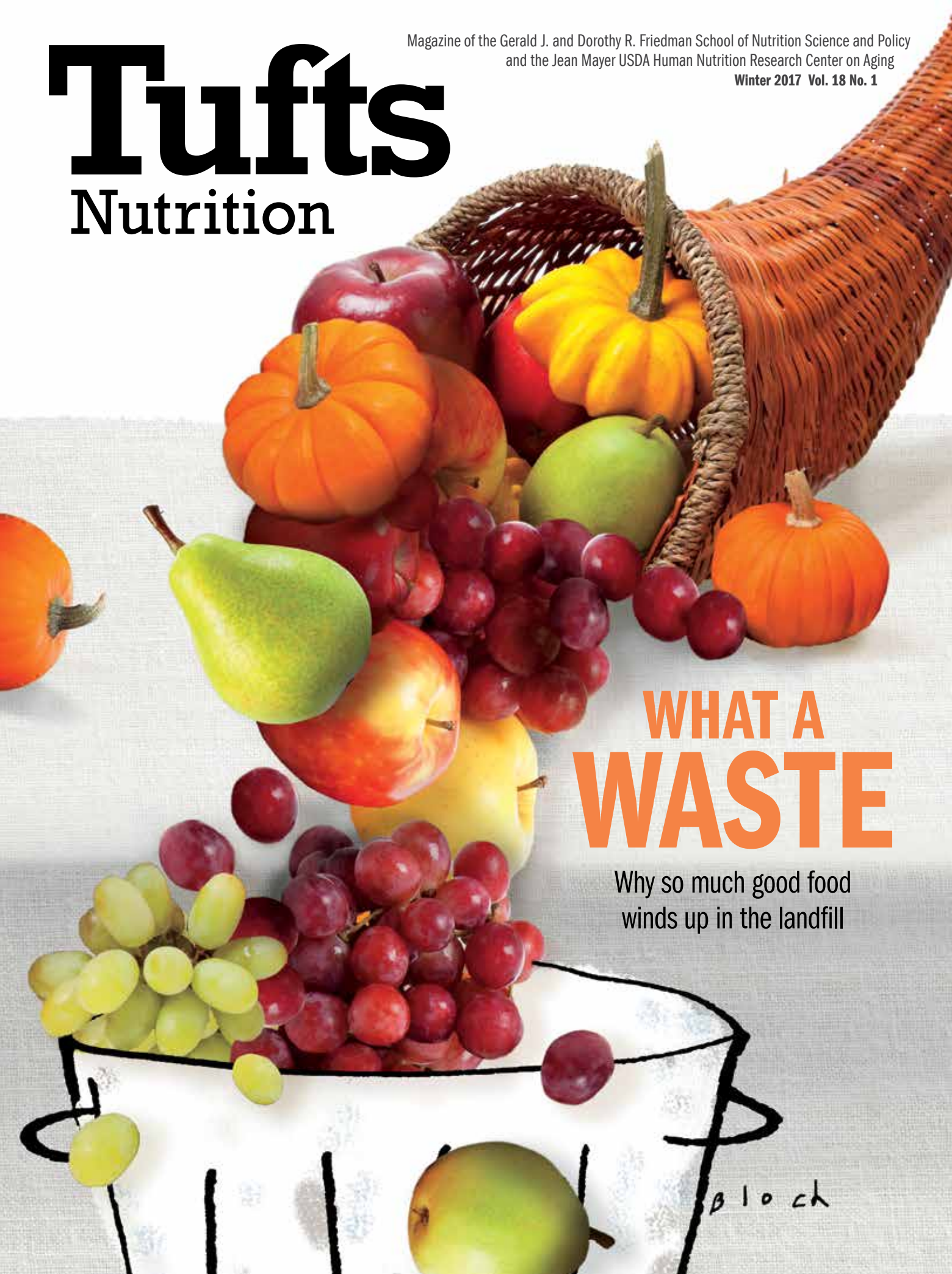


Tufts

Nutrition



WHAT A WASTE

Why so much good food
winds up in the landfill



WHAT TO COOK WHEN YOU HAVE A BUN IN THE OVEN

Morning sickness? Drop a Lemon-Ginger Zing Cube into your seltzer water to soothe the nausea. Heartburn keeping you up at night? Have low-acid Tabouli-ish (aka tabouli sans tomatoes) for dinner. Craving protein but suddenly turned off by the smell of cooking meat? Quinoa-Veggie “Cheeseburgers” may do the trick.

A little menu-planning could help you better handle the physical challenges of pregnancy while meeting your nutritional needs, according to *Healthy, Happy Pregnancy Cookbook* authors Stephanie Clarke, N06, and Willow Jarosh, N06.

Clarke and Jarosh are registered dietitians and owners of C&J Nutrition, a nutrition consulting, communications and workplace wellness company based in New York City and Washington, D.C. The cookbook grew out of a program they developed to offer pre- and postnatal support for their private clients.

The book includes make-ahead meals for after the baby arrives and recipes, such as Orange-Carrot Cream Smoothie, to keep calcium stores stocked, pointing out “if you don’t get enough from your diet or supplements, baby takes what he or she needs from your bones.” A chapter on cravings gives helpful interpretations of favorite comfort foods, such as Baked Mac and Cheese with Roasted Cauliflower.

Most of the recommendations, such as fiber- and magnesium-rich foods to combat constipation, are based on scientific research, while some, like eating oats, chickpeas, nuts and seeds to boost milk production in breast-feeding moms, are only anecdotal. But the ingredients are so healthful that Jarosh considers the potential symptom-solving properties “icing on the already very nutritious cake.” —BETH CAMERON

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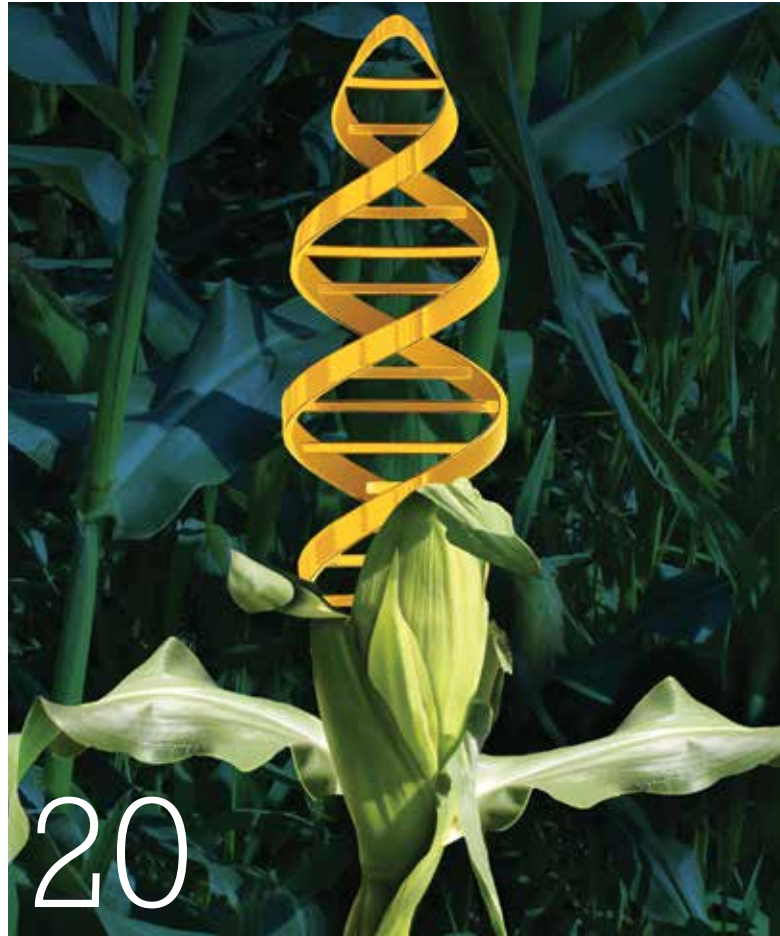
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Cover illustration
by Serge Bloch



A PLAN FOR ACTION



I AM DELIGHTED to announce the launch of the Friedman School's new strategic plan. Over the past 18 months, we have engaged our global community of stakeholders, including faculty, students, staff, alumni, friends, partners and others, in discussions about the greatest challenges and opportunities in the world of nutrition today. We identified our key strengths and competitive advantages, as well as areas with the greatest promise for the future. From this, we

created our new strategic plan, which details how we will focus our strengths and further build our capacity to attain ambitious yet achievable goals over the next five years.

Our vibrant mission is to produce trusted science, future leaders and real-world impact in nutrition science and policy. With 14 goals across eight strategic aims, our plan for action will guide, strengthen and inspire our efforts toward positive change in our community, across the United States and around the world. From nourished children, families and communities to sustainable food environments, from discovery and entrepreneurship to foundational initiatives, our plan outlines where and how we will maintain and expand our leadership. In addition to cutting-edge investigations and education, we aim to integrate principles of social justice, inclusion and diversity across the school's courses, research, student experiences and partnerships; further establish our position as a trusted voice in nutrition; and launch an institutional strategy and structure for advocacy, policy change and public impact.

While this document represents the culmination of 18 months of intensive effort, we know that our plan is best considered a living, evolving road map. In the coming months and years, we will finalize and implement the specific actions for each goal, develop and evaluate the corresponding metrics to assess progress, and seek additional input and apply course corrections, as needed, to ensure success. You can follow our progress at nutrition.tufts.edu/strategicplan.

Our strategic-planning process identified our strong school community as one of our unique strengths. You are part of that community, and I look forward to working together to address the complex nutrition challenges—and harness the remarkable opportunities—facing our country and the world.

DARIUSH MOZAFFARIAN, M.D., Dr.P.H., dean of the Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy

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STAYING TRUE TO THE SCIENCE



INTEGRITY. IT'S A personal value and a professional standard that guides the work of the HNRCA. It's essential to our efforts to advance nutrition science in this time of exciting biomedical breakthroughs. It reminds us that we must reassess old findings while embracing new ideas.

Integrity is vital in our current environment of fake news and social media that thrive on sensational clickbait headlines—I only wish there *were* eight super foods that allow you to defy aging! HNRCA standards demand rigor in our work and a resolute commitment to reporting the complexities of our scientific research. We must have the courage to challenge assumptions that may have guided past research, as our Cardiovascular Nutrition Laboratory recently did in reexamining the Glycemic Index (see “Volatile Index,” page 4).

Maintaining our integrity and a reputation for producing trusted evidence-based research is also critical as we prepare for changes in Washington. A new administration always brings some uncertainty, and this year will be no exception. I'm hopeful that nutrition science will benefit from the strong foundation created last year by the Department of Health and Human Services and the Department of Agriculture when they released the National Nutrition Research Roadmap. We are also hopeful a first-ever strategic plan for nutrition produced by the National Institutes of Health this year will continue to guide the innovation and outstanding research that is the hallmark of the HNRCA.

As interim director of the HNRCA, I find myself thinking about the ethos of the center and what differentiates us from other research organizations. Much of my thinking is reflected in the book *Everyday Practice of Science* by Frederick Grinnell, a professor at the University of Texas Southwestern Medical Center.

I recommend this outstanding little book to anyone interested in what really drives scientists—at the personal, organizational and societal levels. Written by a biochemist, it pulls back the curtain and reveals the many nuances and ambiguities of science. I have to agree with Dr. Grinnell that science is not as logical and absolute as people imagine—but that is exactly what makes this work so exciting and fun.

Grinnell writes that a good scientist must be “open to the possibility of being wrong” and offers the Louis Pasteur observation that “chance favors the prepared mind.” Maintaining our integrity and balancing these two axioms will help the HNRCA prepare for any change that lies ahead.

A handwritten signature in cursive script that reads "Sarah Booth".

