BROWN MEDICINE

Volume 24 | Number 1 | Winter 2018

PLUS:

ASSAULT ON HEP C
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AMONG THE ROHINGYA
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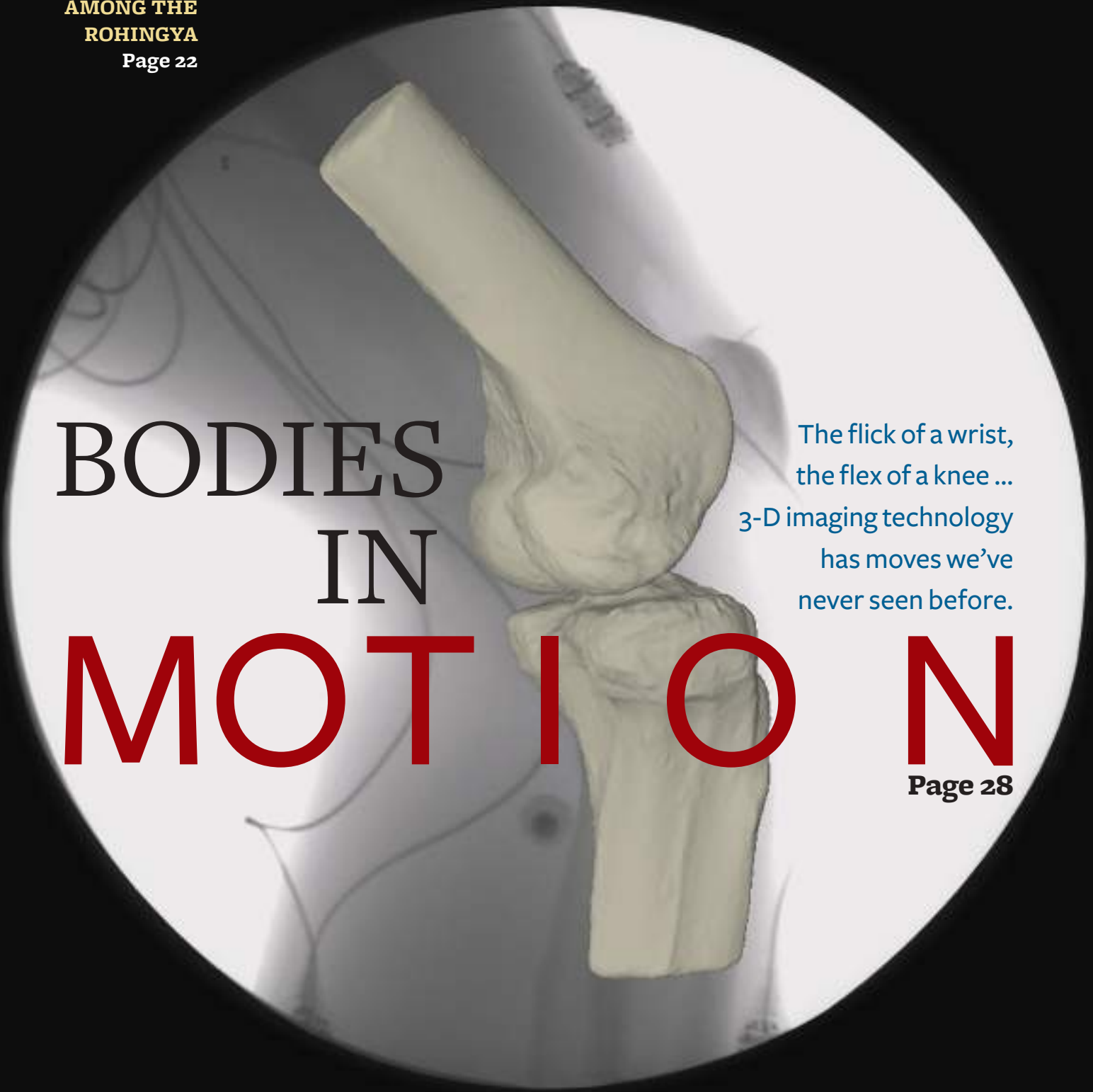

BODIES IN MOTION

The flick of a wrist, the flex of a knee ... 3-D imaging technology has moves we've never seen before.

Page 28

LETTER FROM THE DEAN

Winds of Change

All across the country, Americans are experiencing change and uncertainty in health care. That's true for physicians who are part of fluctuating practices or hospital systems, and it's true for patients who are uncertain about the type of insurance coverage they'll have year to year and how it affects their ability to get the care they need. Undoubtedly there are many physicians among us who are growing tired of this and simply want to practice medicine, doctor to patient, the way we imagined when we chose this career!

