensor, McAlpine says, you need only wet the surface of the entire assembly—silk, sensor and all—and then press it onto the tooth. Once there, the silk backing will dissolve within 15 or 20 minutes, leaving behind the sensor, a rectangle of interwoven gold and black electrodes about half the size of a postage stamp and about as thick as a sheet of paper. The advantage of being attached directly to a tooth means that the sensor is in direct contact with bacteria in the mouth—an ideal way to monitor oral health.

Because the sensor doesn’t carry any onboard batteries, it must be both read and powered simultaneously through a built-in antenna. Using a custom-made handheld device about the size of a TV remote, McAlpine’s team can “ping” that antenna with radio waves, causing it to resonate electronically and send back information that the device then uses to determine whether bacteria are present.

Right now the sensor can detect only gram-negative bacteria, the general class of bacteria responsible for periodontal disease. Once its detection ability is honed, it eventually might help dentists track exactly when and where certain bacteria are present in the mouth so that they can develop customized treatment plans for patients with chronic periodontal disease.

“A sensor like this could give you a panoramic view of what’s happening over a number of hours or even days,” says Gerard Kugel, D85, L93, a professor of prosthodontics and operative dentistry and associate dean for research at Tufts School of Dental Medicine.

In addition to monitoring oral health, Kugel believes the tooth tattoo might be useful for monitoring a patient’s overall health. Biological markers for many diseases—from stomach ulcers to AIDS—appear in human saliva, he says. So if a sensor could be modified to react to those markers, it potentially could help dentists identify problems early on and refer patients to a physician before a condition becomes serious.

“The mouth is a window to the rest of the body,” Kugel says.

David Levin is a freelance science writer based in Boston.
Once a week for the past seven years, Jennifer Hollis has phoned Elizabeth Collins, medical director of the palliative care service at the Tufts-affiliated Lahey Hospital & Medical Center, to ask whether there might be someone there who would benefit from her visit. “A patient may be struggling, or a family may be needing some peace,” Collins suggests.

Hollis is a certified music-thanatologist, a palliative care modality that uses harp and vocal music to comfort patients who are dying. The field, which began in the 1970s, is small, with something like 100 practitioners in the United States. As far as she knows, Hollis, who works as assistant director of admissions at Harvard Divinity School (where she also earned a master of divinity) is the sole practitioner in Massachusetts. She is the author of Music at the End of Life: Easing the Pain and Preparing the Passage (Praeger, 2010) and served as president of the Music-Thanatology Association International from 2006 to 2012.

How would you describe music-thanatology?
Music-thanatologists share a small repertoire of music that we all learn when we go through our training, and then we work with the individual patient to create what we call a “musical prescription” for them. So rather than playing familiar songs, or songs from the era when patients were young, or something they might have heard at their wedding, we work with the underlying parts of music, the “raw materials”—the rhythm, the harmony, the melody, the tonality—to address what’s going on with the patient physically or emotionally—their heart rate, their respiration or their vital signs.

So it’s tailored to the individual patient?
That’s right. No two music vigils are exactly alike. We’re responding moment by moment to what’s going on for the patient, so we can make small changes, we can improvise and really attend very carefully to what’s happening for the patient right in the moment.

Why is the harp the instrument of choice?
One, it’s polyphonic, like a piano, so you can play chords and melodies, creating lots of layers of music at the same time. It’s portable. I have a folk harp that I built from a kit that’s about five feet tall, and I wheel it around on a cart that someone made for me. It fits in the back of my small car. It’s portable enough to get into elevators and into crowded hospital rooms. The other thing is that the harp has a really wide range, so you get these glistening high notes, and then you have really deep, low bass notes.

How does the singing work together with the harp?
Well, it’s sometimes just harp, sometimes just singing, sometimes harp and singing, and sometimes there are periods of silence. It really depends on what I’m observing and how the patient is responding to the music.

What effects of your playing have you seen?
The patients often fall asleep. Caregivers and visitors who are in the room will sometimes also fall asleep. I let people know that that’s all right, because it can be so stressful to be with someone who’s dying—to sit in that hospital room for days on end. I think the music creates a little bit of space so that people can rest.

Sometimes people begin to cry. Then I check in to see if they’re OK. Sometimes people tell stories. They may move closer to the patient’s bed; they may hold the person’s hand. I’ve seen family members lay their head down on the bed in this tender gesture of connection.

And I’ve also seen physical changes in people. One time I went to play for someone whose heartbeat had been very rapid all day long. The nurses weren’t able to get it under control, and so they asked me to come and play. After 20 minutes of music, a nurse came into the room and said, “I just want you to know that we could see on the monitors that as soon as you started playing, the heart rate dropped in half.”

What do dying patients gain from the experience?
I hope they get beauty, an experience of something tender and beautiful in the middle of what can be a challenging and confusing time. I hope they gain a feeling of support. I hope their suffering is relieved, physically or emotionally. And I hope it helps them to be more comfortable with their own death.
Jennifer Hollis performs for a patient at Lahey.
Inside Tufts Medical Center in downtown Boston, Andrew Greenberg leads me through a long hallway covered with research posters. About halfway down, he stops and points to a photo of fat samples collected from mice in his lab. The first sample looks more or less the way you’d expect—a lump of the yellow-white tissue similar to the kind that plumps our bellies and thighs, and wraps itself around our internal organs. The other sample looks very different. It’s a creamy coffee color. This, Greenberg proclaims, is what’s called “brown fat.” Ironically, it is this obscure type of fat that may become a powerful tool in the fight against obesity, thanks to a unique characteristic: Instead of storing calories from food, it burns them up.

Greenberg is director of the Obesity and Metabolism Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging, where he studies brown fat formation and metabolism. He says that the cell’s ability to burn calories is due in part to its structure. Under the microscope, white fat cells look like bundles of swollen grapes filled with molecules of fatty acids. Brown fat cells, on the other hand, are much more compact, and hold only a small number of those molecules. The cells are also chock-full of mitochondria, tiny structures that act as engines for the cell, taking in fuel and creating energy.

**By David Levin**  **Illustration by Betsy Hayes**
Brown fat cells may do more than just burn calories. They may also play a complex role in bone health, says Clifford Rosen, senior scientist at the Maine Medical Center Research Institute in Portland.

As you step out your front door on a cold winter day, Rosen says, your body “turns on” its sympathetic nervous system (SNS), the same system responsible for the rush of adrenaline you feel when startled. The SNS, in turn, activates brown fat cells, which burn up calories to create heat. In the process, your body slowly regains its warmth, and the SNS quiets back down.

If the body doesn’t have enough brown fat to maintain its temperature, though, the nervous system changes strategies. In an effort to keep the body warm, the SNS sends new commands to white fat cells, ordering them to take on brown fat-like properties.

“If you don’t have a lot of brown fat, your body still needs a way to protect its temperature. So it tries to convert white fat to brown fat,” says Rosen, who is also a professor at Tufts University School of Medicine.

If the body can create enough new brown fat-like cells, it can regain its normal temperature. The conversion comes at a cost, however: Rosen says the signals that tell white fat cells to “go brown” can also affect bone density.

Unlike white fat, however, brown fat cells can throw those engines into neutral. Thanks to a protein called UCP-1, they can switch off their energy production and use fatty acids to generate heat instead. “That’s one of the major reasons brown fat exists,” says Greenberg, who is also an associate professor at the Friedman School. “It’s engineered to release heat and keep us warm.”

Because of this special quality, brown fat is common in babies and hibernating animals, which need to maintain body heat to survive long, bitter winters. But the tissue’s warming properties also make it attractive to drug companies and obesity researchers.

Like a furnace in a cold Boston winter, brown fat burns through a tremendous amount of fuel to create warmth. As it works its way through its own small store of fatty acids, it also starts taking fat out of the bloodstream—fat that’s released by bloated white fat cells elsewhere in the body.

“What may be happening is that brown fat is burning what it’s got, but it’s also funneling white fat from other parts of the body to be burned up,” says Aaron Cypess, a researcher and staff physician at the Joslin Diabetes Center in Boston.

If researchers can find a drug that activates brown fat, Cypess says, it might be an

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While the process isn’t well understood, Rosen says, the SNS also seems to boost the activity of cells called osteoclasts that dissolve bone material. The longer the SNS is active, the longer those cells eat away at the skeleton, reducing bone strength and density.