SARAH BOOTH, Ph.D.

Interim Director, Jean Mayer USDA Human Nutrition Research Center on Aging

LAURELS

The American Society for Nutrition will present awards to two Friedman School faculty at the Experimental Biology meeting in April. Professor **CAROLE PALMER**, head of the master's component of the Frances Stern Combined Dietetic Internship Master's Program, will receive the 2017 Roland L. Weinsier Award for Excellence in Medical/Dental Nutrition Education. Professor **BEATRICE ROGERS**, director of the Food Policy and Applied Nutrition program, will receive the 2017 Kellogg Prize for International Nutrition.

FANG FANG ZHANG, an assistant professor and cancer epidemiologist at the Friedman School, was named the inaugural recipient of the Miriam E. Nelson Tisch Faculty Fellowship. The award, in honor of Miriam “Mim” Nelson, former associate dean at Tisch College and professor at the Friedman School, recognizes faculty who share Nelson's disciplinary and civic interests.

Four Tufts nutrition experts have been named to the founding editorial staff of *Current Developments in Nutrition*, a new peer-reviewed journal published by the American Society for Nutrition. Professors **SARAH BOOTH**, interim director of the Human Nutrition Research Center on Aging (HNRCA) at Tufts and director of its Vitamin K lab, and **EILEEN KENNEDY**, former dean of the Friedman School, will serve as deputy editors. **JOEL MASON**, a Friedman School professor and director of the HNRCA's Vitamins and Carcinogenesis lab, and **GERALD COMBS**, a senior scientist at the HNRCA, were named as academic editors. The journal aims to provide widespread access to the latest research in basic and applied nutrition science.

A La Carte



Volatile Index

Glycemic measurement of carbs may not be the final word on blood sugar.

BIG SWINGS IN your blood sugar level can lead to insulin resistance and diabetes, so eating in a way that keeps your blood sugar stable is a healthy goal. But a recent study found that the glycemic index, a long-consulted ranking of how quickly carbohydrate-containing foods raise blood sugar levels, may not be as reliable as we thought.

In repeated tests involving 63 healthy adults, researchers found that different people who ate the same amount of white bread could have different blood sugar levels, with values varying an average of 25 percent. White bread, long considered a high-glycemic food, ranked anywhere from low to high on the index. Even for the same person eating the same amount of bread at different times, the values varied by an average of 20 percent.

The study, published in the *American Journal of Clinical Nutrition*, suggests the glycemic index isn't that useful.

“Glycemic index values appear to be an unreliable indicator, even under highly standardized conditions, and are unlikely to be useful in guiding food choices,” said lead study author Nirupa Matthan, a scientist in the Cardiovascular Nutrition Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA) at Tufts. “If someone eats the same amount of the same food three times, their blood glucose response should be similar each time, but that was not observed in our study. A food that is low glycemic index for you one time could be high the next time, and it may have no impact on blood sugar for me.”

The researchers, including senior author Alice H. Lichtenstein, director of the HNRCA lab and the Gershoff Professor at the Friedman School, found that gender, body-mass index, blood pressure and physical activity seemed to account for only a small amount of the variability. Bigger factors were the participants' blood levels of insulin and glycated hemoglobin, both measures of the body's ability to manage sugar—and evidence that glycemic index values are influenced by an individual's metabolism.

The glycemic index was developed to help people with diabetes control their blood sugar, but the index went on to be used for food labeling and is a centerpiece for popular diets, including South Beach and the Zone.

“Based on our results, we feel strongly that glycemic index is impractical for use in food labeling or in dietary guidelines at the individual level,” Matthan said. “If your doctor told you your LDL cholesterol value could vary by 20 percent, it would be the difference between being normal or at high risk for heart disease. I don't think many people would find that acceptable.”



Heart Helpers

People with more omega-3s in their blood have a lower risk of dying from a heart attack, according to a study published in *JAMA Internal Medicine*.

People with the highest blood levels of omega-3 fatty acids, which are found in many fish, nuts, seeds and oils, had a 25 percent lower risk of fatal heart attack, compared to people with the lowest levels, according to the study.

“For the leading cause of death in the world, lowering the risk by about 25 percent would be quite meaningful,” said senior author Dariush Mozaffarian, dean of the Friedman School.

GROWING NEW FARMERS AND RANCHERS

For aspiring farmers and ranchers, hands-on fieldwork through an apprenticeship is a big part of learning the ropes.

“This is the number one way that people learn to farm, other than growing up on a farm,” said Jennifer Hashley, director the New Entry Sustainable Farming Project at Tufts.

New Entry has long been a pioneer in educating and mentoring food growers. Now New Entry will take the lead in creating a nationwide network of apprenticeship programs that will share best practices, set guidelines and serve as a resource for beginning farmers and ranchers everywhere. The U.S. Department of Agriculture’s National Institute of Food and Agriculture is providing a three-year, \$600,000 grant to support the network.

New Entry is collaborating with programs in Oregon, New Mexico, Wisconsin, Maine and Montana along with establishing an advisory committee of more than 30 farm organizations.

With more than 40 percent of American farmland expected to change hands in the next two decades, the diverse apprenticeship programs across the country need to develop a more coordinated approach, Hashley said.

One of the key goals is to develop a toolkit to help farms and ranches develop legal apprenticeship programs that pay workers fairly and provide safe working conditions, while providing businesses with the labor they need.

“Unfortunately, right now we estimate up to 90 percent of all on-farm apprenticeships or internships are not actually meeting Department of Labor requirements,” said Hashley, noting that more farms are being fined for lack of compliance. “So this is a big sustainability issue for agriculture, when so much of small-scale sustainable agriculture relies on this work-learning exchange mechanism for their labor source.”

Among many goals, the network wants to develop post-apprenticeship support services for newly trained farmers and ranchers to help them find land and obtain financing.

“Hopefully, it will help producers avoid some of the legal pitfalls and improve the quality of on-farm education for the next generation of farmers and ranchers,” Hashley said.



A Diet Shift Feeds More People

IF AMERICANS CHANGE the way they eat, the existing U.S. farmland could feed a lot more people. In fact, a new model that measures the land needed to grow food for different diets suggests that a vegetarian diet with some dairy makes the most efficient use of the land we have—enough to feed 800 million people, or twice the number who could be fed with our current diet.

Nutritionally, our current diet isn't something to brag about. It's high in calories and sugar and low in fruits and vegetables and falls short of nutritional recommendations on many fronts. So Christian Peters, an associate professor at the Friedman School, and colleagues created a model that compared our current diet's agricultural "food-print" to that of nine other diets: one that mimicked our current diet but contained fewer calories, and eight "healthy" diets that comply with the Dietary Guidelines for Americans but varied in their mix of protein sources, such as meat, eggs, beans, nuts and tofu.



Our current diet had the lowest carrying capacity, meaning that it could feed the fewest people per acre, and required eight times more land than a vegan diet. The lower-cal version wasn't far behind. But among the healthy diets, the vegan diet wasn't the winner for land use: Some of the diets that included meat had higher carrying capacity than a diet completely free of animal products, in part because a vegan diet doesn't make use of land that is only suitable for grazing. The diet that ranked highest was a vegetarian one that includes dairy products.

"Dietary choices can influence the ability of agriculture to meet our need for food," Peters said. "Our approach challenges the 20th-century emphasis on increasing yield and production. Improving crop yields remains vitally important, but it is not the only way to increase the number of people fed per acre. Our

aim is to identify potential agricultural sustainability strategies by addressing both food consumption and production."

The research appeared in the journal *Elementa*.



"Business as usual will generate a catastrophic health crisis. Tweaking at the margins won't suffice. We need a radical transformation of our food systems to nourish—not just feed—9 billion people."

Professor Patrick Webb, in his keynote address to a U.N. symposium in Rome, where he called for action to combat the rising malnutrition that may affect half the world's population by 2035.



Boston residents listen to a presentation by HNRCA scientists.

HOLE IN THE DATA

With all the success scientists have had using genetics to fight against disease, one element is missing: minorities. People with non-European ancestries are underrepresented in genetic databases, hindering the potential of personalized medicine.

For example, while hereditary breast cancer is linked to mutations in the BRCA1 or BRCA2 genes, the “normal” genetic sequence for these genes was determined based on women of European and Ashkenazi Jewish descent, so it’s not always possible to tell normal from abnormal sequences in women from minority groups. Similarly, researchers know that African-Americans are disproportionately affected by variants in the APOL1 gene, which can increase a person’s risk of kidney disease by up to seven times. However, there is not yet enough data to come up with effective treatments.

In a paper for *Health Affairs*, Tufts researchers and others called for efforts to increase the enrollment of nonwhites in studies, develop research relationships with target communities and educate health-care providers about genetic research.

“If we don’t expand our efforts, the quality and effectiveness of genetic research and services will be limited in ways that can perpetuate health disparities,” said José M. Ordovás, director of the Nutrition and Genomics Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA) at Tufts and a coauthor of the paper.

REPLACE YOUR FATS

There are benefits to trading bad fats and carbs for good fats

HERE’S A DIET swap with lots of evidence behind it: Eating more unsaturated fats, especially polyunsaturated fats, in place of carbs or saturated fats lowers blood sugar levels and improves insulin resistance, according to a meta-analysis of data from 102 studies.

The study, led by Dariush Mozaffarian, dean of the Friedman School, and Fumiaki Imamura, N09, a senior investigator scientist at the University of Cambridge, provides new evidence for the effects of dietary fats and carbohydrates on the regulation of glucose and insulin levels and several other metrics linked to type 2 diabetes. The results were published in *PLOS Medicine*.

The team identified and summarized findings from randomized controlled feeding trials that involved 4,660 adults; the meals they ate varied in the types and amounts of fat and carbohydrates. The researchers then evaluated how the variations in diet affected measures of metabolic health, including blood



sugar, blood insulin, insulin resistance and sensitivity, and the ability to produce insulin in response to blood sugar.

Rates of insulin resistance and type 2 diabetes are rising sharply worldwide, highlighting the need for new, evidence-based preventive strategies.

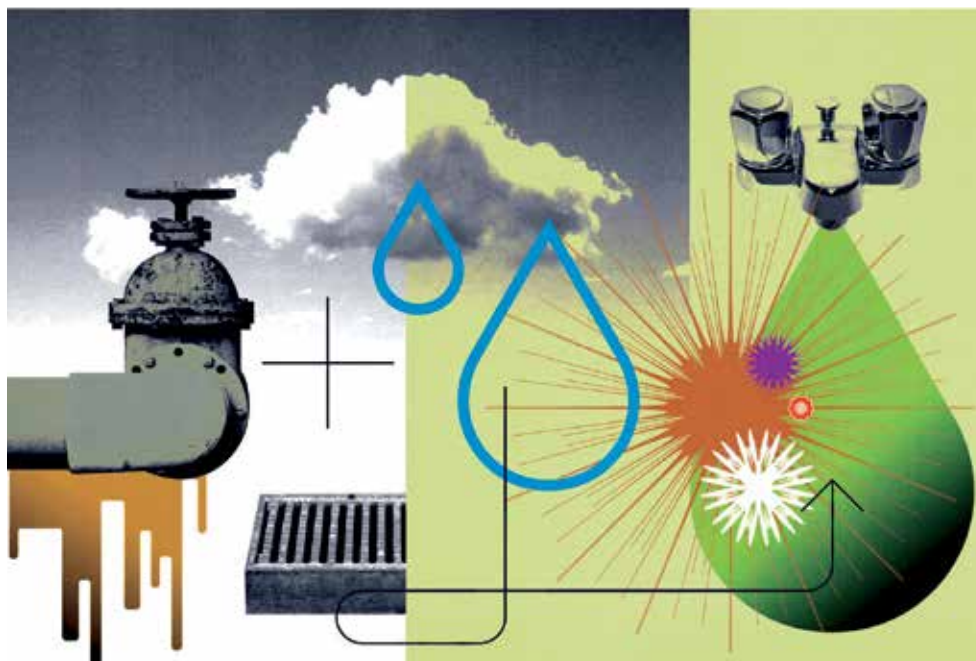
While a healthy diet is clearly a cornerstone of such efforts, the effects of different dietary fats and carbohydrates on metabolic health have been controversial, leading to confusion about specific dietary guidelines and priorities.