Brown and the Warren Alpert Medical School have not been spared from these changes. As I'm sure you know, one of our affiliated hospital systems, Care New England, has been in talks since last April about a merger with Massachusetts-based Partners HealthCare, one of the nation's largest hospital systems. As we go to press with this issue of *Brown Medicine*, the parties are moving ahead with the merger, but it is too soon to know how things will work out. However, the potential deal raises a number of concerns about health care costs and the potential ceding of research and specialty care to Boston. Particularly concerning for Brown is that as part of Care New England, the financially challenged Memorial Hospital of Rhode Island is closing. Memorial is an important community hospital and our key academic partner in family medicine and internal medicine.

In January, Brown President Christina Paxson announced that should the Partners deal fall through, or should state regulators not approve the merger, Brown would join with Prospect Medical Holdings to propose merger discussions with Care New England. This news was met with some surprise, to say the least, since Brown had never before expressed interest in owning a hospital. But this proposal is evidence that the University has a sincere desire to create a world-class, integrated academic medical center in Rhode Island. We have all of the elements that are required. What we lack is integration among the health systems (Care New England and Lifespan), the Providence VA Medical Center, and Brown.

Despite the uncertainties, what we do know is this: Brown's leadership is serious about health care in Rhode Island. There is significant will to do what is necessary to provide integrated, high-quality, efficient health care for Rhode Islanders while fulfilling our academic and research missions.

And that's good for faculty, for students, for our alumni who share history with Brown and our affiliated hospitals, and it's good for the residents of our state.

Sincerely,

Jack A Elias MD

Jack A. Elias, MD
Senior Vice President for Health Affairs
Dean of Medicine and Biological Sciences

SCOTT KINGSLEY

"The medical camp sees 200 to 300 patients per day, working until the army closes the camp at dusk." ***—E. Jane Carter, Page 22***

DAVID DELPOIO; JOHN HERSEY; COURTESY RUHUL ABID

FEATURES

DEPARTMENTS

COVER

Courtesy W. M. Keck XROMM Facility

LETTER FROM THE EDITOR

Kinder Than Necessary

If you Google kindness, you'll get about a million pages' worth of quotes about being kind. Many, I noticed, appear in the book *Wonder* by R.J. Palacio, including this gem: "When given the choice between being right and being kind, choose kind."

With so much writing about kindness going on, why are so few people practicing it? We are constantly belaboring meanness on social media, on cable news shows, on the roadways, and even in our professional lives. We pose it as an us vs. them problem; it's "other people" who are being unkind. However, it all circles back eventually, doesn't it? If only other people are unkind, at some point, we ourselves are the ones perpetrating the unkindness.

Editing this magazine helps me remember that there is much goodness in the world—it refills the well, in self-care speak. In this issue, it was working with Jane Carter and Ruhul Abid on their article about the Rohingya encampment in Bangladesh. The story is a litany of sadness—squalor, malnourishment, communicable disease, sexual assault—and in the middle of it are these Ivy League physicians not just providing acute care but setting up a sustainable health network. Incredibly, they thanked *me* for helping them share this story with world. They are humble, gracious, modest, and above all, kind.

The vast majority of faculty, students, and alumni I meet are just like that. But we all have those moments of frustration and pique, where our less-than-best selves come through. You don't want that landing on a scared patient, a student, or even a loved one. We are all contributing to an unkind world, in big and small ways.

Google offers some sage, though unattributed, advice on how to fix that: "In a world where you can be anything, be kind."

Kris Cambra

KUDOS

Phoebe Hall's article "Baby Steps," about the challenges of treating babies who develop neonatal abstinence syndrome (*Brown Medicine*, Fall 2016), received the Silver Award for Excellence in the Association of American Medical College's Robert G. Fenley Writing Awards. Congratulations, Phoebe!