“This is a systemic effect,” he says. “The body’s trying to compensate for a lack of brown fat, but at the same time, it might be to the detriment of the skeleton.”

The length of time the SNS is active may be linked to the amount of brown fat in the body when it gets cold, Rosen theorizes. He’s begun to test this idea on mice in the lab, and says that his initial findings show that the fewer brown fat cells a mouse has, the poorer its overall bone health.

While Rosen is quick to note that his studies aren’t yet conclusive, it could mean that the same phenomenon happens in humans. The stores of brown fat that we’re born with gradually disappear as we age—a natural development which, Rosen says, could cause osteoporosis in the elderly.

A lack of brown fat may not always be a problem, however. Rosen notes that calcium, vitamin D and exercise also help maintain a healthy skeleton. “Those things are really important,” he says. “And we don’t know this for sure, but maybe not getting exposed to cold as much might be helpful, too.”

Brown to the Bone
effective treatment for obesity. "You've got a [substance] that's basically designed to burn off calories," he says. "The question is, can we use it to burn off enough calories to have clinical significance?"

**A BROWN RENAISSANCE**

Scientists have tried to answer that question many times. During the 1970s and early '80s, labs around the country—including many at major drug companies—began testing compounds that seemed to activate brown fat in lab animals.

"It turned out that these compounds, known as beta-3 agonists, worked on mice, but on humans, they didn't work so well, because there were some different [biological] characteristics," says Greenberg, the Atkins Professor in Metabolism and Nutrition.

One major difference, he notes, is that adult humans have significantly less brown fat than babies or lab rats. As we age, we slowly lose our stores of the tissue, which form mainly along the spine and upper back at birth.

Robin Kanarek, the interim dean of the Friedman School and John Wade Professor in the School of Arts and Sciences, was one of many researchers who studied the effects of brown fat in the early 1980s. She says that interest in the tissue began to wane by the end of that decade, because many researchers assumed that there wasn't enough active brown fat left in adults for it to have a meaningful effect.

"At the time, we just didn't have the techniques and technology to effectively monitor and identify brown fat in the body," she says. "A lot of the science has changed because of the tools we have today."

New imaging technologies such as PET-CT scans, which measure the activity of cells in the body, have led to a renaissance in brown fat research, Kanarek says. Normally, these scans are used to find cancerous tumors, but they can also consistently spot small deposits of brown fat in adults that are reviving away, converting glucose and fatty acids into heat. In 2009, three independent teams of researchers (among them a group led by Cypess) used PET-CT scans to identify tiny stores of the tissue in adult humans.

These discoveries rekindled the hope that brown fat could be used to control obesity. But despite the newfound excitement about its existence in adults, Cypess says he and other researchers still faced one lingering issue: "Adults only have, at most, 100 to 300 grams of brown fat in the body. Due to the small amount, it's not clear if it's going to have that much effect based on its energy expenditure alone," he says.

When the brown fat stores we're born with begin to shrink, there's no way to bring them back, but Cypess says there may be a sort of biological loophole. Some white fat cells can take on the properties of brown fat—they shrink in size, produce more mitochondria, and most important, generate heat.

"If you can make white fat—which we it may be the key to the formation of brown-fatlike cells in the body.

"[By injecting irisin] in mice, we've shown a two- or three-fold elevation in brownlike fat, which improved the metabolic status of those animals," Spiegelman says. "Would that be enough to cause weight loss in obese humans? We're not sure. But in mice it looks promising."

Spiegelman has formed a small biotech firm dedicated to bringing irisin to clinical trials, but he's a long way from testing the hormone in humans. First, he'll have to find a stable version of the protein that will work in the human body and then address any concerns about its safety.

When it comes to brown fat research, says Cypess, "there are some billion-dollar questions sitting on us right now. One, can brown

“We have to be careful to work in a safe manner. You don’t want the therapy to be worse than the disease.” —ANDREW GREENBERG

fat really have a clinical effect on obesity, and two, is it safe if you turn it on?"

Greenberg agrees with that assessment. "The field is really nascent," he says. "We have to be careful to work in a safe manner. You don't want the therapy to be worse than the disease."

At the moment, says Greenberg, researchers still aren't sure how much brown fat humans might need in their bodies to see a positive effect, or if there's a downside to having too much brown fat.

So until a treatment based on brown fat is tested clinically, Greenberg thinks we shouldn't ignore age-old strategies in the war against our expanding girth. Nutrition researchers "still believe in a healthy diet and exercise," he says. "They've been shown to be very effective against a lot of the complications from obesity.”

David Levin is an independent science journalist in Boston.
EAST WEST
meets
PHOTOGRAPHY BY YOON BYUN
BY BRUCE MORGAN
PHOTOGRAPHY BY YOON BYUN
If the early 20th-century painter Edward Hopper could transport his easel to Boston in 2013, he would feel right at home amid the worn brick buildings of Chinatown. The neighborhood is small and densely settled by Chinese immigrants who tend to be poorer and older than residents in other parts of the city, according to U.S. Census data analyzed by the Boston Redevelopment Authority in 2003. Chinatown also happens to surround Tufts Medical Center and the medical school.

These two very different worlds are now coming together. “This is our community. If we’re not addressing health issues here, something’s lacking,” says Laurel Leslie, who directs the Tufts Clinical and Translational Science Institute’s current efforts to build bridges between Tufts and its Asian-American neighbors. (CTSI aims to improve public health by facilitating collaborations between biomedical researchers and the outside world.) Susan Parsons, associate director for community involvement and population science at the Tufts Cancer Center, couldn’t agree more with Leslie’s perspective. As she remembers, “a number of us here thought, How can we do better with community involvement?” The answer has taken, and is continuing to take, many forms.

Our story about how a medical enterprise is taking steps to improve the health of an entire community consists of two parts. In the first, we learn about a rare form of cancer linked to southeastern China that occurs at startling rates among residents of Boston’s Chinatown, and see how this need is being addressed. In the second, we explore a few of the challenges posed by two cultures living side by side. The process of gaining mutual understanding occurs gradually, one smile or sympathetic conversation at a time.
When the current chief of the Division of Head and Neck Surgery at Tufts Medical Center arrived at his job seven years ago, he had a big surprise waiting for him in the form of a cancer so rare that it occurs in about one in 100,000 people worldwide. Suddenly Richard Wein,’97, an associate professor at Tufts Medical School, was encountering nasopharyngeal carcinoma, or NPC, at levels he had never seen—as high as 15 percent of all cancers screenings picked up in his clinic patients.

“I got here and said, ‘Wow,’ ” notes Wein, who had come across just one case in five years during his residency at the University of Rochester. Why the elevated levels in Wein’s clinic? The apparent reason had to do with the hospital’s location, in the heart of Chinatown, a densely packed Boston neighborhood with a large immigrant population. More than half of Chinatown’s 6,000 residents have moved here from Southeast Asia, and southeastern China in particular, where NPC rates are among the highest in the world. Although the exact cause for the correlation is unknown, researchers suspect that the region’s prevalent diet of highly salted fish, in combination with exposure to the Epstein-Barr virus, may account for the spike.

NPC occurs in a golf ball-sized region at the center of the head, where the throat and nasal passages join. The symptoms, which are subtle, include ear pain, nasal secretions and, in some cases, a mass inside the neck. The cancer most commonly occurs in middle-aged men, but it can also affect women. With early detection and treatment with radiation and chemotherapy, the five-year survival rate for NPC can be as high as 85 percent. If caught late, survival rates dip below 50 percent.

Given that they see nasopharyngeal cancer patients at three times the national average, Wein and his clinical team harbor ambitions to make Tufts Medical Center a national center of excellence for the disease. However, witnessing elevated NPC levels among a population that lives literally across the street has raised some obvious questions. How can Tufts doctors respond to this public health need most effectively? And how should the cultural gap between Western medicine and the Asian population most apt to be stricken with the disease be addressed? Wein and his colleagues in otolaryngology have responded by expanding their services and doubling down on their outreach to the Chinese-American community.

As a first step, Wein sets aside one clinic

A rare cancer found at alarmingly high rates in Chinatown is being treated on two fronts: screenings in the clinic and the search for a cure in the lab

Laurel Leslie and Carolyn Leung Rubin, members of Project ADAPT, share a laugh at a recent meeting. Right: Elie Rebeiz, chair of the Department of Otolaryngology, and interpreter Karina Chen counsel patient Ly Toan.