“The world faces an epidemic of insulin resistance and diabetes,” said Mozaffarian, the senior author on the study. “Our findings support preventing and treating these diseases by eating more fat-rich foods like walnuts, sunflower seeds, soybeans, flaxseed, fish and other vegetable oils and spreads in place of refined grains, starches, sugars and animal fats.”

“This is a positive message for the public,” he added. “Don’t fear healthy fats.”



Dig In



THAT DIRTY WATER

An inconvenient truth about old sewer systems. **BY DAVID LEVIN**

IN OLDER U.S. cities, heavy rainfall doesn't just flood basements. It can also send a wave of dangerous pathogens into municipal water sources. Lakes, rivers, streams and even reservoirs may see an uptick in sewage-borne bacteria and viruses after heavy rains, infecting boaters and swimmers and overwhelming the ability of treatment plants to purify drinking water, according to Jyotsna Jagai, MPH05, N09.

Jagai, who earned her doctorate at the Friedman School and is a research assistant professor of

environmental and occupational health sciences at the University of Illinois at Chicago, said much of the problem is caused by aging infrastructure. Instead of having two separate pipelines—one for human waste and one for storm runoff—older sewer systems route both waste streams into a single underground pipe, aptly called a “combined sewer.”

When unusually heavy rains fill these sewers past their capacity, water and human waste can sometimes back up out of storm drains, spilling into rivers

and streams. In some cases, Jagai said, sewer operators may be forced to cause an intentional overflow in order to release excess pressure in the sewage lines after a storm.

Jagai is studying these events, which are known as “combined sewer overflows” (CSOs). They're a distinct problem in more than 70 major American cities with aging sewage systems and have a significant effect on public health in those regions, she said.

In 2014, she examined daily historical weather data across Massachusetts

during a five-year period (2003 to 2007), noting regions where sudden, heavy rainfall occurred. She then compared those dates to hospital records from the same area, looking for any change in the number of patients diagnosed with illnesses caused by bacteria and viruses carried in human waste. Sure enough, she said, after heavy rains, she saw a distinct spike in patients diagnosed with gastrointestinal disorders—nearly 13 percent more than usual in areas where the CSOs affect drinking water sources.

“This study looks at extremely heavy rainfall events as a proxy for combined sewer overflow events—we don't make the connection 100 percent, but it definitely shows there's a significant impact,” she said. “These sorts of gastrointestinal or diarrheal diseases have a huge impact on health, especially for patients who are malnourished, or whose immune systems are compromised in some way.”

Environmental Protection Agency guidelines call for the removal of combined sewers over the next 20 years, Jagai said, but many major cities have yet to make the change because such projects are extremely costly. Until that infrastructure is replaced, Jagai said that new data

linking CSOs to illness could help warn residents to boil drinking water or to avoid swimming and boating in certain areas.

“If climate change predictions are true, we’ll be seeing more heavy rainfall and more CSO events in the next 10 to 20 years,” she said. “This study suggests the need for increased messaging to communities to warn people not to play in the water, or to boil and filter drinking water after major rainfall as a precaution.”

Preventive measures like these may work in the short term, but in some cases, the effects of a CSO event can linger for weeks or months after a heavy rain. Certain pathogens can thrive inside aging pipes and water transport systems within some buildings. Microbes like *Legionella pneumophila*, *Mycobacterium avium* and *Pseudomonas aeruginosa*, all of which cause serious respiratory and systemic infections, can form sticky biofilms on interior surfaces of pipes, infecting water that passes over them and prolonging residents’ exposure to those pathogens. A study published in 2016 by Elena Naumova, director of the Initiative for the Forecasting and Modeling of Infectious Disease at Tufts, estimated that those three pathogens alone may result in the

hospitalization of as many as 80,000 elderly each year, at a cost of \$2 billion.

While this is a serious localized concern, Naumova and Jagai are quick to note that water quality in the United States is still exceedingly good overall. Pathogens released during CSO events are often removed from the community water supply during normal treatment processes, and microbes growing in a building’s water mains usually infect only people with compromised immune systems.

“While public drinking water is safe, it is clearly more safe if you are healthy than if you have medical conditions that enhance your vulnerability to infections,” said Jeffrey Griffiths, a professor of public health and community medicine at Tufts School of Medicine and a coauthor on Naumova’s study. “The risk of becoming ill from drinking water is much less than the risk of becoming ill from food, but it is not zero.”

Jagai wants to extend the scope of her research into a broader public health arena. She’s developing a cumulative index for exposure to environmental pollutants—not just pathogens in water, but industrial chemicals, pesticides, the built environment and more. “I want to build a much broader notion

of exposure,” she said. “Everyone should be able to live in a place with access to clean water and clean air. There shouldn’t be an uneven distribution of pollutants. The big theme to me is one of environmental justice.”

BISCUITS THAT COULD CHANGE LIVES

A nutritional supplement developed at Tufts is helping people in one West African village feed their children and earn a living.

BY MONICA JIMENEZ

WHEN TUFTS NUTRITIONIST

Susan Roberts went to the small village of Dandu in Guinea-Bissau, on West Africa’s Atlantic coast, to test nutritional supplements for mothers, infants and children, she could have been satisfied with gathering data about the health of the population. Instead, she decided to throw her arms around the community.

With partners at Tufts and elsewhere, she’s involved in a multipronged mission to help the village thrive by creating new ways for the 800 residents to eat, learn and make a living. Dandu, a subsistence farming community, doesn’t have electricity; there are no stores, and you won’t find any cars there either.

On her first visit to Dandu two years ago, Roberts, a professor at the Friedman School,



Dandu residents prepare the new nutritional biscuits.

discovered that the typical diet is 80 to 90 percent rice. Cassava root is also a staple, with the occasional fish or meat from a small animal. Villagers grow and sell cashews to buy fabric for clothes, aluminum for roofs and more rice. Many children are short and thin, and some have orange hair, the sign of a protein deficiency that causes normally dark hair to lose its pigment.

The conventional food supplement she was testing was supposed to provide better nutrition, but many of the micronutrients absent from the Dandu diet were not in the supplement, said Roberts, who also directs the Energy Metabolism Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts. “When I looked at it, I thought, This isn’t the complete formulation, surely,” she said.

The World Health Organization standard for the supplement is designed to increase the most essential nutrients and keep

kids alive. Roberts wondered whether standard supplements could reverse the cognitive decline or impaired metabolism and immune function caused by malnutrition. To address that, she has developed what she hopes is a more complete food supplement. (Tufts has applied for a patent on Roberts’ supplement.) She began testing it in Dandu in January and will assess its effectiveness over six months. “Our goal is not just to keep kids alive, but to help them thrive—physically, mentally—for long-term health,” she said.

Rather than handing out packets of the new supplement, which comes as a paste, Roberts is taking the project a step further. Aided by a \$200,000 grant and business expertise from philanthropist and entrepreneur Bill Schawbel, Roberts will buy the ingredients used to make the supplement, such as peanuts from West African farmers, and

pay local bakers to make special biscuits containing the supplement. Then she’ll hire local workers to distribute them.

Not only will the supplement help improve the villagers’ nutritional status, the local production and distribution of it will stimulate the economy and enable villagers to continue production even after the six-month trial has ended, Roberts said.

Schawbel, founder of the Schawbel Corp. and CEO of Schawbel Technologies, which manufactures heated insoles and hand warmers, visited Dandu with Roberts last year during a trial of the supplement production system.

He asked the villagers if they could increase production. “They said, ‘Oh yeah, our wives could work with us,’” Schawbel said. “I said, ‘Could you deliver some baked goods to other villages?’ And they said, ‘Our kids on bikes could do that.’ I said, ‘Now there’s a business.’”

Roberts has been working to fortify Dandu in other ways. When she found out that the villagers desperately wanted their children to be educated, she and her colleagues including Sai Das, N02, an assistant professor, and Andrew Greenberg, the Atkins Professor in Nutrition and Metabolism, privately raised \$7,000, and the villagers built Dandu’s first elementary school; it now has 200 students. Nina Schlossman, J75, N86, founder and president of Global Food and Nutrition, and John Whetten, former CEO of Challenge Dairy, also contributed. They’re trying to raise another \$7,000 to build two more classrooms.

As discerning as she is about what goes into food supplements, Roberts is just as picky when it comes to food for thought. Looking to start a library at the school, Roberts pored over American children’s books and found them lacking. “Our books are [about]... things they’ve never even seen,” she said. “It’s almost impossible to find culturally appropriate books for beginning readers in subsistence farming villages.”

With the help of the Global Literacy Collaborative and a seed grant from the university, Roberts is collaborating with locals to gather Dandu’s history, songs and proverbs, which will be translated and turned into reading



Children at the Dandu school that Tufts researchers helped create

material that will be offered to students on tablet devices. Roberts has already brought a handful of tablets to the village to show children how to use them, and distributed a 30-page text about the history of Dandu. “We’re combining what we hope is a superior nutritional formulation with educational enrichment to see how far we can push the envelope to help these kids turn into exceptional students,” she said.

Schawbel hopes to eventually expand access to the food supplement, helping villages around the world improve their health, educate their children and create a sustainable income for themselves. “With this one simple biscuit, I think we can make a major change in the world,” he said.

The villagers of Dandu “are rich in everything except material goods,” Roberts said. “They are a very worthy people to help. And what else are we here for other than to do some good in the world?”



If you are interested in supporting the Tufts nutrition research in Guinea-Bissau, please contact Cindy Briggs Tobin, senior director of development at the Friedman School, at 617.636.2940 or cindy.briggs@tufts.edu. You can also make a gift to the project online at www.tuftsgiving.org; please indicate that your gift is for the Family Nutrition Research Program in Guinea-Bissau.

GET 'EM WHILE THEY'RE CUBS

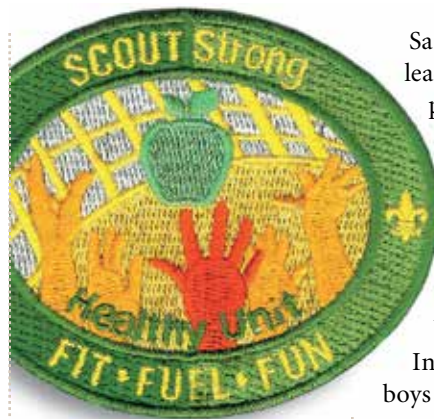
Scout troops strive for healthier habits.

BY BETH CAMERON

BOYS IN MATCHING kerchiefs and caps cluster around a snack table. Their uniforms might be reminiscent of a Norman Rockwell painting, but this is not your father’s Cub Scout meeting. Instead of eating cookies and drinking bug juice, these first-graders are sampling kiwi and star fruit with all the intensity of grown-ups at a wine tasting.

The fruit and vegetable taste test is just one of the activities the boys might try as they work to earn the SCOUTStrong Healthy Unit patch. Developed in partnership with Healthy Kids Out of School (HKOS), an initiative of ChildObesity180 at the Friedman School of Nutrition Science and Policy at Tufts, the award is designed to help Boy Scout troops make simple changes to their snacking and activity routines and establish a new “healthy meeting” norm.