BROWN MEDICINE

Volume 24 | Number 1 | Winter 2018

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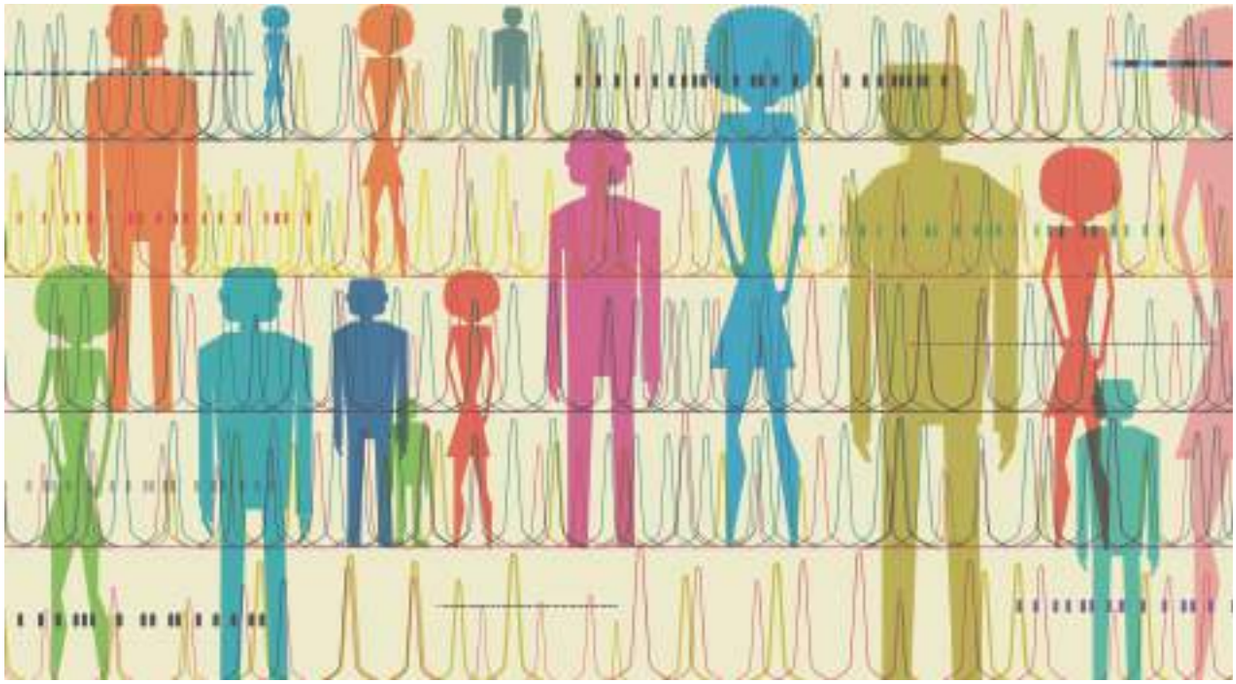


JOHN HERSEY

RESEARCH

Cross Talk

Brown physician-scientists bridge academic divides to improve the lives of people with brain disorders.

At first glance Judy Liu, MD, PhD, and Eric Morrow, MD, PhD, don't seem to have much in common. She's a neurologist, he's a psychiatrist and geneticist. She studies and treats epilepsy, while his research and clinical work center around autism spectrum disorder.

But the two have research roots in common—they met while completing their postdoctoral fellowships at Harvard Medical School in the 2000s—and both enjoy the intellectual challenge and inspiration of working at bench and bedside. Over the years they've occasionally been able to collaborate, she from George Washington University, he from Brown.

Then, last fall, Liu moved to Providence, recruited to the Medical School and Brown's Laboratories for Molecular Medicine, where she set up her lab just down the hall from Morrow's. They're thrilled for the research opportunities their proximity will bring.

"We work on very similar problems, but they have different names," says Liu, an assistant professor of neurology and of molecular biology, cell biology, and biochemistry. "By combining forces we can really make a lot of headway into all these problems, really push some science forward."

Morrow and Liu stress that their work is, first and foremost, patient based. "There's a very, very strong sense in both of our research programs that basic science work is a required prerequisite," says Morrow, an associate professor of biology and of psychiatry and human behavior. "We're both in the patient realm and in the basic science realm. We're trying to go back and forth—ultimately, to bring things back to the patients."

Morrow, who sees patients at Bradley Hospital, says he turned to genetics to identify mutations and better understand the biology of developmental conditions like autism. Just in the past five years scientists have found dozens of such mutations, he says.

"Now patients with autism, intellectual disability, epilepsy get their genome sequenced as a part of their genetic diagnosis," Morrow says; up to 30 per-

cent of patients with autism have a genetic subtype for their conditions. "We now have traction to study the biology of these very enigmatic disorders that, otherwise, were not so approachable. … So there's a huge new wave of hope that comes from understanding the condition at much more of a biological level."

Once scientists know a mutation, he says, they can make animal models that have it, generate stem cells from patients with the mutation, study the cells and neural pathways, and test therapeutic targets before embarking on expensive, difficult clinical trials. It makes precision medicine possible.

"The way you choose [epilepsy] medications is based on the side effect profile and tolerability. We don't necessarily match the medicine with the cause of the disease," says Liu, who will treat patients at Rhode Island Hospital. "The failure rate is about 30 percent. This is a very common neurological disease. … That means there's over a million people in the US with seizures that aren't adequately treated. In both autism and childhood epilepsy, a large proportion of cases are due to identifiable genetic causes."