ONE-TWO PUNCH
morning a week primarily for his Asian patients. This involves arranging for two hospital interpreters to be there, and allowing time for the three-way exchanges that such patient interactions require. (A 2003 analysis of the 2000 U.S. Census data done by the city of Boston found that nearly two-thirds of Chinatown residents speak little or no English.) “When it takes extra time, you just have to make room for it,” Wein says. At a pace of 10 to 15 patients per week, the clinic sees as many as 750 Chinese Americans over the course of a year.

Seeing a patient in the clinic often means seeing an entire family. Because English proficiency is relatively uncommon in the Chinatown community, especially among older Chinese-American patients, a clinic visit may entail aunts, uncles, children and grandchildren arriving en masse. A younger member of the family with greater fluency in English may be able to counsel his or her elder relative and reassure the person about what is going on.

Family ties are the bedrock of Chinatown. Karen Freund is a professor of medicine and a nationally recognized expert in treating patients from different cultures who sees patients through her primary-care practice—and one of just 20 American Cancer Society clinical professors in the United States. She recalls getting a weekend call from a Chinese-American man who was concerned about his grandmother’s health. Although the young man didn’t live in Chinatown, he visited his grandmother every day to check on her, and stayed alert to even small changes in her condition. “I was struck by how close that relationship was,” says Freund, who relied on the grandson’s acumen to develop a treatment plan for the grandmother.

THE SCREENING PROCESS
Specialized clinics are one way of reaching out. Another way is through the free NPC screenings that Tufts Medical Center offers three times a year. These are promoted by means of blast emails to hundreds of Chinatown residents; informational pamphlets (printed in Chinese on one side, English on the other, with anatomical diagrams) distributed around the hospital; and display ads in Sampan, the main Chinese-language newspaper in Chinatown.

At the most recent NPC screening, held at Tufts Medical Center’s otolaryngology department in mid-November, every effort was made to dampen anxiety for the Asian-American visitors. For many, this would be their first visit to the big hospital they had walked past many times. Yoshie Ng and Joshua Ngo, interpreters who work for the medical center—and speak seven Asian languages, including four Chinese dialects, between them—sat with patients individually as soon as they came through the door to gather medical histories.

Three people were scheduled for examinations. If the past were any guide, most people would be coming a short distance of a block or two for the screening; a few might travel from as far away as Quincy, Mass., or Providence, R.I., areas that are home to significant Asian-American communities. The exam takes 15 to 20 minutes from start to finish. Since the NPC screening effort began five years ago, approximately 200 people have been screened, with about 10 percent of them warranting further diagnostic evaluation.

The screening procedure, while pain-free, is about as mysterious as it could be for someone new to the experience. First, a white-coated medical person using a handheld device that resembles a pistol releases a blast of air into the patient’s nostril, making an abrupt sound like the air hose used to fill tires at a gas station. The blast delivers an anesthetic mist. (“It’s bitter tasting, but you can swallow it,” one patient was told.) Then a long, snaking tube, called a nasal endoscope, is inserted into the patient’s nostril and edged to the back of the nasal passage, where it enables the doctor or nurse to look around for signs of nasopharyngeal cancer.

IN THE LABORATORY
Pamela Smith, M.D./Ph.D., assistant professor of medicine, has a split personality when it comes to NPC. For the past five years, she has divided her time between treating patients who have the disease and conducting laboratory research into precisely how the cancer migrates along a cellular pathway from the nose and throat to other parts of the body. She is equally passionate either way.

“The problem with the disease is location,” she begins. “It’s located high up and in the back of the throat. And then the symptoms are not that obvious. They might include something like an ear infection—well, this is not something a typical man
ospitals are tough places to get around in for everyone. Generally large, multiwinged structures with few clear directions for a new patient, they can be like crossword puzzles that are nearly impossible to solve. Warm welcomes are rare. Does anyone greet you at the hospital entrance? Are the signs coherent in their meaning? Getting people through the door is the easy part, says Susan Koch-Weser, an assistant professor at the medical school whose specialty is the expansive field of what is known as “patient navigation.” Once patients are inside the hospital, she asks, “Can you care for them in a timely fashion in whatever system of care is appropriate?” The mechanism for the spread of NPC has been hindered. “This has had an effect on those outlying sites, but not at the point of the cancer’s origin,” Koch-Weser points out. “Wouldn’t it be nice if we could find the trigger that causes the cancer to grow and hit that?” Her goal in the lab is to get closer to the “source point” for the disease.

That’s down the road. Meanwhile, Chinese-American patients keep showing up in her office exam rooms, often in great distress. Her typical patient, Smith suggests, has been hit hard by NPC. “Imagine that you’re a middle-aged man with kids, working at a low-paying job in Chinatown, as many of my patients are, and you get this disease. It’s devastating,” she says. “The cancer tends to be advanced, and it’s extremely difficult to treat. A number of my patients have told me that they work in a restaurant and have been fired once they start to lose hair or otherwise look sick from their cancer treatment.”

Smith is emphatic about the importance of Tufts Medical Center’s rising to meet the challenge of a disease that’s at once rare, acute and near at hand. “We can offer easy access to good screening for NPC as a starter,” she asserts. “Then we need to offer our patients the highest quality treatment and be available to treat them further if their cancer comes back. I hope we’re offering them a place where they can rely on us to find and treat their disease as well as anywhere.”

Smith is trained as an immunologist. Her research, which she describes as “mid-stream,” focuses on a particular cellular pathway that stimulates cancer cells to grow and helps expand their reach to other sites within the body. Smith has found a drug that “interferes” with the function of the pathway. This is good news, but an incomplete victory, in her view. The mesh of the two cultures has not been studied much. A recent search of the medical literature found just 12 studies examining patient navigation among Asian immigrants, and none of the funded federal grants in this general area has targeted Asian immigrants within their scope.

Perhaps surprisingly, the mesh of the two cultures has not been studied much. A recent search of the medical literature found just 12 studies examining patient navigation among Asian immigrants, and none of the funded federal grants in this general area has targeted Asian immigrants within their scope. “We’re doing some of the first studies that will look at this,” confirms Karen Freund, a professor who’s nationally known in the area of medical and cultural dynamics.
Tufts has therefore embarked on a new frontier, driven by two critical realizations: Connecting with Chinatown is the right thing to do, and now is the time to do it.

Associate Professor Laurel Leslie, who heads up the community engagement effort for the Tufts Clinical and Translational Science Institute (CTSI), the organization charged with making laboratory work pay dividends in the wider world, sees all the moves occurring between Tufts and the Asian-American community as the start of a beautiful friendship. “We’re trying to build [that relationship] from the grassroots up,” she says.

Project ADAPT (Addressing Disparities in Asian Populations through Translational Research), a new program within CTSI that includes researchers, administrators, medical providers and community partners, is key to the effort. The Tufts participants at the monthly meetings of Project ADAPT are there largely to listen. Rather than have a medical investigator presume what the needs of a neighborhood might be and proceed from there—enacting what Leslie calls “the helicopter approach” to research—residents of Chinatown speak for themselves and say, “This is an issue in our community.”

A spirit of collaboration animates the ADAPT model, Leslie explains, “because, in the end, what good is research unless it’s going back into the community, into the streets and having an impact on people’s lives?” Casting the net wide extends the logic. Accordingly, ADAPT has offered a program called Building Your Capacity (BYC) that’s aimed at drawing more community-based organizations into the conversation. A recent BYC workshop held in Chinatown drew 18 participants representing 10 community agencies.

Much of the work to be done is reparative, Tufts people admit, coming as it does after times when the two communities were not always in step. When residents were surveyed at ADAPT’s formation about their prior involvement with Tufts research, many said they had found it to be a waste of time, says Sujata Ghosh, an ADAPT community partner who works on domestic violence programs in Chinatown. “They didn’t see anything coming back,” she reports.

Language barriers remain. There is no single Chinese language, of course, but multiple regional dialects instead. Cantonese (linked to southern China) predominates as the main language of Chinatown, with Mandarin (common in more northern regions of China) on the rise.

Interpreters at Tufts Medical Center stay busy facilitating community/hospital interactions at every turn. Of 15 interpreters on staff, six speak Chinese. “We are jack-of-all-trades,” says Yoshie Ng, an interpreter who was born in Taiwan and has worked at Tufts for more than a dozen years. “We help with scheduling appointments; we call patients with reminders of their appointments; we relay messages to them from the doctors and nurses, and we follow up on care.”