Over the course of at least nine meetings, the scouts practice healthy habits, such as drinking water instead of sugary beverages, choosing



nutritious snacks, and increasing physical activity. Alyssa Koomas, project manager for HKOS, said that trying out new activities in the company of peers can help reinforce the behaviors, which means that scouts are more likely to bring some of the new habits home with them.

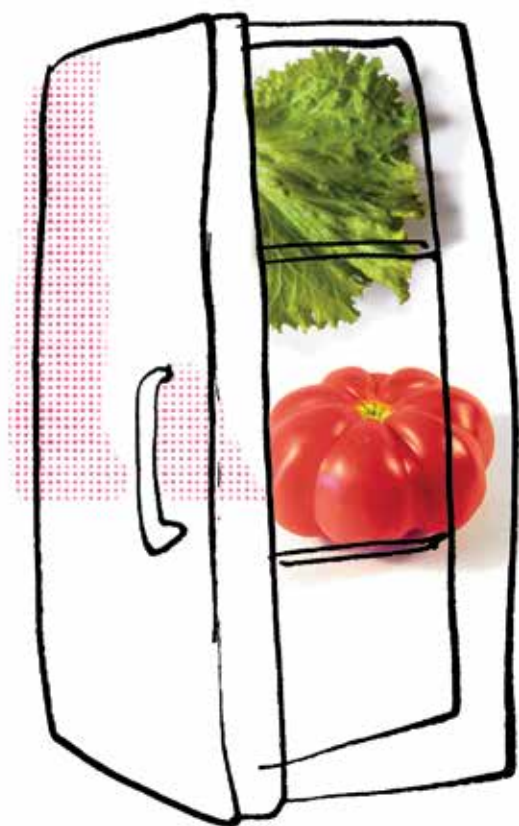
The Harvard Pilgrim Healthcare Foundation sponsored a three-year study with Boy Scouts in New England that resulted in the patch program, as well as updates to Cub Scout Leader Guides that incorporate the new healthy meeting principles. A corollary Strong Girls patch for Girl Scout troops debuted in 2015.

More than 40,000 Boy and Girl Scouts have completed the patch programs. With more than 4 million children participating in scouting in the United States each year, the patch program could go a long way toward helping ChildObesity180 accomplish its mission to reverse the trend of the childhood obesity epidemic within one generation.

Sandy Smith, a scout leader in Bangor, Maine, piloted the Healthy Unit patch program with his grandson’s troop, working with parents to revamp the weekly meeting. Sodas and juice boxes were banned.

Instead of candy, the boys now bring apples, carrots and fresh-popped popcorn to share at snack time. But by far the most popular change was stretching the meeting time from 60 to 75 minutes to allow for physical activity.

“The kids started to ask when it would be time to head outside and run around,” said Smith. Scouts who initially struggled to put away screens during meeting time became enthusiastic participants and even signed up to attend scout camp during the summer. Koomas hopes the success of the scouting patch programs will translate to other volunteer-led initiatives. To that end, HKOS has created a number of other healthy-habits programs, including a training to help youth sports coaches educate athletes about the best ways to refuel on and off the field. Eventually, kids could hear the same healthy-choice message at all their out-of-school activities, so when they run from a scout meeting to soccer practice, they skip the sugary sports drinks and bring their water bottles instead.



WASTE BY

BY CLARE LESCHIN-HOAR AND JULIE FLAHERTY

ILLUSTRATIONS BY SERGE BLOCH

NEARLY A THIRD OF THE FOOD THAT WE PRODUCE EACH year winds up getting thrown away or lost somewhere along the supply chain. According to the United Nations, that amounts to about 1.3 billion tons of food that's squandered annually.

And that's more than merely a shame: Researchers say that preventing food waste and loss will be essential to finding a way to feed the world's growing population in the years to come.



DESIGN

Why do we throw away so much perfectly good food?

In a 2014 report, the U.N. High Level Panel of Experts on Food Security and Nutrition, including Friedman School Professor Eileen Kennedy, called for making the prevention of food loss and waste a global priority. “The extent of food losses and waste while more than 800 million people still suffer from hunger seems to indicate that something is wrong, that food systems do not function as they should,” the panel wrote.

Of course, this issue is about more than just hunger.

The energy used on wasted food would make it the world’s third-largest producer of greenhouse gases. Waste also carries a hefty economic price tag for food producers—about \$750 billion annually, says the U.N.

For these reasons, the United States is calling for a 50-percent reduction in food waste and loss by 2030. In the pages ahead, we’ll look at how innovative ideas coming out of Tufts’ labs, classrooms and dining centers are helping to meet that goal.



Willing to Waste

What motivates people to buy food they don't intend to eat?

BACK IN COLLEGE, when Norbert Wilson would buy a jar of pasta sauce at the supermarket, he had every intention of using it up. But there's only so much spaghetti a person can eat, which meant those jars occasionally ended up as half-eaten, fuzzy science experiments lurking in the back of his refrigerator.

It was a small example of food waste, but one that stuck with him. Wilson, who joined the Friedman School as a professor of food policy in January, has been investigating food waste, building on his past research on food choice, domestic hunger, food banking and the international trade of food products.

When Wilson turned his attention to issues related to food waste, he theorized that consumers buy food even when they're aware they may not finish it. It's a concept that anyone who has purchased a container of sour cream can understand—we buy it knowing we may toss the container with a hefty portion still clinging to the sides. But what motivates people to spend good money on food they don't intend to eat?

Wilson found a clue in 2013, when the Natural Resources Defense Council released a report showing that a substantial portion of America's \$160 billion food-waste problem could be traced to those “use by” and “sell by” dates found on food containers. It turns out that many consumers, worried that food that has passed the date on its packaging is no longer worth eating, throw out plenty of perfectly good stuff. Could consumers be thinking about those labels as they buy the food?

To find out, Wilson devised an experiment that involved putting differently worded date labels on yogurt, cereal and salad greens. The labels used a variety of terms—“use by,” “best by,” “sell by” and “fresh by”—and included an expiration date. Wilson wanted to know whether certain language would result in people buying food with a greater expectation

that they would waste some of it—what Wilson and his colleagues called the “willingness to waste.” The 200 participants in the study were asked to examine food carrying the different labels and then say how much of each product they expected their household to consume. In nearly every case, the subjects' answers indicated that they would be more willing to toss out food if it had the “use by” wording. The researchers theorized that may have been because “use by” implies that the food would no longer be safe to eat after that date.

The study found that date labels were influential even when it came to a food like boxed cereal, which is less vulnerable to spoilage. In fact, the willingness to waste was actually higher for cereal than it was for more perishable items like yogurt and bagged salad. The cereal example also showed that the perception of a bargain can influence willingness to waste amounts. For instance, when participants in the study perceived that they were getting a better deal by buying a larger box of cereal (think Costco-size double boxes of Cheerios), they anticipated wasting more of it, even if the “use by” date was a year in the future. “I was surprised by how strong a response they had to the cereal,” Wilson said, “and that people were willing to waste more when they saw the larger size.” The pitfall for consumers, he said, is that tossing more of the cereal may have canceled out the savings they thought they were getting.

The findings imply that the way foods are packaged can enable waste. Tweaking package sizes may keep consumers from buying more than they'll eat. But one wide-reaching change would be to standardize date labels—currently unregulated at the federal level—so that they have a consistent meaning. “To move forward on [reducing] food waste,” Wilson said, “we will need collaborations between industry, consumer groups and the government to change labels.” —C.L.

Cutting Waste On Campus

Sometimes your eyes are bigger than your stomach.

2 MILLION

Number of meals Tufts Dining serves each year, at eight locations

X 1.6

The average ounces of food a Tufts student leaves on the plate at the end of a meal

100 TONS OF FOOD THROWN OUT PER YEAR

but about a third of that is inedible food like apple cores, chicken bones, etc.



Steps Tufts is Taking

PLANNING For recipes that call for apples or tomatoes, Tufts Dining buys imperfect “seconds” that might otherwise get tossed, and had a local company create a custom marinara sauce that can use imperfect tomatoes. They also started ordering smaller bananas after noticing that a lot of half-eaten bananas were being left on breakfast plates.



DONATING In March 2016, The Tufts Food Rescue Collaborative (formed by faculty, staff and students) started turning leftover dining center food into meals for the hungry. Student volunteers now use a food-packaging machine to assemble and refrigerate meals that Food for Free, a local nonprofit, delivers to people in need.



COMPOSTING

360

Number of tons composted in 2014-15 by Tufts Dining, including napkins and other non-food items. Tufts has been composting for more than 15 years.

EDUCATING In February, Tufts Dining will hold its second Waste Less dinner in Dewick-McPhie dining center, with information stations where diners learn about waste and sustainability. The highlight is the weighing station, where student volunteers weigh the food diners leave on their plates, to raise awareness.



HOLDING ON TO FRESHNESS

New technologies could extend the shelf life of produce.

HOW QUICKLY DO avocados go from unripe to mushy and spoiled? A funny internet meme out there goes like this: Avocado—Not yet. Not yet. Not yet. Too late.

Of course, avocados aren't the only produce that always seem to go bad before we've gotten around to eating them. Fuzzy strawberries, darkened bananas and decaying tomatoes that act as fruit-fly bait can be just as frustrating.

But solutions may be on the way in the form of two promising technologies with Tufts roots that could extend the shelf life of fragile produce. Tufts biomedical engineer Fiorenzo Omenetto sees potential in a surprising place: silk. More specifically, in the silk fibroin, an insoluble protein found in silk that can help prevent decay in fruits by controlling their permeability to gases.

In a study published in May 2016, researchers in Omenetto's lab found that after freshly picked strawberries were dipped into a solution containing 1 percent silk fibroin protein, the fruit stayed fresh for more than a week without refrigeration. "It's a transparent coat," said Omenetto, the associate dean for research and a professor at Tufts School of Engineering. "It's consumable, sustainable. The most exciting thing is you have an imperceptible

layer that has such tangible effects on the fruit."

Meanwhile, Irwin Heller, A67, A98P, a founder of BioWish Technologies, has been working on extending the shelf life of bananas. His product began as a wash to remove the sticky, discoloring latex sap that oozes from bunches when they are harvested. The wash, made from dietary fiber and active microbial cultures that break down the sap, is an environmentally friendly alternative to traditional banana-washing techniques, which use chlorine, aluminum sulfate and lots of fresh water.

But the fiber wash has an even bigger benefit. Bananas cleaned with it stay green far longer than bananas washed the traditional way, making them more likely to reach consumers before they overripen.

"We saw immediately that not only was it a better way to clean off latex, it would preserve shelf life," said Heller, a former university trustee and longtime member of the Friedman School's board of advisors. "Longer shelf life, less spoilage—it's a net gain for the environment, consumer and the grower."

Now if someone would just invent an avocado ripeness alarm. —C.L.

Lost and Tossed

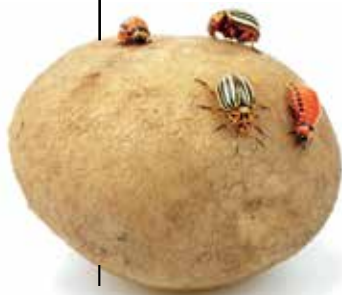
"Loss" means food that doesn't make it to market, while "waste" is the term for food that stores, restaurants and consumers toss. Loss is a greater concern in developing countries, accounting for 84 to 95 percent of the food that goes uneaten there. Waste is a bigger problem in higher-income countries, where about a third of uneaten food is simply squandered. Researchers see chances to fight both problems all along the supply chain.

1 FARMS
Harvests lost to poor storage and contamination. Farmers in low-income countries often can't protect harvested crops from the elements and pests. Simple technologies, such as metal silos, could help. Some farmers cut their losses by 40 percent when they started using specialized plastic storage bags.