Epilepsy brought Liu and Morrow into the same research orbit. "I've always wanted to study epilepsy comorbidities," Liu says. "People with epilepsy, as the seizures get worse and worse, they become more and more cognitively impaired. But we work on controlling seizures and not necessarily the cognitive problems."

Nearly a third of people affected by autism or similar intellectual disabilities also have epilepsy. "These are not freestanding disorders," Morrow says. For example, individuals with Christianson syndrome, a rare, X-linked condition that he studies, all have epilepsy. His early research on the disorder gave him and Liu a chance to work together again.

"Once he realized that all of the Christianson patients had epilepsy, he really wanted somebody who worked on epilepsy to be a close collaborator," Liu says. "It's very, very helpful to be closely related to a lab that is interested in the intellectual disability, the psychiatric aspects of these disorders. The same structures in the brain are important for both." She adds, "As a doctor, it's important for me to understand not just the one symptom, but to have a whole view."

> "Neurology/psychiatry training programs have fallen out of favor, but it's quite apparent that the research should be done with both points of view."

Rare diseases like Christianson syndrome inform scientists' understanding of more common conditions. Twenty to 30 percent of autism is composed of individually rare genetic conditions, Morrow says—but each mutation is an opportunity to study the biology and "understand the themes."

"There might be hundreds of different genes, but there are going to be fewer mechanisms because they're related to each other in the molecular pathways," he says. "So finding the points of convergence is a huge theme in the research. … Environment matters, people's experience matters, but gene changes are very, very strong contributors that provide a powerful approach to study the mechanism."

Morrow and Liu argue that the separation between neurology and psychiatry is an arbitrary one. "It's all in the brain," Morrow says. "If the person seizes they go to the neurologist. But if the person has abnormal behavior they'll go to the child psychiatrist. But it's really the same underlying problem." People with epilepsy are prone to severe depression, he says, and the biology underlying the two conditions may be the same. "I think a lot of the treatments will be shared across disorders," he says.

"They are, because anticonvulsants are used in psychiatry all the time as mood stabilizers," Liu says. Combined neurology/psychiatry training programs have fallen out of favor, she adds, "but in the lab, it's quite apparent that the research should be done with both points of view."

Liu and Morrow are committed to bringing their disciplines together, and to a seamless flow between basic science and clinical medicine as well. To foster translational science, people must speak and understand both languages, Morrow says. "We're two MD-PhD leaders of the lab groups, but our lab environment is filled with trainees who flow across these dualities": PhDs and MDs, postdocs and medical fellows, undergrads and med students and grad students. "It's a very special environment for trainees," he says.

"Having a mixed environment is extremely powerful because it makes the trainees realize that there really shouldn't be walls, so they're not afraid to go over to the hospital, and even develop collaborations independently," Liu says. "By working together we're bridging pretty much every gap you can think of."

—Phoebe Hall

WHO KNEW?

MOBILE CLINIC Robert Partridge with his medical supplies for BSO tours.

The Show Must Go On

When illness strikes, this doctor is waiting in the wings.

You're a top musician in one of the world's best symphony orchestras, performing thousands of miles from home, and you've got a nagging cough. Who you gonna call?

"If it's a loud part of the piece they can get away with it, but if the soloist is performing or it's a quiet piece they don't want to start coughing," says Robert Partridge, MD, MPH, an adjunct associate professor of emergency medicine. "That was something I didn't even think about before this job."

"This job" is tour physician for the Boston Symphony Orchestra, a gig that takes Partridge abroad for about two weeks a year to attend to the colds, GI complaints, bleeding calluses, injuries, and myriad other maladies of the traveling musicians, as well as staff, stage crew, and friends and family—up to 200 jet-lagged people moving from city to city in planes, buses, and trains. "It's not unusual for illnesses to spread through the group because we're traveling together in confined spaces," he says. "In a lot of ways I feel like a small-town doctor."

Partridge, who most of the year works in the emergency departments of Rhode Island Hospital and Emerson Hospital, in Concord, MA, joined the BSO in 2013 and has toured with them in Europe, China, and Japan. He travels with a huge trunk—"my rolling emergency room"—that only the stagehands are able to move and is packed with orthopedic supplies, bandages, an AED, and more than 100 medications. At performance venues he sets up shop in an office backstage, and at intermission heads back there from his seat in the audience to treat headaches, cuts, and yes, coughs that arise during the show.

Working as an emergency physician has surprising parallels to his part-time role. "The motto of the emergency department is 'anyone, anything, anytime.' That fits well for this kind of position," Partridge says.