Ng’s involvement reaches beyond the routine demands of her job. She has volunteered to interpret for a weekly hourlong session every Friday (run by Marybeth Singer, a clinical instructor in anesthesiology) for Chinese-American patients undergoing chemotherapy, during which she fields any questions they may have. Ng also manages to teach a class in basic Chinese for first- and second-year Tufts medical students eager to connect better with the Chinese-speaking patients who may await them in their practices.

Knowledge of the other brings a closeness that builds on itself, preparing the ground for better days to come. Recently a Chinese-American man and his wife, newly arrived in this country, were out walking in Boston when the wife fell and broke her hip at a downtown subway station. When the couple was brought to the emergency room at Tufts Medical Center, staff and interpreters quickly gathered around the two to ask if there was anything they needed.

Soon after this traumatic incident, the husband was diagnosed with cancer and scheduled for treatment at Tufts. At that point he wrote a heartfelt letter to Eric Beyer, CEO of Tufts Medical Center, relating the couple’s positive earlier experience and concluding simply, “I have confidence in this hospital because I know they will take care of me.” One more connection had been made.

Bruce Morgan is the editor of this magazine.
LILY ROBINSON—STILETTO-HEELED, RAVEN-HAIRED, A DEVOTEE OF ARMANI, deadly plants and a certain sea snail that spears its unsuspecting prey with a harpoonlike venomous tooth—is heading out, a hint of glitter on her décolletage.

Robinson’s target this evening is a professor with an unruly gray mane who has created an encryption-proof method of digital communication. Intelligence operatives have learned of his intent to share his revolutionary but potentially insidious discovery with America’s political enemies.

At a catered affair, Robinson, the mad professor and the other guests dine on mussels in a leek, celery, onion, garlic and parsley broth, followed by a watercress and endive salad. The entree is wild grilled salmon with tarragon and rosemary. Robinson surreptitiously digs a plastic vial out of her Prada clutch. As waiters clear the last of the chocolate mousse and herbal tea, the traitorous academic doubles over, drooling, gasping, vomiting and wracked by seizures.

He’s dead before help arrives. Robinson touches up her eye shadow before waltzing out the door on crystal-bedecked Jimmy Choos.
Poison’s aura of intrigue—as well as the cavalierly evil array of natural toxins found in flora and fauna—has long captivated Barbarajean (BJ) Magnani, pathologist-in-chief at Tufts Medical Center. The assassin Lily Robinson exists only in her imagination, but Magnani, professor and associate chair of pathology at Tufts University School of Medicine and a forensics expert, is all about educating medical professionals, Hollywood producers, the media and the public on poisons’ very real dangers.

Poisoning deaths have shaped history, politics, literature, love and war for millennia. First-century Romans routinely poisoned emperors; the Borgias were known for eradicating their enemies at Renaissance dinner parties. The Victorian era spawned some of the world’s most notorious poisoners—and launched the field of toxicology.

Poison is the most devious of murder weapons, noted the 19th-century Scottish toxicologist and physician Robert Christison, because only the most “dexterous toxicologist and skillful physician” can outwit a poisoner who has found an “exact imitation of some natural cause.”

It was that darker side of nature that hooked Magnani. Collecting samples of algae and other marine life in Long Island Sound as a graduate student at SUNY Stony Brook, she became enthralled with the creatures’ extravagant defense mechanisms—one-celled plants that generated a potentially lethal neurotoxin and jellyfish that could kill with a single sting. Onshore, there were scorpions, venomous snakes, poison dart frogs and dozens of varieties of noxious plants. “These are all fabulous toxins,” she notes. “I think it’s fascinating that nature came up with a way to make organisms themselves resistant to poisons that can kill other organisms.”

After exploring the role of environmental pollutants for her master’s degree and then the metabolic pathways of tumor cells for her Ph.D., Magnani earned her M.D. from Boston University. Living for a time in rural Sherborn, Mass., she indulged her black thumb by growing deadly nightshade, monkshood and foxglove within the protective confines of a 12-foot-tall chain-link fence.

In her office at the medical center, Magnani shows a visitor a gift from a colleague—an armful of branches studded with golf ball-sized seedpods dappled with evil-looking spikes. She pries open one of the prickly purple pods to reveal a plump, beige nugget etched with a variegated pattern of delicate dark brown swirls. This, she declares, is a castor bean—considered one of the world’s most lethal plants. As little as 0.5 mg of its naturally occurring protein, ricin, can kill an adult; the Bulgarian secret police reportedly murdered dissident Georgi Markov by using a modified umbrella to inject a ricin-laced pellet into his leg.

Even though Magnani assures me that swallowing the entire bean—as long as I didn’t chew it—wouldn’t produce any ill effects, I keep my distance, especially when she notes that the tear-shaped bean looks like an engorged tick, which it does. She then picks carefully at a needlelike thorn that has become embedded in her finger.

When the editor-in-chief of the Journal of Clinical Chemistry approached Magnani in 2009 about writing a series about the properties of esoteric poisons, she dreamed up Lily Robinson. Like Magnani, Lily wears the latest Manolo Blahniks and Jimmy Chooos. For the first year, Magnani wrote the pieces anonymously, identified only as “a prominent clinical chemist/toxicologist,” although she laughed that some of her colleagues were on to her because of the shoes. (Magnani claimed the black Donald Pliner pumps with three-inch heels she wore the day I met her were unusually tame, but she also sported a stylish black dress under a white lab coat embroidered with her name and the Tufts Medical Center logo.)

Each installment of her journal series described a murder, and amateur detective/chemists around the world sent in their best guesses about which poison was responsible for the untimely demise and then awaited the next issue, when she revealed the poison, its clinical properties and analytical means of detection. “It was so much fun to read all the answers,” Magnani says. Eight of the poison stories were published last year in the book Lily Robinson and the Art of Secret Poisoning (nVision Press), and she’s working on a novel based on her fashionista assassin.

MAGNANI CONSULTED FOR THE PRODUCERS OF THE NOW-DEFUNCT TV DRAMA CROSSING JORDAN, WHICH FEATURED A SMART, SEXY, CRIME-SOLVING FORENSIC PATHOLOGIST EMPLOYED BY THE MASSACHUSETTS CHIEF MEDICAL EXAMINER’S OFFICE. “I TRIED TO BE VERY Fussy ABOUT ACCURACY,” MAGNANI SAYS. SHE PROTESTED WHEN THE SHOW’S LEAD CHARACTER, DR. JORDAN CAVANNUH, PLACED A CUP OF COFFEE NEXT TO HER MICROSCOPE, OR WHEN TOXICOLoGY REPORTS THAT SHOULD LOOK LIKE ROWS OF TYPWRITTEN FIGURES APPEARED AS COLORFUL GRAPHS.

In one of her poison stories, “Lily Robinson and Ready, on the Set, Go,” Magnani has her alter ego observe a TV shoot in Hollywood. Robinson knew that real laboratories didn’t have large plasma screens, expensive analytical equipment simulating data or the “multiple Florence flasks and beakers perfectly aligned on shelves brimming with brightly colored liquids” that she saw on the set. She was appalled that the TV lab allowed food on the same bench as autopsy material. In the end, the producer informed Robinson that TV forensics is about entertainment, not science or real life.

While Magnani believes the CSI franchise and similar TV crime dramas have raised awareness about science and laboratory medicine—“a lot of people are interested now in working in forensic labs, and I think that’s great”—the small-screen shows also have created unrealistic expectations. When Magnani once testified in court about lab results, “jurors asked questions that were clearly coming

POISONING DEATHS HAVE SHAPED HISTORY, POLITICS, LITERATURE, LOVE AND WAR FOR MILLENNIA.
Two months after Michael Jackson died in 2009, the Los Angeles coroner, based on a toxicology report still considered preliminary, tied Jackson’s death to the powerful anesthetic propofol, although the pop icon’s bloodstream contained traces of a litany of prescription drugs. Three years later, the coroner took more than a month to report that singer Whitney Houston had cocaine in her system after she was found submerged in a bathtub in a Beverly Hills hotel in February 2012. Many in the media questioned the delays.

At a press conference the American Association for Clinical Chemistry held in conjunction with its 2009 annual meeting in Chicago, following Jackson’s death, Magnani explained that done conscientiously and correctly, toxicology reports take time. At an autopsy, pathologists collect vials of heart blood, peripheral blood and tissue from the brain, liver and kidneys. An analyst performs an alcohol screening and a general immunoassay, which can detect such drugs as opiates or tranquilizers.