2 TRANSPORT
Food lost in packaging and handling. Without refrigeration or other ways to preserve them, foods wilt and spoil. Rough handling damages produce and hurries rot.

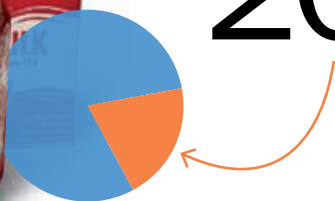
45%

of the fruits and vegetables grown worldwide are never eaten.





20% of milk Americans buy is thrown out before it is consumed.



Follow the Milk

Discarded cartons in schools show there's room to improve.

THE MEALS SERVED in our nation's public schools may vary from region to region, but there's one thing they have in common: the small carton of chilled milk that's offered to every child at every meal of the week. Rich in vitamin A, calcium, vitamin D and magnesium, milk is valued for its unique nutritional profile. But it turns out many of those nutrients meant for kids' bellies are going down the drain.

Stacy Blondin, a doctoral candidate in food policy and applied nutrition

at the Friedman School, set out to measure milk waste in the School Breakfast Program, a federally assisted program that has grown exponentially in the past decade as a way to give all children access to healthy food.

Blondin looked at 20 classrooms in a medium-sized, urban school district in the Northeast. The classrooms used a Breakfast in the Classroom model, in which students were served food right at their desks. Researchers collected what went uneaten of the children's meals and weighed the leftover milk.

They discovered that in this case, the

well-intentioned system, not the consumer, was the more concerning source of waste. While the children who took milk did a pretty good job of drinking it, consuming about 74 percent of it, a considerable number of cartons brought to the classrooms were untouched. Even if they remained unopened, food safety regulations do not allow them to be served again because of milk's susceptibility to spoilage. Altogether, about 45 percent of the milk brought to the classrooms was thrown away.

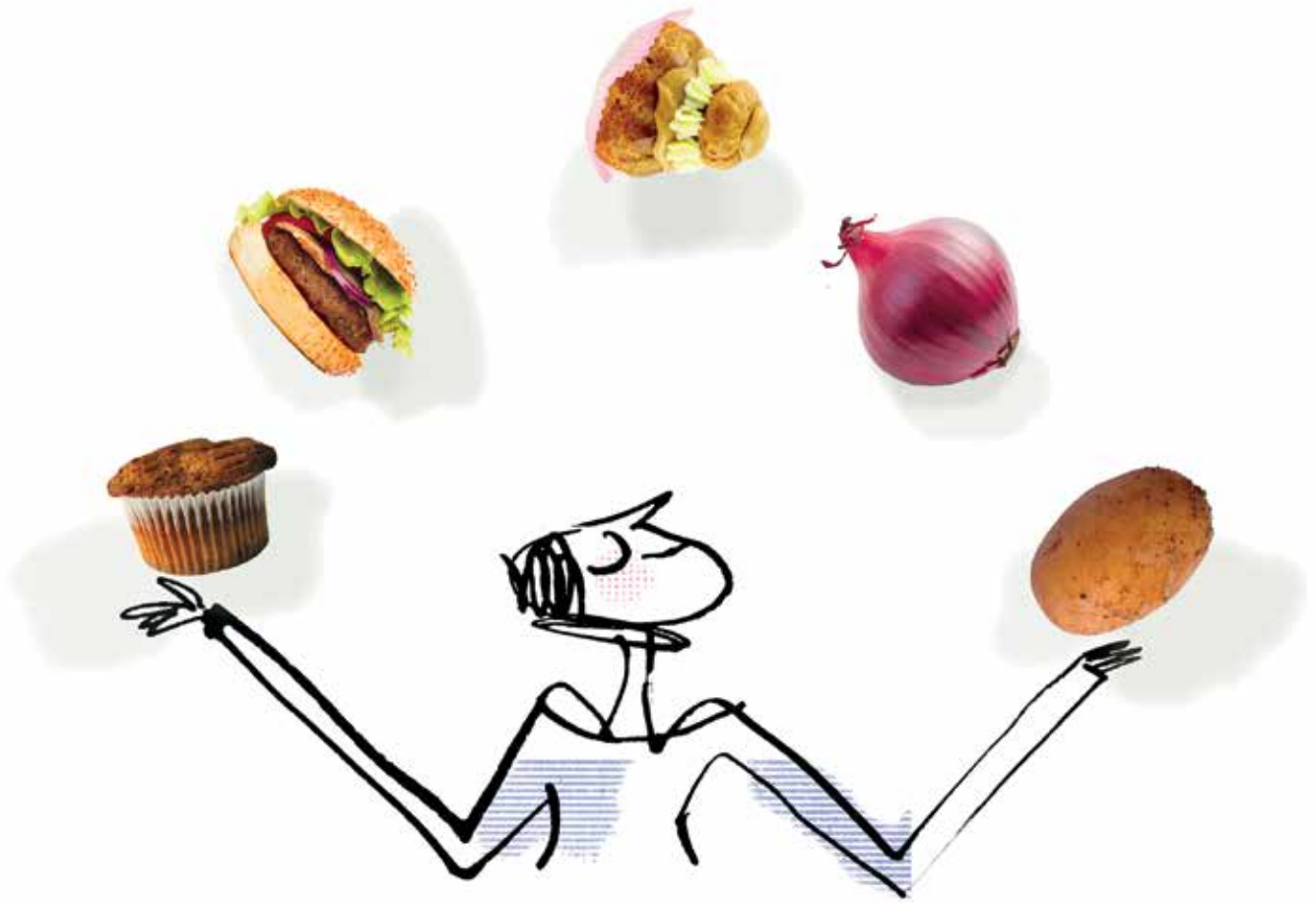
Blondin estimated that this rate of milk waste amounted to an annual loss of almost \$275,000 in this school district alone—16 percent of the district's breakfast program expenditures. Environmental costs were hefty, too. "Milk has a higher resource intensity in terms of production than plant-based foods," Blondin said. Making that much milk would require more than 192 million liters of water and more than 495,000 kilograms of carbon dioxide equivalents over the course of a school year. Multiply that by every school district in the country, and suddenly that tiny carton looms much larger in its importance.

The results of the Tufts study, published in the *American Journal of Public Health*, led Blondin to suggest better calibrating milk supply and demand in the classroom and finding ways to preserve milk once it reaches the classroom, perhaps by refrigeration or shelf-stable packaging. Schools could also consider adding other foods that contain some of milk's nutrients to their menus to make up for the milk that kids aren't drinking. Such steps, she said, could help keep school breakfast programs economically and environmentally sustainable, while keeping kids well-nourished in the years to come. —C.L.

3 RETAIL
Food wasted by stores and restaurants.
American stores toss about 43 billion pounds of food per year—from dented melons to discontinued cookies to ham that is nearing its "Sell By" date. Restaurants cook abundant amounts and then dump what's left at the end of the day.

4 CONSUMERS
Food wasted at home.
What with buying too much, serving too much and not storing food properly, the average American family throws away up to \$2,200 worth of food per year.





Tufts Nutrition

TOP 10

How you can fight food waste

We asked Danielle Nierenberg, N01, president of Food Tank: The Think Tank for Food, and Marisa Tsai, N18, a Food Tank researcher and master's student in the Food Policy and Applied Nutrition Program at the Friedman School, for their advice on combating food waste locally. Here, in no particular order, are some things you can do to make the most of the groceries you bring home and cut back on what ends up in the compost bin or landfill.

PLAN, PLAN AND PLAN

The Environmental Protection Agency (EPA) recommends making shopping lists with quantities noted for each item. Shopping on a full stomach can help consumers avoid overpurchasing food, says the World Wildlife Fund. Not sure exactly how much you need, or hosting guests? Online portion calculators can estimate just the right amount to cook.

FAMILIARIZE YOURSELF WITH THE FRIDGE

Before you head to the store, the EPA recommends taking stock of what you already have to avoid purchasing duplicates. Apps like Fridgely can help record and track your fridge contents. The Barilla Center for Food & Nutrition recommends putting items close to their expiration at the front of

the fridge so they get eaten sooner. And using clear storage containers can help you quickly identify foods, according to the Boston-based food-rescue organization Lovin' Spoonfuls.

DONATE TO FEED THE HUNGRY

One in six Americans is food insecure. Donating excess food to community organizations or food banks helps get

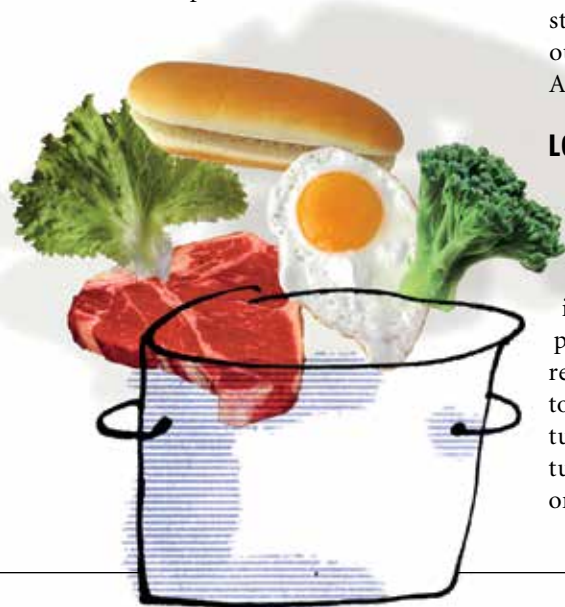
food to those who need it most. Find food-rescue organizations using the Food Rescue Locator (sustainableamerica.org/foodrescue) launched by Sustainable America, End Food Waste and the Food Rescue Alliance.

Ample Harvest helps more than 42 million home and community growers donate their garden surplus to food pantries across America. Food businesses and institutions can donate to DC Kitchen or NYC-based City Harvest, which take surplus food and deliver it to community organizations, homeless shelters, transitional homes and other locations.

Technology is helping to streamline the process. Copia (gocopia.com) in the Bay Area uses a smartphone app to pick up food from individuals and businesses and deliver it to charities. Similarly, Chicago-based Zero Percent (zeropercent.us) helps businesses with surplus food easily connect with neighborhood hunger charities via their smartphone app.

KEEP THE SCRAPS

Repurpose food scraps that you typically toss. Broccoli stems can be chopped and cooked along with the florets. Carrot peels, mushroom stems and green onion ends can make delicious vegetable stock. Check out savethefood.com/cook-it for a collection of recipes that use chicken bones, stale bread, potato peels and other food scraps.



RETHINK “SELL BY” AND “BEST BY” DATES

When it comes to food safety, simpler can be better. Looking for mold, or using a sniff or taste test can tell you when food has gone bad, for the most part. Food date labels such as “sell by,” “best by” or “use by” dates are not definite rules for determining whether a product is safe to eat—they are indicators of quality rather than food safety. The Natural Resources Defense Council says, “learning what dates actually mean will help consumers to make better food-safety decisions, and will also reduce premature disposal of products, saving people money in the process.”

SUPPORT GOOD FOOD POLICIES

Local and state policies affect the way we identify, assess and deal with food waste. “Reduction of food losses and waste needs to be prioritized within political agendas,” says the Barilla Center for Food & Nutrition. ReFED, a collaboration of business, nonprofit and government leaders fighting food waste in the United States, recommends standardizing date labeling, increasing food-donation tax incentives and expanding best practices in food recycling.

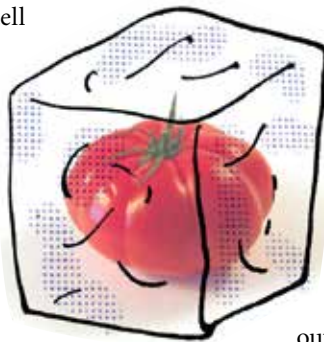
Find out where your legislators stand on food issues by checking out this scorecard from Food Policy Action (foodpolicyaction.org/scorecard).