A longtime lover of classical music and travel, the job is a dream for Partridge. "It's a blend of all the things I love: music plus medicine plus travel," he says. "It's a wonderful group. I'm in awe of what they can do." No doubt they're impressed by his talents, too. ***—P.H.***

ANDREA SHEA; COURTESY OF LIU LAB

FINDINGS

Good Fat/Bad Fat

An enzyme suppresses inflammation while increasing metabolism.

White fat, which stores excess calories, and brown fat, which burns them to produce heat, have long intrigued scientists who study obesity and its complications. Now a new finding suggests an intriguing drug target in the battle against the bulge.

A study led by Brown University researchers has identified an enzyme, called SNRK, that appears to regulate the physiology of both fat types in mice—decreasing inflammation in white adipose tissue, while promoting the ability of brown adipose tissue to burn calories. Preliminary genetic evidence included in the study suggests that SNRK performs similar functions in humans.

MORE SNRK: An enzyme that regulates fat may be a target for obesity research.

"This study suggests that there may be dual benefits if we can find a way to

enhance SNRK production in fat tissue," says Simin Liu, ScD, MPH, a study co-corresponding author and professor of epidemiology in Brown's School of Public Health and professor of medicine at the Warren Alpert Medical School.

"Reducing inflammation in white fat may ease associated complications such as insulin resistance, while at the same time increasing brown fat metabolism may aid in weight loss," Liu says. "Those possibilities will need to be followed up in further studies in humans."

The research, published in the journal *Diabetes* in January, was led by Jie Li, PhD, a research associate in epidemiology, and Bin Feng, PhD, a research associate at Brown and Rhode Island Hospital's Hallett Center for Diabetes and Endocrinology.

The team established that SNRK appears to regulate fat tissue inflammation and metabolism in mice, and then investigated whether the enzyme may play a similar role in humans. They identified multiple germline mutations in the human genes responsible for SNRK production that were directly associated with higher body mass index, higher waist circumference, and risk of obesity in a cohort of 12,000 women.

Taken together, the researchers say, the results suggest that SNRK could be a target for new therapies aimed at curbing obesity and its complications.

"What's particularly noteworthy about this work is we were able to present an integrative link from genetics, cell- and animal-based experiments, all the way up to clinical outcomes in a large human population," Liu says. "We hope that making that connection will quicken the process of multidisciplinary collaborations in translating lab-based discoveries to new therapies or targets for interventions."

—Kevin Stacey

ANATOMY OF A DATA MANAGEMENT LIBRARIAN

Collect Them All

Andrew Creamer, MEd, MSLIS, is on a mission to save your data. And publications. And biological specimens. "Brown's scientists create so many interesting things that I'm trying to capture as much as I can, as soon as I can," he says. The scientific data management librarian is haunted by the specter of Brown's Jenks Museum, whose natural history collections were unceremoniously dumped in a landfill in 1945. Now Creamer wants to ensure that the many terabytes of digital scholarship that Brown's faculty and students produce, from theses to microscope images to datasets, are preserved and accessible, in perpetuity, in the Brown Digital Repository (BDR). "This is the legacy of Brown," he says. Furthermore, data management and sharing is increasingly required by federal funding agencies and scientific journals. Creamer and his colleagues not only help scholars digitize or deposit their objects in the BDR, where they're accessible to everyone online, they make sure they can be found, with the proper metadata, and are stored in file formats and on physical servers that will survive for future generations to discover. "We want to preserve these objects the same way that we might repair a 100-year-old manuscript," he says. He compares the BDR to Brown's John Hay Library, which houses rare books, University archives, and other physical collections for public use. "It's not just storing stuff in the attic," Creamer says. "It's making it accessible for people who want to use it." ***—P.H.***

ROCK STEADY

Traveling for Creamer means new finds for his collections. He picked up this piece of lava on Tenerife, in the Canary Islands. His partner is from Spain, and they're always exploring new places when they visit.

LOCAL LANDMARK

"It is such a bizarre symbol for a city, but Rhode Islanders are very proud of their industrial roots," the Columbus, Ohio, native says of Providence's iconic power station.

WEIGHTY OBSESSION

Creamer also collects 19th-century scales and weights. "I have so many of these pharmacy scales, I have no space for them," he says. "I have to clamp down."

ADAM MASTOON (4)

CITIZEN SCIENCE

Before he became a librarian, Creamer was a science teacher, in Virginia and Massachusetts. This 1969 edition of Carson's classic has found a spot on his desk at every place he's worked.

FROM THE ARCHIVES

"I've already encountered students who have no idea what a floppy disk is," Creamer says. For the record, these are, clockwise from bottom, a floppy disk, CD-ROM, MiniDV, and DAT.