“Most death investigations screen for common drugs of abuse,” says Magnani, who uses case studies drawn from celebrity deaths (the actor Heath Ledger and singer-songwriter Janis Joplin, to name two) in her workshop presentations to the College of American Pathologists and other professional groups.

And that brings us to her latest public education campaign and what she calls toxicology’s latest challenge—the skyrocketing numbers of unintentional overdoses from prescription drugs, a problem she claims has reached epidemic proportions. She offers this sobering statistic as evidence: In 2008, just as many emergency room visits stemmed from prescription or over-the-counter medications as illegal drugs. Of the 27,000-plus deaths from unintentional drug overdoses reported in the United States in 2007, approximately 12,000 were from opioid analgesics; heroin accounted for about 2,000.

In textbooks, professional meetings and grand rounds at Tufts and other hospitals, Magnani stresses that an estimated 50 million Americans experience chronic pain, despite the $100 billion spent annually on pain management and care. Addictive prescription drugs such as OxyContin or Vicodin, prescribed for everything from toothaches to postsurgery pain relief, are being abused by a wider spectrum of the population than teens looking for a high, she says, and many pain drugs have a high potential for misuse or abuse.

If a nondrug-related cause of death is to be investigated, “you’d have to have a suspicion or evidence that leads you in a specific direction,” Magnani says. “Someone might have been poisoned by anti-freeze, but that’s not something you’d normally test for. Then you’d go back and look for that in organs.” If a drug test is positive, more tests are done to pinpoint the culprit. Autopsy supervisors review analysts’ findings and may request additional substantiation. Barring glitches or lengthy tests for hard-to-detect drugs, such as neuromuscular blockers, the process could take a couple of weeks or longer.

How did the made-up Lily Robinson, whose initial career path mirrors Magnani’s—a toxicologist with graduate degrees, a medical degree and a university appointment—become an undercover agent ridding the world of undesirables? Lily’s not “an assassin who uses the Internet to match missing persons with unidentified human remains. Deborah Halber, G96, is the author of The Skeleton Crew, coming from Simon & Schuster. The book tells the stories of amateur sleuths who use the Internet to match missing persons with unidentified human remains.
Drowned

Part of the challenge of treating displaced patients in the aftermath of Hurricane Sandy was figuring out who they were
Sun gleams on the Hudson River in the distance, with the darkened Manhattan skyline visible at center page, two days after Hurricane Sandy made landfall, on October 31, 2012.

Imagine a humid gymnasium stinking of body odor and excrement. The space is large enough to hold a full-size running track, basketball courts and bleachers under an enormous iron canopy and bright fluorescent lights casting an eerie greenish hue below. Now imagine this space filled with 600 cots, and nearly that many frail and dehydrated elderly people, either bedridden or milling about aimlessly in the enormous room.

These people had all been displaced when their nursing homes and assisted living facilities got submerged by Hurricane Sandy’s terrible wind and surging waters in late October. As ground floors, basements and sub-basements were lost to the flood tides, residents were evacuated in droves from their homes and facilities and brought here to the Park Slope Armory, an imposing 19th-century brick castle located in a dry neighborhood of Brooklyn, N.Y. For some, it would be their temporary source of basic human needs for more than three weeks; for us, it was our mission and our home for seven days.

BY DAVID WATSON SOBEL, ’14
One of my first patients was Alice. Alice was a rarity among the denizens of the armory due to her relatively young age. She was a short and portly 50-year-old with thick coke-bottle glasses heavy enough to give her nose a chronic scrunch. She walked around combating the effects of gravity with her nose high but her attitude humble.

Like so many of the shelter residents, Alice had been swept onto a bus and driven through the storm to the armory without any notice. At least 29 facilities in Queens and Brooklyn that had been filled with elderly, disabled and mentally ill residents were “severely flooded” by the storm, according to the *New York Times*. Everything had been left behind in the evacuation, including medical records and medications. For some, the loss included their identities. A number of patients with advanced dementia entered the armory not knowing their names and were quickly lost in the crowd. Long-term medical problems such as seizures, diabetes, chronic lung disease, high blood pressure and incontinence were suddenly unregulated and untreated. People accustomed to living in a lockdown dementia ward were now roaming about freely in the disarray.

A nurse brought Alice over to the field hospital complaining of a sore throat, but what I noticed first was that she was shaking on the medical cot. She struggled to even bring the tissue to her nose without tearing it between her quivering hands, and when I checked her pulse it threatened to race out of her wrist. A ring of sweat pooled under her glasses and on her forehead. One of the aides from the home came through the part in the wrestling mats that made up the walls of the “hospital” and stated simply, “She has anxiety. She hasn’t slept for days.”

Patients were now two days out from getting their last medications and thoughts of withdrawal and accompanying seizures jumped into my mind. Alice was used to being on high-dose sedatives three times a day. Can we contact the pharmacy? There was no way. Like her apartment, the pharmacy was underwater.

I checked on Alice again. She had been moved to the far corner of our field hospital, separated from the chaos by a couple of wrestling mats stood on end, finally asleep. We restarted her on her medications that we had on hand and let her rest. Released back to the milieu hours later, I wondered how she would do. Luckily, I continued to see her drifting about with her head held high throughout our stay. Every time, she smiled at me and said “thank you.”

**SCATTERED AND LOST**

Fortunately, I was not alone in the middle of all this chaos. Rhode Island One was one of 17 federal Disaster Medical Assistance Teams under the Department of Health and Human Services to deploy to Hurricane Sandy. Although this was my first federal deployment, I had trained with the Rhode Island One team for more than four years during college as an EMT and throughout medical school. Thirty members had been on the roster for October, and two days before we were to rotate off, we got the call. Our team, made up of paramedics, nurses, physicians, pharmacists and logistics support staff all left our day jobs the moment our phones and pagers went off.

Our deployment was nothing if not by the book. First, the government sends the teams. I was warned that NDMS, the National Disaster...
Medical System, really stood for “Night Drive, Morning Surprise,” and this was no exception. Packed to the gills with medical equipment and supplies to be self-sufficient under any conditions for 72 hours, we convoyed south through the night in rented Suburbans and minivans from Rhode Island into a blacked-out Queens. There we received mission orders to proceed to the Park Slope Armory.

Once a team has secured the location, the government sends the federal caches. Two 18-wheelers filled with medical supplies and enough equipment to build a critical-care field hospital and pharmacy showed up within hours of our arrival at the armory. Hundreds of gunmetal grey Rubbermaid containers on pallets were cracked open—here, I learned that NDMS also stands for “Never Done Moving Stuff”—and the acute-care area that had seen the shelter through the first 12 hours was transformed into a well-oiled MASH unit. Massachusetts Two showed up to augment our numbers. We staffed the field hospital and treatment areas 24 hours a day, day in and day out.

Disaster medicine attracts those who constantly think about “worst-case scenarios.” Despite all our training, walking the perimeter of the gymnasium for the first time was like stepping off a plane in a foreign land with harsh smells and sounds. Yells of disorientation echoed off the walls. A forlorn man who looked far older than his age was slumped in his cot crying “help” over and over. The bathrooms overflowed. Whole communities had been lost to the storm and had washed up here like flotsam and jetsam. Two days ago these people were lying on crisp sheets with hospital corners and attended by nurses in their familiar rooms and apartments; now they were scattered around a gym, helpless and wearing donated clothes.

Bobby was another of my patients. He was a short pudgy man with an awkward bowl cut and chubby cheeks who lived at the nursing home considered worst off. He was identified by the shelter staff as a psychiatric flight risk. Originally combative, he ended up checking himself into the “VIP Lounge,” the code name given to the mental health unit that we had set up.

Pleased with his new status as a VIP, Bobby became a benevolent ruler within the walls of the unit and gained the support of the care providers and his comrades. After a few days, he was well enough to graduate back to the larger crowd and collected his food-stained clothes and minor items in his arms. It was not to last. Later that afternoon, I heard that Bobby was back in the VIP Lounge, crying inconsolably. The owner of the nursing home had come through and told everyone that the facility had to throw out all of the residents’ possessions, that all of their earthly belongings were gone. There was nothing left.

Bobby’s fragile world had shattered. His only source of comfort now was his VIP status and his knowledge that the “people in the tan uniforms” cared about him. The VIP Lounge was his shelter within the shelter, and he moved back into the mental health unit with his few remaining belongings.