LOVE YOUR LEFTOVERS

According to the website lovefoodhatewaste.com, a major reason people waste food is that they prepare too much. One simple solution is to save, properly store and repurpose leftovers. Keep leftovers in the refrigerator and eat them within two to three days. Leftovers can also be turned into new dishes (postholiday turkey sandwiches, for example, or omelets made with leftover veggies).

CONSIDER FREEZING

Freezing is a great way to preserve food while maintaining its nutrients. Love



Food Hate Waste advises

wrapping food well in freezer bags and pureeing items with higher water content, such as fruits and vegetables, before freezing. Sauces can even be stored in ice cube

trays—pop the cubes

out of the trays when you need them to avoid defrosting too much. Just make sure the food hasn’t already gone bad before freezing it.

OFFER, DON’T SERVE

Even with careful planning, it’s hard to know how much people will eat at a dinner party or gathering. To allow for varied appetites, let guests decide how much they want. Creating a buffet line or letting guests serve themselves at the table family-style can reduce what gets left behind on plates.

STORE FOOD PROPERLY

Storage choices make a huge difference in how long food stays fresh. In fact, storage temperature affects food safety more than the amount of time that has passed since the product’s production. Keeping the refrigerator below 40 degrees Fahrenheit will keep food fresh longer, according to the Natural Resources Defense Council. Love Food, Hate Waste recommends keeping ready-to-eat food on the top or middle shelves, raw meat on the bottom, and fruits and vegetables in drawers in their original packaging.

The Food Storage Directory (savethefood.com/food-storage), created by Save the Food, provides guidance on how to store and revive your favorite foods, including keeping herbs with their stems in a glass of water, wrapping cheese in wax paper (not plastic) and recrisping celery by soaking it in ice water.



Associate Professor Timothy Griffin, who researches the intersection of agriculture and the environment, worked with farmers when GE crops became available in the late 1990s.

Good to Grow

Studies find no more health risks from genetically engineered crops than from conventional ones, but we cannot abandon other plant-breeding methods. **BY LAURA FERGUSON**

A GROUP OF EMINENT scientists found that genetically modified foods are safe to eat, but noted that it has become increasingly difficult to distinguish between genetic engineering and conventional plant breeding and their effects on health and the environment. Timothy Griffin, an associate professor and director of the Agriculture, Food and Environment program at the Friedman School, was one of the scientists who spent two years doing an exhaustive review of 900 research publications about genetically engineered (GE) foods for a study commissioned by the National Academies of Sciences, Engineering and Medicine. In

addition to the literature review, the committee of scientists sponsored public meetings and webinars.

Genetically engineered foods—ones in which new genes have been introduced to develop a particular trait, such as resistance to pests or herbicides—have long been controversial and have generated a range of opinions, both pro and con.

The scientists' 400-page report focused on all genetically engineered

products, but contains the most detail on corn, soybeans and cotton. These three commodities consume the biggest acreage and account for almost all commercial GE crops; they also have been the subject of the most published research.

Griffin spoke with *Tufts Nutrition* about the research, the report and what it all means.

TUFTS NUTRITION: Why did the National Academies decide to study this issue now?

TIMOTHY GRIFFIN: We're essentially 20 years into the production of this small set of GE crops, and it has emerged, in some cases, as a polarizing issue. To date, though, there has been no consensus about impact; no one had assessed the evidence around different impact areas—agricultural, environmental, socioeconomic and human health.

At the same time, the rate of change with regard to genetic engineering has been nothing short of remarkable. It's interesting that concurrent to our study, the government is reviewing how products from these technologies are regulated.

The committee examined studies that found that GE foods are as safe as foods from non-GE crops for both people and livestock. But the report also strikes a cautionary tone about the long-term safety of genetically modified foods. We looked at a lot of evidence and found no apparent health risk. We also heard from a number of speakers who talked about research both on potential health impacts and on perceptions—how people perceive different risks and benefits.

We looked at all this evidence and concluded that there doesn't appear to be any negative impact. If there had been a clear signal, that would have been a very different story. But there wasn't. But yes, that doesn't say there never will be a risk—that's why the

cautionary tone. Policy and regulatory functions need to continue to look at these issues.

You probably heard some new perspectives as well.

Yes, and the report reflects that. We did not go out and just accumulate the science and then say, Here's the science. This report focuses on a much broader range of issues, including how people think about their food.

Regarding crop production, it's interesting that you also widen the lens to focus not just on genetic engineering, but on conventional plant breeding.

The most notable GE crops are grown commercially and on a large scale—they include soybeans, cotton and corn. Those plants were developed by introducing a gene from another organism not related to the crop. In these cases, the genes are from bacteria that are inserted in plants to make them either insect resistant or herbicide resistant.

Our report makes clear, though, that while this kind of genetic engineering has advanced in recent years, conventional breeding has to continue as well.

With some of the newer technologies, like gene editing, it's unclear what the impact will be—that's still an open question. Gene editing means that you modify or manipulate existing genes; you change the genome to achieve a desired trait, like disease resistance. You're not adding new genes, which is what was done, for example, to develop herbicide-resistant corn.

Increasing the yield of crops is the result of many, many traits, so conventional breeding has a very important role. Even though GE crops are grown on millions of acres, it is hard to disentangle the effect of genetic engineering from genetic improvement. Our report states that if you want yield to increase year after year after year, then you have to continue conventional plant breeding year after year after year.

Do you see genetic engineering going beyond the large crops—soy, corn and cotton?

Until very recently, traits targeted by genetic engineering have been all pest-related. They are what we call input traits, rather than output traits—like changing the composition of a grain.

In just the past two years, though, more new products are output-related, like apples and potatoes that don't brown as quickly when they're bruised. It will be interesting in the next five to 10 years to see the potential for genetic engineering to alter nutritional aspects of food crops or feed crops to make them healthier.

The report states that "new technologies in genetic engineering and conventional breeding are blurring the once-clear distinctions between these two crop-improvement approaches." It goes on to say that regulating new varieties should focus on a plant's characteristics rather than the process by which it was developed. Talk more about that.

Right now there is a lot of attention focused on regulating the process. We have a special set of regulations that apply only when certain techniques are used. But the committee agreed that there is a blurring of the line between a range of techniques.

Genetic engineering, conventional breeding and newer technologies like gene editing all work differently, but the outcome might be genetically similar, with similar risks and benefits.

You could have a plant variety that is conventionally bred to be herbicide resistant and one that is genetically engineered to be herbicide resistant. It's increasingly difficult to distinguish between the two processes. So that's why we stated that regulatory agencies need to focus not on the process itself, but on the risk/benefit of the product, considering all the health and environmental impacts of those foods.

Hungry for Answers

We've used the same strategy for decades to provide refugees with food aid. Does it work? **BY JULIE FLAHERTY**

A **S THE ONGOING** refugee and migrant crisis continues to dominate international news, it has given new urgency to an age-old question: What is the best way to get desperately needed food to people who have been forced to flee their homeland because of war, natural disaster or persecution? The traditional method of providing aid has been either distributing sacks of flour or rice off the back of trucks, or handing out packages of oil, pasta, lentils and other foods to families residing in camps.

But the strategies for delivering food aid have not kept up with the times, according to Karen Jacobsen, who directs the Refugees and Forced Migration Research Program at the Friedman School's Feinstein International Center. Now Jacobsen, Henry J. Leir Professor in Global Migration at the Fletcher School, is analyzing new methods for serving one of the world's most vulnerable populations.

What is the point of relying on a strategy of distributing food to refugees living in camps, Jacobsen asked during a recent interview, when most refugees do not live in camps at all? Of the 2.29 million Syrian refugees living in Turkey, for example, 90 percent live in residential communities, alongside people who are not refugees. For that reason, Jacobsen said, humanitarian organizations have begun turning away from shipping bags of commodities and instead are giving refugees the means to buy their own food—"especially in urban areas, and especially for Syrian refugees." That often means vouchers that can be used at supermarkets or even cash wired directly to those in need.

It's an approach that has won praise for its efficiency and its support of local markets. But the news isn't all good, as Jacobsen and her team found when they evaluated one high-profile food voucher program from 2015.

As part of a \$6.5 million program, the Danish Refugee Council (DRC) surveyed 9,100 Syrian refugee families living in southern Turkey to determine which were most in need of food aid. About 95 percent of the families reported coping with lack of food in some way—such as borrowing from neighbors or eating less so their kids could eat. From there, the DRC provided more than 32,000 of the refugees with e-vouchers that they could use at designated supermarkets.

The vouchers did help alleviate hunger: The refugees who received the benefits were less likely in follow-up interviews to report skipping meals or going a day without food. They said the e-vouchers reduced their worries, and even "conferred dignity and respect," since they were able to go to the grocery store and choose their own food.

But the vouchers also caused friction. Everyone in the neighborhood knew who was receiving them, most likely because only a small number of supermarkets were involved. Some refugees reported that neighbors and extended family who did not receive the benefits were jealous, and that they felt pressured to share their benefits with



Syrian refugees use humanitarian aid vouchers to shop at a mall in Amman, Jordan.

Refugees said the e-vouchers reduced their worries, and even “conferred dignity and respect,” since they were able to choose their own food.

them. And because the DRC did not explain clearly enough why some people qualified for e-vouchers and others did not, some refugees perceived the qualification process to be unfair. They called a hotline to complain, started a Facebook page for grievances, protested

outside the DRC offices and even threatened DRC staff on the street.

What lessons can be learned from the DRC e-voucher program? Jacobsen said that some of the problems could have been avoided by first asking the refugees what they thought would be

a fair way to distribute the vouchers. Making the qualification metric clearer and more transparent might also have helped—basing it, for example, on the ratio of household members to money-earners.

But the biggest takeaway from the DRC program, Jacobsen said, is that the best way to help urban refugees may be by giving them not food, or even food vouchers, but cash. While many of the refugees said they worried about putting food on the table, they worried about other needs even more. “Much more of a concern is paying rent,” Jacobsen said, with health care, education and transportation also competing for their

scarce funds. “In a camp you get these things for free, but in an urban setting you have to pay for them.”

Accordingly, cash transfers are being used more and more often by humanitarian groups. The World Food Program, for instance, said cash now accounts for just over a quarter of its assistance, a “conceptual shift” the organization made in the end of the last decade because of the flexibility, efficiency and choice that cash gives to beneficiaries.

“The government might ask, ‘Why are you giving this cash to these refugees, when our people are just as much in need of help?’”

Opponents of cash payments have argued that recipients could use the aid money for alcohol or cigarettes, or that the money could fall into the hands of terrorist organizations—a concern that has left some aid agencies skittish about sending cash, lest they run afoul of government counterterrorism imperatives and lose their funding. But those fears have proven to be largely unfounded, said Dan Maxwell, acting director of the Feinstein International Center and a Friedman School professor. During the Somalia famine, for example, people used the vast majority of the cash they received to buy food or repay debts they incurred from buying food before assistance was available. “The overwhelming evidence is that money is used on things that people genuinely need,” Maxwell said.

And yet, while research demonstrates that e-vouchers and cash transfers can be superior approaches to providing assistance to refugees, there continues to be resistance to changing

the system away from shipping in food. “For 50 years, the automatic response was to wind up the food-aid machine,” Maxwell said. Some of the inertia is attributable to the usual skepticism about new ideas, he said, but other factors are also at play.

The traditional method of food assistance started out as a solution to both human suffering and surplus U.S. grain production. “A whole industry grew up,” Maxwell said, “and that industry still lobbies on Capitol Hill

to block or delay proposals for food-aid reform.” Part of that lobby is aid agencies themselves, some of which feel threatened that their specialized roles as food purveyors will be made obsolete by upstart organizations doing cash transfers.