ADAM MASTOON (6); ISTOCK

NEW DIMENSION

A Brown ecologist found this trilobite fossil in Morocco, scanned and 3-D printed it, and deposited the files in the BDR. For Creamer it's a reminder that data can be physical, too.

PINNED DOWN

Creamer loves natural history museums, and he loves collecting. As a kid he collected (and labeled) rocks and seashells. These butterflies are from a trip to Honduras.

PARTING GIFTS

Creamer has received memorable souvenirs from former colleagues. He got this pewter cup, modeled after a design by Thomas Jefferson, when he was a teacher in Virginia; and this book when he left the UMass Medical School library to come to Brown.

HOSPITALS

End of an Era

Memorial Hospital closes its doors.

Citing a declining patient base and years of operating losses, Care New England announced in November that it would close Memorial Hospital of Rhode Island. The decision came after negotiations with Prime Healthcare Foundation to buy the hospital failed to reach mutually agreeable terms.

In announcing the closure, CNE said that the 294-bed hospital "had averaged a daily inpatient census of just 15 to 20 patients resulting in an operating loss in the past fiscal year of $23 million." The health system filed its application for a reverse certificate of need with the Rhode Island Department of Health in November. The closure was approved provided CNE continues to offer outpatient care at the location.

James Fanale, MD, president and CEO of CNE, says the health system has been working closely with the mayor of Pawtucket and the governor's office to address the impact the closure will have on employees and the community.

"CNE is committed to the future of community-based care in the Blackstone Valley," Fanale says. "This speaks to the changing landscape of health care and the needs of the patients in that region. We are developing a robust program of outpatient care that will be an important resource there. In addition, specific to the residency programs, we remain optimistic in their future here and their critical role in the growth and development of highly skilled physicians."

Hospital leadership also has been working with the Warren Alpert Medical School to ensure continuity of the residency programs in family medicine and internal medicine. As the sponsoring institution of the residencies, the hospital requested permission from both the Accreditation Council for Graduate Medical Education and the Centers for Medicare & Medicaid Services to move both residencies to Kent Hospital, a CNE facility in Warwick, RI.

Kent also will become the academic home of the Department of Family Medicine. "We've worked with CNE to develop a plan that would serve our faculty, allow residents to have high-quality inpatient and outpatient training sites, and maintain the level of care for the community," says Jack A. Elias, MD, senior vice president for health affairs and dean of medicine and biological sciences. "I'm confident moving things to Kent will accomplish those goals."

The Family Care and Internal Medicine centers, which provide primary care to thousands of community residents, will continue to see patients in Pawtucket. Family medicine and internal medicine residents will continue to see patients in these locations with their attending physicians as part of their outpatient training. ***—Kris Cambra***

Hospital leadership also has been working with the Medical School to ensure continuity of the residency programs.

COURTESY CARE NEW ENGLAND

CARE PACKAGE: Santos collected and delivered supplies for people on Vieques, Puerto Rico, in January.

COURTESY JANICE SANTOS

OUTREACH

No Relief in Sight

A urologist joins efforts to rebuild her native Puerto Rico.

In the immediate aftermath of Hurricane Maria, Janice Santos Cortes, MD, an assistant professor of surgery (urology) and a native of Puerto Rico, organized fundraisers and collected medical supplies and gave interviews. She told reporters in October that crippled transportation and electrical and communications failures were hindering relief efforts. She worried about a looming mental health crisis, communicable disease outbreaks, and a shortage of health care workers.

Months later, little has changed. "We have received more generators," Santos says. "Most hospitals now are open. ... We are very thankful that we haven't heard of any new outbreak after the initial leptospirosis that we had."

But many of her fears have been realized. Unreliable electricity and communications have a "domino effect," she says, that hamper rebuilding and endanger public health. Even though 90 percent of Puerto Ricans have running water, "we still have to boil it," she says. With the loss of jobs and homes, the spiraling cost of living, and the mass exodus from the island, she adds, suicides are up. (The number of deaths due to the storm is under review.)

Like many Puerto Ricans on the mainland, Santos has been fully engaged in the island's recovery. "For me, it's like a second job," says the urologist, who practices at Brown Urology Inc. and sees patients at the Women's Medicine Collaborative in Providence. She has networked with colleagues across the country (and at work) to gather medicine, food, and water, as well as solar lights, clothing, and toys.