Celeste was another medical disaster waiting to happen. One morning, Celeste would not budge from her cot. An unforeseen consequence of the outpouring of food donations was diabetic patients gorging themselves throughout the night. A volunteer nurse came to us and said Celeste was drinking a lot of water and eating with reckless abandon. She was sitting up with a dazed look, crumbs scattered over her oriblike belly. She had poorly controlled diabetes at baseline and now was feeling the effects of a blood sugar of 400, on the brink of acidosis. An insulin drip, started in the critical-care area, brought her sugar level under control.

She was afraid that if she got help, we would send her to the outside hospital and she would not be able to come back to the shelter. Like Bobby, she had few comforts: Her cot, some shelter blankets and a tarnished silver necklace was all she had left.

Life in the shelter was a constant battle against chaos. We awoke one day for shift change to frigid air: Not used to round-the-clock occupancy, the heat in the armory had automatically shut off overnight, and six patients were sent to the hospital with hypothermia. A handful of shelterees suffered an acute reversal of their constipation when a stomach virus that plagued other shelters infiltrated ours.

And yet, even with the unpredictability of the shelter and its residents, an odd sense of peace and structure developed; the days began to coalesce into a timeline of patients and problems that we fixed. Creature comforts for the team returned in the form of showering in the basement of the shelter for battered women next door. Food donations meant the remaining government-provided MREs (Meals Ready to Eat), or “Meals Rarely Edible,” as we called them, sat in our jump bags. In precious downtime we pondered the merits of a tour of duty in the VIP Lounge versus “The Thunderdome,” our name for the field hospital, over New York bagels donated from the local deli. A volunteer orchestra set up and played an impromptu concert within the walls of the armory. The anguished yells that greeted our arrival were replaced by classical music coming from the string quartet in the bleachers. Somehow, we had reached equilibrium.

After seven days, the situation at the armory was declared stable, and we were ordered to rotate out: “Convoy to Times Square, await further orders.” The Massachusetts Two team took command of the field hospital, and we packed our jump bags. Our exit from Park Slope Armory was just as surreal as our entrance had been. Bedraggled but smiling residents lined up and applauded as we passed over the threshold and back into the world.
Programmed to Gain

Infants born to overweight or underweight moms are at higher risk for obesity later in life by Jacqueline Mitchell

IN THE WINTER OF 1944–45, TOWARD THE END OF WORLD WAR II, A GERMAN blockade of food and fuel plunged Nazi-occupied Holland into famine. For eight months, over what came to be known as the Hunger Winter, 4.5 million Dutch citizens subsisted on meager diets, as little as 600 calories a day, or less than a third of the average adult’s requirements. More than 20,000 starved to death.

Nineteen years later, 300,000 boys born to women during the Hunger Winter entered the Dutch Army, providing startling data that linked the recruits’ exposure to the famine while in their mothers’ wombs with their tendency to be overweight as adults. The recruits whose mothers endured the famine during the first two trimesters of pregnancy were far more likely to become obese later in life than their peers whose mothers had had enough to eat during the early months of their pregnancies.

The Hunger Winter provided some of the earliest evidence for the now well-accepted Barker Hypothesis, the theory that the maternal environment has profound long-term consequences for infants. In industrialized nations like the United States, too many calories—not too few—pose the greater health risk. Two-thirds of American women, many of whom are of reproductive age, are overweight or obese. Scientists are just starting to investigate how the historically unprecedented numbers of overweight mothers may be affecting their children’s chances of growing up to be obese adults. Just as too little food during fetal development is linked to increased risk for obesity as an adult, so is maternal obesity.

A recent Tufts study reviews current research on the relationship between a mother’s diet and the child’s weight later in life. The paper, published online in Physiology and Behavior, was written by Sarbattama Sen, a neonatologist and investigator in the Mother Infant Research Institute at Tufts Medical Center, and Susan Roberts, professor of nutrition and of psychiatry and director of the Energy Metabolism Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts, and their students, Ariel Carpenter, A10; Jessica Hochstadt, A08, N11; Juli Huddleston, N10; Vladimir Kustanovich, N10; and Ashley Reynolds, N11.

Maternal nutrition may play an important role in the obesity epidemic, notes Sen, who is also an assistant professor of pediatrics at the School of Medicine. She sat down with Tufts Medicine to discuss her research.

What are the long-term consequences of a mother’s diet on her infant?
Infants born to mothers on both ends of the spectrum—mothers who are undernourished as well as overnourished—end up having similar predispositions to obesity later in life. As we discuss in the review article, researchers are investigating the biological mechanisms by which maternal malnutrition may be linked with metabolic changes in the offspring.

How do scientists think that happens?
The most likely mechanism is through changes in the genes involved in laying down fat in the infant’s body. Babies born to obese mothers aren’t just bigger, they have more fat and less muscle than babies born to women of average weight.
Students interested in pharmacology careers—one of the fastest-growing job sectors in the United States—have a new option available to them. The Sackler School of Graduate Biomedical Sciences at Tufts will offer a master of science degree in pharmacology and drug development starting this fall. The new degree will be managed along with the doctoral track through Sackler’s existing graduate program in pharmacology and experimental therapeutics.

“Because the needs of the pharmaceutical industry are constantly changing, people with master’s degrees are assuming a more and more important role in the private sector,” says Emmanuel Pothos, the program’s director and an associate professor of molecular physiology and pharmacology. “Both types of degrees continue to be very popular with industry.”

The first such two-year degree affiliated with a medical school and offered in the Boston area, the Sackler M.S. will provide students with a foundation in drug discovery and development. The first year of training will parallel that of the Ph.D. degree track. Students in both programs will take the same core courses, participate in the same journal club, attend the same seminars and do laboratory rotations, says Pothos.

In their second year, the master’s students—just like those enrolled in the doctoral program—will be expected to conduct original, publication-quality laboratory research for a thesis. “The only difference is the duration of the research training,” says Pothos. The option to conduct a library thesis will also be available to master’s students.

Because the Ph.D. program can take four to six years to complete, the brisker pace of the master’s degree is expected to appeal to professionals already working in the pharmaceutical industry in the United States and abroad.

“Companies and governments may be willing to send workers here for more training, but they need them back in a reasonable amount of time,” Pothos says. “The master’s program accomplishes both goals.”

The pharmacology job sector is expected to increase 25 percent by 2020, according to the U.S. Bureau of Labor Statistics, while overall job growth in the same period is forecast to expand 14 percent. Sackler expects to admit three to 10 students to the inaugural class, which will begin in September.
Tufts: The Next 10 Years

President Monaco launches strategic planning initiative by Taylor McNeil

Tufts has launched a strategic planning initiative that will identify priorities and create a road map for where the university aspires to be in 10 years.

“This is an opportunity for us, as a community, to envision a trajectory for Tufts—where it needs to be, and should be, in a decade’s time,” said President Anthony P. Monaco, who has asked Provost David R. Harris to lead the initiative.

“The process of creating a strategic plan allows you to learn more about yourself as an institution,” said Monaco. “We will engage with the community—faculty, students, staff, alumni, trustees, advisers and friends—to come up with a direction we believe is important and meaningful for Tufts. More broadly, strategic planning is an opportunity for us to think about Tufts’ mission, its role in the world and our values and priorities.”

Monaco and Harris sat down with Tufts Medicine to talk about the role of strategic planning in advancing Tufts.

What is the purpose of strategic planning?

Provost Harris: This process will explore what the Tufts community sees as our core opportunities, our core challenges and the barriers to our success. A strategic plan will enable us to make decisions that are aligned with shared goals instead of what any one of us might think is an appropriate direction for Tufts.

President Monaco: If the planning process indicates that it’s important for Tufts to increase its impact on society, for example, then it will be up to the leadership and faculty at each of our schools to consider how they can contribute to that objective.

Why is it important to do this now?

Harris: We have a relatively new administration, and it is important for the president and me to hear from the community about the opportunities and challenges that face us and for the community to hear from us about how we will synthesize their input and develop aspirational goals for Tufts University.

Why have you named the initiative “Tufts: The Next 10 Years”?

Harris: It reflects the idea that we are always looking 10 years out, and regularly asking whether we are on the path to achieving our goals. Strategic planning is not something we do once and then move on. This will be an ongoing activity.

What other areas will the strategic plan address?