“Many agencies can figure out how to do a cash-transfer program,” Maxwell said. “In fact, Visa Card can probably figure out how to do it better than a humanitarian agency.”

Of course, it is true that cash won’t work in every refugee situation. In places such as South Sudan, there may not be enough food in the markets for people to be able to buy their own. In other places, there is the danger that sending cash would cause inflation in the local economy. “A lot of the work that we’ve done over the past five years has been to say this isn’t just an automatic response, one-size-fits-all question,” Maxwell said.

But for refugees living in urban areas, money transfers seem to be a

good fit. Even then, though, there can be problems. “When people are living in refugee camps, you can easily say everybody here needs food, everybody needs tents,” Jacobsen said. “But most of the refugees settling in cities live amongst the urban poor. Their neighbors and hosts could be even poorer than they are. Targeting cash assistance at refugees can create a lot of antagonism with the host population. The government might ask, ‘Why are you giving this cash to these refugees, when our people are just as much in need of help?’”

Indeed, recent studies predict that rising social tensions between displaced people and their new neighbors have the potential to generate new conflicts, this time within the host countries. So humanitarian groups are looking at a new approach: providing aid to everyone in the areas where the refugees are settling.

Jacobsen said that areas with many refugees can be easily identified, and several of them are clearly in need. “In urban areas that have been heavily affected by a huge influx of refugees, especially in Jordan, Lebanon and Turkey, their systems—water, roads, housing—are all being burdened.”

The scope is not as financially overwhelming as it may sound. “You can target those areas that are being affected,” Jacobsen said. “Don’t just focus on the refugees; treat it as a whole area that needs to be supported.”

In the end, solving the problem of feeding millions of refugees may mean reimagining humanitarian aid as something more holistic, that addresses not just hunger but the many interconnected struggles that go along with urban poverty. It’s a new way of thinking, and one that Jacobsen, Maxwell and their colleagues will be pushing the sometimes entrenched humanitarian industry to explore.

From All Corners

UNIVERSITY, SCHOOL & ALUMNI NEWS



A NIGHT TO SAVOR

Andoni Luis Aduriz, chef at the world-renowned restaurant Mugaritz in Spain, brought his team to Boston in November to promote good food's place in a healthy society. Aduriz is a member of the Tufts Nutrition Council, a group of thought leaders who are helping the school address malnutrition. In collaboration with Loyal Nine restaurant in Cambridge, Massachusetts, Aduriz created a benefit dinner to support the Human Nutrition Research Center on Aging at Tufts. His imaginative menu included egg yolks with sea urchin and potatoes cooked to mimic river stones.



“In order to be able to make big strides and tackle key public health challenges, you need to bring different disciplines together,” said Simin Meydani.

system in overdrive that is now known to bring on a range of health problems, from cancer to Alzheimer’s disease. Inflammation and its connection to nutrition and aging would figure prominently in Meydani’s work as director of the Nutritional Immunology Laboratory at the Jean Mayer USDA Human

Nutrition Research Center on Aging (HNRCA) at Tufts, and in her later work as director of the HNRCA itself, a role she assumed in 2009.

“Sometimes you’ve got to take some risk and get into new areas that might not be as established, but that might turn out to be very rewarding,” Meydani said.

She brings that trailblazing spirit to her new office, where she is an advocate for researchers, scholars and students across the university; promotes a culture of innovation and creativity; and identifies research areas where Tufts can have the greatest impact, all while ensuring researchers work in a safe environment and observe all regulatory requirements. She succeeded Diane Souvaine, a professor of computer science who is now a senior advisor to Provost David Harris and vice chair of the National Science Board.

Sarah Booth, associate director of the HNRCA, director of its Vitamin K Laboratory and a professor at the Friedman School, is serving as interim HNRCA director until Harris conducts a search to identify a permanent leader of the center, one of the largest in the world devoted to research on the relationship between healthy aging and nutrition and physical activity.

“It is great news for Tufts University that Simin Meydani has agreed to be our new vice provost for research,” Harris said. “She has a broad range of academic interests, deep experience at Tufts, and a drive that led the HNRCA to even greater heights under her leadership.

“She leaves big shoes to fill as the

Prescription for Good Science

Former HNRCA director Simin Meydani, now Tufts’ vice provost for research, says big breakthroughs happen through collaboration. **BY JULIE FLAHERTY**

SIMIN NIKBIN MEYDANI, the new vice provost for research at Tufts, is known for her groundbreaking work on nutrition and the immune system. But her introduction to the field was something of a happy accident. Early in Meydani’s career, a cancer study she was slated to work on abruptly lost its funding. When she was deciding what to pursue next, she met with a professor who was beginning to research something relatively new.

“He started talking about these compounds called prostaglandins, which I had not heard of, so I ran from the meeting to the library to look them up. I found that they were actually very intriguing,” she said.

Although little was known about prostaglandins then, she signed on. These chemical messengers turned out to be essential for, among other things, modulating inflammation, a condition caused by an immune

HNRCA director, but we are very fortunate that Sarah Booth is serving as interim director,” Harris said. “She has worked closely with Simin for many years, so I know the transition at the HNRCA will be a smooth one.”

Meydani, who will continue to lead the HNRCA immunology lab, is also a professor at the Friedman School and a professor of immunology at the School of Medicine. She has more than 300 publications to her name and has been the principal investigator or coinvestigator on research projects that have received more than \$40 million in external funding. She is a former president of the American Society for Nutrition and of the American Aging Association, and received their highest awards in recognition of the importance of her research findings.

Meydani grew up in Iran, where she attended Tehran University and earned a doctor of veterinary medicine degree. The D.V.M. studies “enabled me to see the connection between the different species and not be focused on one way of thinking, to be able to see the commonalities and also the differences,” she said.

For her thesis, she traveled to remote areas of Iran to study parasites in gazelles and discovered three new parasite species. That got her hooked on research. “I liked the excitement of finding new things,” she says.

She and her husband, Mohsen Meydani, continued their studies in the United States, both earning doctorates in nutrition from Iowa State University. Mohsen Meydani, who directs the HNRCA’s Vascular Biology Laboratory, joined the center soon after it opened in 1982, and Simin Meydani followed in 1984.

She began researching the effects of nutrients on aging, immunity and infection. In studies that are considered seminal, her HNRCA lab was one of the first to conduct well-controlled trials that demonstrated how important nutrition is to a well-functioning

immune system. The work often bridged the gap between bench science and clinical application. Studies on vitamin E, for example, started with examining how aging can damage cells, and eventually moved to animal studies and finally large clinical trials that showed vitamin E supplements can improve older people’s ability to fight off infection.

Meydani became director of the HNRCA at Tufts—one of six human nutrition research centers in the country funded by the U.S. Department of Agriculture—in the midst of the economic downturn. She quickly saw the need to create the center’s first strategic plan. Its cornerstones were to increase

collaborative work by researchers across the university. “Working in silos will only get you so far,” she said. “In order to be able to make big strides and tackle key public health challenges, you need to bring different disciplines together.” That underpins a main tenet of Tufts President Anthony P. Monaco’s research agenda for the university—bring together the best minds in multiple fields to engage in science for social good.

From her experience creating cross-lab research clusters at the HNRCA—focused on cancer or cardiovascular disease, for example—she acknowledges that this is not an easy task. “Everyone says, ‘Yes, we’ll do it.’ But it requires time,

“It requires time, effort and support to make sure the ideas that are generated from the bottom up become successful initiatives.”

interdisciplinary collaboration, boost community and government outreach and visibility, develop strategic relationships with organizations such as AARP and the City of Boston, and diversify sources of funding. “It really helped us prioritize and make strategic investments,” she said.

One of those investments was funding pilot grants for budding research, with the goal of kick-starting studies that could then attract outside grants to advance discovery. In the last five years, the center has invested about \$1 million in its own pilot grants, which led to about \$8.5 million in external funding—a return that amazed even Meydani. “I expected it to be successful, but not *this* successful,” she said.

As vice provost for research, Meydani wants to continue fostering

effort and support to make sure the ideas that are generated from the bottom up become successful initiatives.”

As for the challenge of helping Tufts’ research enterprise grow in a difficult funding climate, she is unbowed. “I’m an optimist by nature,” she said. “I’m hoping that we’ve been through the worst of it.” Meanwhile, she aims to help Tufts increase the funding it receives from corporations and foundations, create synergies among different disciplines and become more creative in making strategic alliances with other nonprofit and for-profit institutions and organizations. “That will help Tufts become more competitive in seeking federal funding,” she said.

JULIE FLAHERTY, the editor of this magazine, can be reached at julie.flaherty@tufts.edu.



Recipe for Success

Champion of good food practices inspires budding nutrition entrepreneurs with new scholarship.

BILL LAYDEN IS a big-picture guy, one who's fearless in the face of the status quo.

While a congressional investigator with the Government Accountability Office, he concluded that the Environmental Protection Agency's

pesticide safety review process needed a major overhaul, not just a few tweaks. That earned him a Government Accountability Office meritorious service award. Addressing Friedman School graduates in 2010, Layden, a member of the school's board of advisors, challenged them to break the food system—"and break it good." He added: "Sometimes you have to tear down something to make it better."

As owner and partner of the food and nutrition consulting firm FoodMinds, Layden helps food companies achieve something that may not seem an obvious recipe for success—grow their bottom line and do right by consumers.

"Entrepreneurship is the ability to create something that doesn't exist, to impact the public positively," he says, describing the business model that has guided his professional life. "We have demonstrated that a food company can compete and make money on nutrition, health and wellness just as it competes and makes money on taste, price and convenience."

To encourage Friedman School students to tap into their own inner entrepreneurs, Layden and his wife, Lee Anne, have created something new: the William and Lee Anne Layden Scholarship for Food and Nutrition Entrepreneurs. The scholarship will support students who want to pursue business development and other kinds of entrepreneurial activities at Tufts and after they graduate.

Their \$100,000 gift will be doubled through Tufts' Financial Aid Initiative. In addition, the Laydens also pledged \$25,000 to the dean's discretionary fund to support student projects related to entrepreneurship as well as other student priorities.

"This scholarship seeks to inspire students to have the courage to break through and create something new," Layden says. "It aims to inspire students to think about entrepreneurship with a business and social purpose."

Layden says he and Lee Anne chose to invest in Tufts because of the university's history of entrepreneurship and the international reputation of the Friedman School. He became involved with the school more than 12 years ago, when Professor James Tillotson invited him to speak to students in his course "Health Messages by the Food Industry." Layden joined the school's board of advisors in 2008 and supported the creation of the online certificate program Nutrition Science for Communications Professionals in 2010.

He says his appreciation of the quality of students the Friedman School attracts has grown steadily over the years. Four alumni work at FoodMinds, the latest in a long line of Tufts graduates at the firm. "FoodMinds depends on these graduates to provide the intellectual power that drives our vision and mission," Layden says. "When I'm recruiting, the first place I go is Tufts." —JESSE FLOYD

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6 YEARS AND COUNTING...

Markers of a Journey

NAME: Ronit Ridberg, N11

RIGHT NOW: A doctoral student at the University of California, Davis

RESEARCHING: The role of food as preventive medicine, specifically “prescription programs” for low-income, overweight and obese youth. Run collectively by clinics, hospitals, nonprofits and farmers’ markets, the programs enable pediatricians

to offer “prescription” vouchers that can be redeemed for fruits and vegetables at local farmers’ markets. “I’m interested in the extent to which program participation helps increase children’s fruit and vegetable consumption or household food security, and whether there are socio-demographic barriers to this impact.”