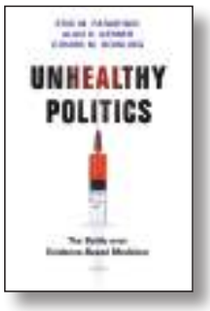
In late December, with Puerto Rico Rise Up, a nonprofit composed of health care professionals, Santos was able to go home and deliver supplies personally, at orphanages across the island. "We're helping them rebuild"—from paying orphanage staff to repairing structural damage—"and bringing some happiness during Christmas," she says. "These kids broke my heart. They just wanted to be loved and play with you."

A couple of weeks later Santos went back, to distribute MREs, water filters, medical supplies, and first aid kits as well as toys on Vieques, an island off Puerto Rico's east coast that was hit hard by the hurricane. In January residents still lacked electricity, adequate food, and a functional hospital, she says. "The VA clinic and the public hospital were condemned after Hurricane Maria and many patients do not have access to medical care or medications," she says. Fuel shortages have made travel to and from the island even more difficult.

Santos returned from Vieques disheartened. "It was very intense," she says. Nonetheless she expressed gratitude to people around the country who have donated to organizations like hers; to Brown, which admitted dozens of displaced University of Puerto Rico students this year, tuition free; and to the Medical School, which coordinated a press conference so she could call attention to the island's emergent needs after the storm. "They've been raising a lot of awareness," she says.

Santos wishes she could do more. But she's optimistic. "I'm just trying to be a little grain of sand, and keep building it and building it, and hopefully with the help of everyone, we can have a beach. And slowly but consistently, we can rebuild our island," she says. "I just want people to understand that there's still a lot to be done." ***—P.H.***

Visit *www.puertoricoriseup.org*



BOOKSHELF

Unhealthy Politics: The Battle over Evidence-Based Medicine

By **Eric M. Patashnik**, Alan S. Gerber, and Conor M. Dowling | Princeton University Press, 2017, $29.95

"[T]here is tremendous pressure from powerful economic actors to maintain the health care status quo. Eliminating a dollar of waste in the health care system usually means reducing someone's income." —from *Unhealthy Politics*

In 2002 Eric Patashnik, PhD, MPP, a professor of public policy and political science at Brown, came across a puzzling study in the *New England Journal of Medicine*, which found that a widely used surgical procedure for osteoarthritis of the knee worked no better than a sham procedure.

Assuming that common medical treatments must rest on evidence of their effectiveness, Patashnik and colleagues Alan S. Gerber of Yale and Conor M. Dowling of the University of Mississippi began to investigate why the procedure had become popular and how doctors responded to the landmark study. The political scientists found that the knee surgery case is illustrative of broader problems in the US health care system and that treatments contradicted by evidence can remain the standard of care for decades.

In their new book, Patashnik and his co-authors look at how partisanship, political polarization, and medical authority stymie efforts to promote better, more efficient health care for Americans. They draw on public opinion surveys, physician surveys, case studies, and political science models to explain how political incentives, physicians, and partisanship undermine evidence-based medicine. ***—Gillian Kiley***

Got a new book? *Have your publisher send us a copy at Box G-P, Providence, RI 02912.* **Listen to an interview** *with Patashnik at soundcloud.com/watsoninstitute/medicine-in-america*

TOM ROSTER

An MD with Valor

The American Medical Association honored Robert Smith, MD, with the Medal of Valor Award for fighting social injustice and providing health care to all Mississippi citizens during the civil rights era.

Smith was instrumental in the success of Brown's Early Identification Program with his alma mater, Tougaloo College. He has supervised Brown medical students on rotation at Jackson clinics and recruited local high school students into medicine (see *Brown Medicine*, Spring 2007).

The honor is tinged with some irony. In 1963, Smith was among the physicians who picketed the AMA's annual meeting in Atlantic City to demand that the organization remove all racial barriers to membership.

QUOTABLE

"Before we can think about single-payer health care in this country, we have to get a handle on costs."

—Former US Secretary of Health and Human Services Services and President of American University **SYLVIA BURWELL**, speaking at the Warren Alpert Medical School, November 30

"It's completely avoidable by not doing it."

—Clinical Professor of Surgery (Ophthalmology) **PHILIP RIZZUTO** on how not to go blind from an eyeball tattoo, *USA Today*, September 29

"You tend to see the same 10 men quoted over and over again in my field. Their story is old."

—Associate Professor of Emergency Medicine **NEHA RAUKAR** on the #QuoteHer campaign, *Columbia Journalism Review*, November 20

Teen girls "are left on their own and, when there's a bad outcome, they are blamed. I thought that was completely unfair."

—Assistant Professor of Obstetrics and Gynecology (Research) **LYNAE BRAYBOY** on why her Girl Talk app is needed, IFLScience.com, October 12

"Physician burnout and system failures do not have to be things we accept. They cannot be things we accept."