Monaco: Many strategic plans focus on core values, and so will ours. The plan will contain sections on teaching and learning, research and scholarship and Tufts’ impact on society. We will look at our civic engagement mission and our role in economic development through applications of our research. Then there are what I call challenging areas for the future, things like online learning, entrepreneurship and innovation, interdisciplinary and other modes of research and the student experience. We need to think about the direction we are going to take as an institution to make us stronger in these areas.

How was the groundwork laid for this?

Monaco: During my first year, I spent a lot of time listening and meeting faculty, alumni, students and staff to understand their perspectives on Tufts. Out of that came issues I thought were essential to laying the groundwork. One was diversity—recruiting and retaining students, faculty and staff of diverse backgrounds and creating an environment of inclusion. Another was being good stewards of the environment. And finally was thinking how Tufts can have a larger impact in the world, in particular how collaborative research, teaching and learning across all our schools can help solve some of society’s greatest challenges.

How long will this take?

Harris: On the one hand, we want the plan done as quickly as possible, because the absence of a plan means that we are making decisions without the benefit of a shared vision. On the other hand, we want to proceed slowly enough so that everyone has an opportunity to be heard. That said, we’re aiming to complete the plan by the fall of 2013. But this is a living document. Once a year we will revisit the plan, systematically asking what is working, what isn’t, what new challenges have arisen and how we can more effectively pursue our goals.

How can the Tufts community get involved and stay informed?

Monaco: Once the plan gets to a certain draft level, we will put it online so all can tell us what they think. We will also be engaging with our trustees and alumni and listening to their perspectives. We want everyone to have a say.

Learn more at strategicplan.tufts.edu.
The MClub recognizes alumni, parents, faculty, staff, and friends who play a leadership role in supporting Tufts University School of Medicine by donating $1,000 or more annually to the Fund for Tufts Medicine. Loyalty and leadership: it’s what the MClub is all about.

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M. Lynn Buttolph, M.D., Ph.D., J74

Edward P. Toffolon, M69

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Both Sides of Medicine

The Gorbach Professorship will honor a beloved faculty member and pioneer in infectious diseases by Heather Stephenson

ENTER THE OFFICE OF SHERWOOD “SHERRY” GORBACH, ’62, J84p, AND you might be surprised by the number of yogurt containers he’s collected. Clearly not just leftovers from lunch, the cups bear names in many languages.

What they have in common is a single ingredient: the probiotic Lactobacillus rhamnosus GG, a microorganism known to control diarrhea and produce other beneficial effects. Gorbach and Tufts colleague Barry Goldin discovered and patented the probiotic in the 1980s (the double G denotes their partnership).

The yogurt additive is one example of how Gorbach has combined his interest in research and his concern for patients over his distinguished career. A trailblazer in the field of infectious diseases, Gorbach has been on the faculty at Tufts University School of Medicine for more than 35 years.

“He’s a remarkable clinician and has an exhaustive fund of knowledge,” says David Snydman, a professor of medicine who has worked with Gorbach since the late 1970s. “He’s also an extraordinary teacher,” notes Snydman, chief of the Division of Geographic Medicine and Infectious Diseases at Tufts Medical Center. Gorbach has received many honors for his teaching, including twice earning the Faculty Recognition Award, given to the best professor as judged by the graduating medical school class.

The School of Medicine is honoring Gorbach’s legacy by creating an endowed professorship and research fund in his name. The goal is to raise $3 million.

“Sherry is the master clinician of his generation for infectious disease,” says Dean Harris Berman. “This professorship and research fund will allow Tufts to build on the remarkable work he has done.”

Optimer Pharmaceuticals, the San Diego–based company for which Gorbach serves as chief scientific officer, recently donated $500,000 to the professorship and research fund. Gorbach has helped the company develop an antibiotic, sold under the brand name Dificid, to combat a hard-to-treat bacterium that infects hundreds of thousands of Americans each year. He and his Tufts colleagues had previously identified the bacterium C. difficile as the agent responsible for severe diarrhea that afflicted patients after an initial course of antibiotic treatment and could lead to life-threatening consequences.

Pedro Lichtinger, Optimer’s president and CEO, says Gorbach has been a valuable addition to the company because he combines a rigorous understanding of scientific research with a focus on helping people.

“He’s an unbelievable individual,” Lichtinger says. “Many people see the science, but they stay in the science. And many people are very good clinicians but are not able to connect to the science. He is able to connect both. Whatever he says, you better listen. Ninety-nine-point-nine times of every 100, he is right.”

FOR MORE INFORMATION ABOUT HOW TO SUPPORT THE GORBACH PROFESSORSHIP, CONTACT REBECCA SCOTT, SENIOR DIRECTOR OF DEVELOPMENT AND ALUMNI RELATIONS, AT 617.636.2777 OR REBECCA.SCOTT@TUFTS.EDU.

Sherwood Gorbach’s career has bridged biomedical research and patient care.
In his 17th birthday, William Bradley, '15, finally went to the ER after experiencing abdominal pain for days. Surely appendicitis, his parents guessed. But as the day wore on, and he underwent more and more tests, the doubts grew. A biopsy revealed it was cancer.

“There was a large mass by my kidneys, a germ cell tumor,” says Bradley. The treatment was so aggressive that he spent most of the summer between his junior and senior years of high school in a hospital bed. After four intensive cycles of chemotherapy, everyone was optimistic. But the X-rays showed that the mass had grown.

“It was “game over,” he remembers. Not quite. When surgeons went in to remove the enlarged tumor, they instead found large amounts of dead tissue, which posed no threat. Bradley and his family could finally have hope that everything would be all right. It was a feeling that eluded many of the other patients he’d met and shared rooms with in the pediatric ward. “I was a lucky one,” he says. “I had lost my hair, felt like I had lost my dignity as a person. Coming out of that after meeting so many other patients who were in the same spot, who deserved to have the second chance I got, I knew I wanted to research cancer full time.”

Months later, Bradley graduated as high school valedictorian and that fall he entered Yale. His first day on campus, he went to the medical school and asked about assisting with cancer research projects. He plans on becoming an oncologist. His research at Tufts focuses on using biomarkers to personalize treatment and improve outcomes for patients with breast, prostate and skin cancers. He says he is “deeply committed to improving cancer treatment for patients in the future”—and immensely grateful to everyone who has helped him get to where he is today, especially his scholarship donors.

Financial aid is essential for Tufts medical students like Bradley. Graduates leave with an outstanding education—and an average debt of almost $200,000. The high cost of attending deters applicants from all walks of life from applying. It also prevents some graduates from choosing careers in such critical areas as primary care and public health, because what they earn may not cover all their expenses, including that education debt.

The need for financial aid continues to outpace the medical school budget, even after the university’s most ambitious fundraising endeavor, a $1.2 billion campaign completed in 2011. To help meet the need, the school will match any newly established endowed scholarship of $100,000 or more, doubling the impact of that fund, which will support students in perpetuity. Additionally, four-year term scholarship pledges of $60,000 or more will be matched, and thereby doubled.

Scholarship gifts help students become the skilled and compassionate physicians and public health professionals who will care for us, our children and our children’s children. Future oncologist William Bradley is a recipient of the H. Edward MacMahon Scholarship, named for the anatomical pathologist and beloved teacher, a “Mr. Chips” to Tufts medical and dental students for 40 years. Friends and colleagues of MacMahon, who retired from Tufts in 1969, established the scholarship in his honor. Bradley is determined to pay it forward: “Every small kindness,” he observes, “is an invaluable step on my road to success.”
A Few Notable Recent Changes

Several recent events have touched the lives of Tufts Medical alumni. Our thoughts and prayers are with those students and alumni affected by Hurricane Sandy (see story, page 28). This was a devastating event that stressed many resources, including access to timely and appropriate medical care.

Important new endeavors are afoot at Tufts University. President Anthony P. Monaco and David Harris, our new provost, have initiated a strategic-planning process for the university. The goals of this process are to formulate a universitywide strategic plan to address the challenges facing the university in a rapidly changing higher-education landscape. For more on this initiative, see page 34.

It is also an exciting time at your alma mater. In January Tufts welcomed its first class of students in the physician assistant program. With the omnipresent pressures to reduce health-care costs and a nationwide shortage of physicians, the demand for physician assistants has grown. There has been a robust response to the first class of students, and Tufts has developed an impressive two-year curriculum.