PAST LIFE: A documentary film producer. After spending two years researching the pharmaceutical industry for the documentary *Big Bucks, Big Pharma*, she became concerned about the overmedication of society and developed an interest in food policy. Eventually, that interest led her to the Friedman School, where she earned a master’s through the program in Agriculture, Food and the Environment (AFE).

COMING FULL CIRCLE: This year she began mentoring a Friedman student. “I gained a lot from mentors, speaking candidly with alumni on the annual Washington, D.C., alumni trip and through summer internships for which I worked directly with two

AFE alumni. It’s so important to connect with people who have been in your position and have come out the other side.”

PAYING IT FORWARD: A Friedman School scholarship recipient herself, she directs her annual giving to financial aid. “Graduate school can be a cost-prohibitive privilege, because it requires interrupting an income stream to further your education. It’s gratifying to contribute to reducing this financial burden for someone else.”

GIVING WHEN YOU CAN: “Large gifts can be a challenge, but parceling it out through monthly payments makes it manageable.”

SIX-YEAR ANNUAL FUND DONOR: That’s a gift a year since graduation. “Marking the number of years I’ve been out of school helps me reflect on my journey since then.” —DIVYA AMLADI



Every gift counts. Did you know that nearly 75 percent of donors to Tufts give \$250 or less each year? Learn more at nutrition.tufts.edu/giving.

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Tufts Alumni

A NEW FACE IN ALUMNI RELATIONS



Janine Seidel has joined the Friedman School as the associate director of alumni relations.

Previously, she worked at Ursuline Academy

in Dedham, Massachusetts, building community among alumnae, students and parents. She also worked on the clubs and regional program team in alumni relations at MIT. She received her bachelor’s degree from Emerson College and her master’s in educational leadership and policy studies from Boston University. You can reach her at janine.seidel@tufts.edu.

YOUR ALUMNI ASSOCIATION

WE NEED YOUR INVOLVEMENT



IT WAS AN exciting fall semester at the Friedman School. We welcomed 109 new students in September; 100 alumni and friends attended our reception at the Food and Nutrition Conference and Expo in Boston in October, and Dean Dariush Mozaffarian held a launch event for the new strategic plan in November.

The Alumni Association Executive

Council has spent the past year examining its mission, vision and core strategic areas. The council has established a new committee structure, including the addition of a Communications Committee,

which will work closely with other standing committees to develop and execute outreach initiatives for upcoming events, volunteer opportunities and more.

My term as alumni association president ends in April, and I am grateful for the opportunity to have worked with so

many of you. I urge all of you to remain connected with other alumni and to support the school. The mentoring program is a wonderful way to give back. It began as a pilot program three years ago and already has proven invaluable to students. I welcome your ideas and feedback: andrewsh@herbalife.com. I look forward to seeing you during reunion weekend, March 31-April 2.

ANDREW SHAO, N00

President, Friedman School Alumni Association

Class Notes

N88

STEPHEN D. KRASINSKI has been appointed vice president for administration at MDI Biological Laboratory, an independent, nonprofit biomedical research institution in Maine.

N99

LYNN COLANGIONE, see N09.

N91

PUNAM OHRI-VACHASPATI, N94, a professor at the School of Nutrition and Health Promotion in the College of Health Solutions at Arizona State University, Phoenix, was selected as a National Academy of Medicine and Robert Wood Johnson Foundation Health Policy Fellow for 2016-17. She will spend a year in Washington, D.C., working on health-related legislative and

regulatory issues with members of Congress and the executive branch. The fellows were chosen from a national pool of highly accomplished health, behavioral and social-science professionals.

N03

ERIN HENNESSY, J99, MPH03, N10, has joined the Friedman School as a research assistant professor. She works with ChildObesity180 to advance research, evaluation and scholarship related to the nation's obesity epidemic. Before joining the Friedman School faculty, she was a senior behavioral scientist at the National Cancer Institute within the National Institutes of Health.

N05

GRACE PHELAN, a nutrition support

coordinator at Tufts Medical Center, was honored as Employee of the Month in October.

N08

MARY KATE KEYES and her husband, Daniel, welcomed their first child, Lana Ellen Marotta, on September 2, 2016. "Our little sweetie makes us smile every day," she wrote.

N09

JESSICA JONES-HUGHES and RAVDEEP JAIDKA, N16, are the produce team of Equal Exchange, a Massachusetts-based company that imports fair-trade foods from small farmers. To mark the company's 10th year in the banana trade, they hosted a screening of the banana trade documentary *Beyond the Seal* and a panel discussion that included

LYNN COLANGIONE, N99, the financial adviser at food hub Red Tomato.

N10

CHELSEA BARDOT LEWIS, A06, N10, the business development section chief at the Vermont Agency of Agriculture, was named one of *Vermont Business Magazine's* 2016 Rising Stars. She was selected for her commitment to business growth, professional excellence and involvement in her community.

N16

RAVDEEP JAIDKA, see N09
CLAIRE WHITNEY is a research dietitian at the U.S. Army Research Institute of Environmental Medicine. She participated in the Friedman School Alumni Association's fall career panel.

IS IT POSSIBLE TO GROW A HEALTHY KID IN AMERICA?



Gerald J. and Dorothy R.
Friedman School of Nutrition
Science and Policy

Jean Mayer Human Nutrition
Research Center on Aging

Tufts
UNIVERSITY

The answer is *YES!* We are tackling childhood obesity by bringing together leaders from public health, science, business, academia, and nonprofits. Our intervention programs are teaching communities how healthy eating, exercise, and environmental change can make children's lives not just healthier but longer and happier. And they're working. In fact, a Tufts program was the model for the nationally acclaimed Let's Move Program.

If you'd like to donate in support of Tufts' trusted nutrition science and intervention programs, visit nutrition.tufts.edu/givenow2.

Does Celery Juice Cure the Problem?

JOEL B. MASON, a professor at the Friedman School and Tufts School of Medicine and director of the Vitamins and Carcinogenesis Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts, serves as our expert.

Q *Are the nitrates/nitrites in celery juice used in some processed-meat products as a preservative and color enhancer really safer than products containing regular additives?*

A Nowadays, many processed meats advertise themselves as being “uncured” and “containing no nitrites or nitrates other than what naturally occurs in celery juice.” The implication is that this is healthier, since nitrites and nitrates have been implicated as possibly increasing the risks of certain cancers.

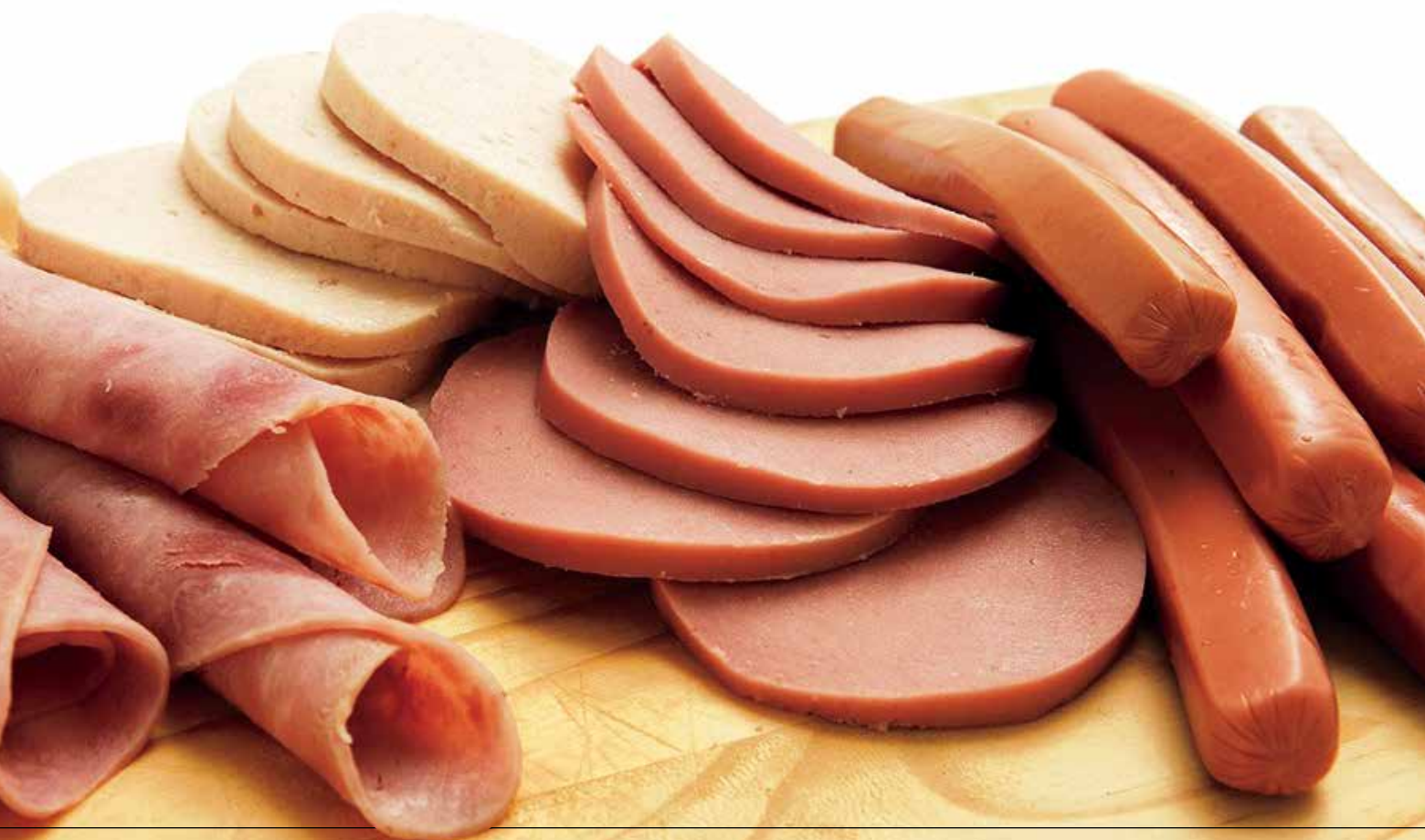
In reality, there is little reason to believe that the nitrates

or nitrites in celery juice are any safer, although to my knowledge, the form that is added to processed meats has not been compared to that which appears in celery juice in regards to the potential for promoting cancer risk.

It is also worth pointing out that federal law strictly limits the amount of commercially produced nitrate or nitrite that can be added to meat, whereas the amount added in the form of celery juice is not regulated.



Send your questions for “Ask Tufts Nutrition” to Julie Flaherty, Tufts University Office of Publications, 80 George Street, Medford, MA 02155 or email julie.flaherty@tufts.edu.





I benefited from a scholarship when I was a student, and I need to pass that on.

Dr. Carole Palmer, G69, is a pioneer in the study of nutrition and oral health. She is securing her legacy through a gift in her estate plans to support future Tufts Dental students and Friedman School students in the Frances Stern Nutrition Center Combined Master of Science/Dietetics Internship (MS/DI) program.

For 47 years, Carole has imparted her mission of “promoting dentistry and nutrition as allies in health” to Tufts students. A Frances Stern alumna, Carole serves as director of the master’s component of the MS/DI program, head of the Division of Nutrition and Oral Health Promotion at the School of Dental Medicine, and adjunct professor at the School of Medicine. “I have witnessed the impact financial aid has on students’ lives and want to do my part to help,” she says.

Carole’s impact clearly extends beyond Tufts. Her book *Diet and Nutrition in Oral Health*, which reads as a how-to manual for diet screening and guidance, was released in its third edition this year. “I’m so pleased that my gift will encourage further advancements in this field.”

For information about including a gift for Tufts in your estate plans,
please contact the Gift Planning Office:
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➔ Change of address? Questions? Email julie.flaherty@tufts.edu.



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22

Cash for Refugees

We've used the same strategies for decades to provide refugees with food aid. Does it work?