Your Tufts Medical Alumni Association also had a wonderful start to the year. We had well-attended alumni events in New York City and Boston. We also heard from current medical students about the projects they were able to do with funds provided by the association. Please visit http://medical.alumni.tufts.edu/alumni-services/tufts-medical-alumni-association to see what students are doing with the assistance of the association.

Finally, we have had a great initial response this year to membership in your Tufts Medical Alumni Association. With your help, we can continue to provide valuable funds directly to financial aid and current student services. Membership renewals can be made online by visiting www.tufts.edu/givenow.

Please feel free to contact me with your thoughts or questions.

Laurence S. Bailen, ’93
President, Tufts Medical Alumni Association
laurence.bailen@tufts.edu

Save the Date

APR 26–28, 2013

medicine-alumni@tufts.edu
or 617.636.6770

REUNION
TUFTS MEDICINE 2013
Albert Hurwit of Hartford, Conn., the late-blooming musician who has written award-winning orchestral works in recent years, is being featured as part of a new PBS television series called “Lifecasters,” which highlights inspiring personal stories such as his. The hourlong presentation, which was scheduled for broadcast on February 7, contains three 20-minute segments, including one devoted to Hurwit’s musical achievements.

Charles Little of South Paris, Maine, is retired from his practice days, when he was director of emergency medicine at Mercy Hospital in Portland, among other responsibilities. An avid collector of antique cars, Little is proud to be a member of the Model T Ford Club of America. He and his wife, Mary, have two daughters.

Bess Dawson-Hughes, professor of medicine and director of the Bone Metabolism Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts, has been named one of three scientific members on the board of directors of the Center for the Advancement of Science in Space, a non-profit that promotes and manages research on board the international Space Station U.S. National Laboratory.

Candace Lapidus Sloane, J80, M84, of Brookline, Mass., has been elected chair of the Massachusetts Board of Registration in Medicine. She is a clinical assistant professor of pediatrics at Brown Medical School.

Thomas Grady Jr., of Oswego, N.Y., a cardiologist, has joined the medical staff of Oswego Hospital after more than 14 years of local experience caring for patients with heart-related issues.

Akudo Ikemba of Lagos, Nigeria, was named Entrepreneur of the Year and Female Innovator of the Year in Europe, the Middle East and Africa at a ceremony sponsored by the Stevie Awards for Women in Business, a global competition, in New York City last fall. Since 2006, Ikemba has led Friends Africa, a pan-African organization intent on mobilizing political and financial support for the fight against AIDS, TB and malaria across the continent.

Rishi Manchanda, A97, MPH03, of Los Angeles, Calif., recently launched a new website called Health Begins (HealthBegins.org), a physician-led social enterprise aimed at improving the health of vulnerable populations by addressing the environmental roots of disease. In early October, more than 130 clinicians and health advocates had joined the effort. “Four out of five physicians nationwide feel unprepared to address social needs—like housing problems, hunger or workplace stress—that contribute to their patients’ health problems and drive up healthcare costs,” says the founder. Manchanda works as the lead physician in a clinic for homeless veterans at the VA Greater Los Angeles Healthcare System.

Noaman Vaidya of San Diego, Calif., a radiologist, married Sobia Hamlani on June 23, 2012, in a Muslim ceremony before some 300 guests in Uniondale, N.Y.

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WE WANT TO HEAR FROM YOU Send your Class Note information to Tufts Medical Alumni Relations, 136 Harrison Avenue, Boston, MA 02111. You can also email medicine-alumni@tufts.edu.

TUSM Alumni and Boston Red Sox—A Winning Combination!

Join Dean Harris Berman, M.D. and TUSM alumni, family, and friends at the 5th Annual Red Sox Spring Training Game at the new JetBlue Park in Fort Myers, Florida for a picnic buffet and afternoon game on March 23, 2013.

To purchase tickets, visit: http://bit.ly/2013tuftspringtraining
Questions: contact the Office of Special Events at 617.627.4153 or rsvp@tufts.edu
ALUMNI NEWS

MARSHALL KAPLAN, FORMER CHIEF OF GASTROENTEROLOGY

Marshall Kaplan of Wellesley, Mass., professor of medicine, nationally acclaimed gastroenterologist and inspirational figure to legions of Tufts colleagues and students, died on Sept. 1, 2012, at age 77. He had served as chief of the Division of Gastroenterology at Tufts Medical Center from 1972 until 2006.

Kaplan helped the division become widely known for its management of primary biliary cirrhosis and sclerosing cholangitis. In 1984, the division became one of the first awardees of a Silvio O. Conte Digestive Disease Research Center grant from the National Institutes of Health. Kaplan was a graduate of Harvard Medical School who had served for many years as an associate editor of the New England Journal of Medicine.

“Marshall Kaplan was a dear friend whom I’ve known for more than 35 years,” said Deeb Salem, chair of medicine at Tufts Medical Center. “He was the epitome of clinical and research excellence who was named one of the five outstanding gastroenterologists in the U.S. in the 1980s by Good Housekeeping and one of the 20 outstanding gastroenterologists by Better Homes and Gardens. Dr. Kaplan made a multitude of contributions to our understanding and treatment of diseases of the liver and has left behind scores of loving patients whose lives have been saved by his great skills and caring touch.”

Longtime colleague Andrew Plaut, ’62, concurred: “Marshall and I probably had 6,000 conversations over the years,” he said, “and if I think hard about them I would guess that each left its mark on my ability to take care of patients and my understanding of the world.” Joel Weinstock, current chief of gastroenterology, noted that “patients from across the country have sought his counsel, knowing they could count on his knowledge and attention to provide them the best course of treatment.”

Kaplan is survived by his wife, Nancy, four children and four grandchildren.

In Memoriam

Stanley Stellar, ’39, of Englewood, N.J., a former member of the Board of Advisors to the medical school, died on Nov. 4, 2012, at age 98. He was valedictorian of the Class of 1939 and later a neurosurgeon in the New York City area. He is survived by two children, two grandchildren and one great-grandchild.

Robert Andersen, ’48, of West Harwich, Mass., died on Dec. 3, 2012, at age 89. He practiced family medicine. He is survived by his wife of 67 years, Nancy; four sons, nine grandchildren and one great-grandson.

Francis J. Donovan, ’48, of Dover, N.H., died on Sept. 7, 2012. He practiced medicine for 45 years in the Boston area. He is survived by his wife, Marion; six children, 17 grandchildren and three great-grandchildren.

Gerald Aronson, ’53, of Winthrop, Mass., died on Sept. 14, 2012. He practiced internal medicine for nearly 50 years. He is survived by his wife of 34 years, Millicent; four children, four stepchildren, 17 grandchildren and two great-grandchildren.


Robert Provost, ’60, of Lexington and Edgartown, Mass., died on Dec. 15, 2012. He is survived by his wife, Cynthia; three children and 10 grandchildren.

Robert Ascheim, ’62, of New York, N.Y., died on Sept. 19, 2012. He was an internist, cardiologist and a clinical associate professor of medicine at Weill Cornell Medical College.

Thomas Richardson, ’73, of Sudbury, Vt., died on October 10, 2012, at age 78. He was an associate professor of ophthalmology.

FACULTY


In Memoriam
If you ask George Schneider, M65, A90P, what his favorite memory of Tufts is, he’ll say it was meeting and marrying his wife, Patricia, J63, A90P. The Schneiders met while he was completing his undergraduate degree at Harvard and she was a freshman at Tufts. Drawn to its academic offerings, George also chose to attend TUSM to stay close to Patricia, and they married during his final year. Twenty-six years later, their son Andrew graduated from Tufts, following in the footsteps of his parents, as well as Patricia’s father and sister.

Today, the Schneiders reside in Livingston, N.J., where George teaches part time after retiring from his endocrine practice, and Patricia works as a travel agent. Crediting a large part of their success to their educations, they recently set up a charitable remainder unitrust at Tufts to benefit the medical school. Their gift provides them with current income and tax benefits and will support future medical students through the Clinical Education Fund and the George and Patricia Schneider Endowed Scholarship Fund.

“We feel very loyal to Tufts. With our gift, we can do something meaningful for the medical school while enjoying the tax benefits of a charitable remainder unitrust.”

For more information please contact Tufts’ Gift Planning Office 888.748.8387 giftplanning@tufts.edu www.tufts.edu/giftplanning
Music at the End

Jennifer Hollis has been providing soothing music at the bedsides of dying patients for seven years now. To learn more about her mission, turn to page 12.