—YAO LIU '15 MD'19
AMA Wire, October 11

COOL TOOL

Fur Real

A Brown-Hasbro team is designing smart robotic pets to assist seniors.

The health benefits of pet ownership are well documented. But a cat or dog who can help you find your keys or remember to take your pills would take that companionship to a new level.

Researchers from Brown and the Warren Alpert Medical School are partnering with the toy company Hasbro to design smart (and cuddly) robots that can help older adults with everyday tasks. The project, dubbed ARIES (Affordable Robotic Intelligence for Elderly Support), is supported by a $1 million NSF grant and includes researchers from Brown's Humanity Centered Robotics Initiative (HCRI) as well as the Department of Psychiatry and Human Behavior.

ARIES will add artificial intelligence capabilities to Hasbro's existing animatronic cats and dogs, which already can make realistic sounds and movements. "We may want to expand those capacities and add intelligence to them, so the companions give meaningful clues—gestures, nudges, purrs—that help to guide users toward misplaced objects or let them know that it's time to do something," says principal investigator Bertram Malle, PhD, a professor of cognitive, linguistic, and psychological sciences.

Over the next three years, the group will perform user studies to understand how ARIES might best assist older adults. Then they'll work on developing and integrating a variety of artificial intelligence technologies that will meet the needs identified in the studies.

One critical factor the team will keep in mind is cost. "The 'A' in ARIES stands for 'affordable,' and that's something we're taking very seriously," says Michael Littman, PhD, a professor of computer science and, with Malle, codirector of HCRI. Hasbro's current pets cost around $100, but "similar robotic products can cost $5,000 to $6,000. We want the ARIES robot to be available to anyone who needs it," Littman says.

The team, which includes psychiatry and human behavior faculty members Michael Armey, PhD, Gary Epstein-Lubow, MD, and Ronald Seifer, PhD, hopes to complete and test a prototype by the end of the three project years. They say they don't intend the robotic pets to replace human caregivers, but they do hope they might complement caregivers' work.

"We know that caring for an aging population will be a tremendous challenge in the coming years, and we think technologies like ARIES could play a small but potentially important role in helping people meet that challenge," Malle says. ***—K.S.***

AP PHOTO/STEPHAN SAVOIA

PET UPGRADE: Mary Derr, 93, of South Kingstown, RI, with her robot cat, Buddy. Derr has mild dementia, so her daughter purchased the Hasbro cat earlier this year to keep her mother company.

> "We may add gestures, nudges, purrs that help guide users toward misplaced objects or let them know it's time to do something."

SHOUT OUTS

Please send letters, which may be edited for length and clarity, to:

- *Brown Medicine*
  Box G-P
  Providence, RI 02912
- Brown_Medicine@brown.edu
- Tweet us @BrownMedicine

STUDENTS

Growth Mindset

Interventional radiologists at Brown help more students discover their field.

In September, 85 medical students from across the Northeast gathered at the Warren Alpert Medical School for a day of lectures, hands-on simulations, and networking at an annual symposium for one of the newest subspecialties in medicine: interventional radiology, or IR.

"The goal is to expose medical students to IR early on in medical school, to not only help students get involved early, but also to expand the knowledge base of procedures in any field one goes into," says Lauren Park MD'19, the 2018-2019 chair-elect of the Society of Interventional Radiology Medical Student Council.

More than 400 medical students applied for 125 IR integrated residency spots in the US last year, says Sun Ho Ahn '93 MD'97 RES'02 F'03, an associate professor of diagnostic imaging and director of the IR residency and fellowship programs at Brown, which he established in 2016—one of only a few dozen programs in the country.

One reason IR is gaining popularity is because it is broadly applicable across specialties. "IR treats all different organs and diseases—vascular diseases, tumors. We treat patients from head to toe," Ahn says. "IR treats patients using image guidance with minimally invasive procedures. It's really the cutting edge."

But few medical students are exposed to interventional radiology early in their studies. Park says she's heard about students who discovered IR late in their third-year rotations, when they'd already started applying for residency.

That's why, for six years running, Brown has hosted IR symposia: to give students earlier exposure to the field. Physicians offer lectures to show off IR's depth and breadth, and students get to try some procedures—the only time they can freely use the technology and techniques without compromising patient care. "It's nice for students to get a stress-free, hands-on experience," Park says.

One of the organizers of the first symposium was Erica Alexander '11 MD'15, now a diagnostic radiology resident at the Hospital of the University of Pennsylvania and a past chair of the Society of Interventional Radiology Medical Student Council (two of the council's six chairs have been Warren Alpert medical students).

Alexander says she first learned about IR in an article in *US News* in 2008, and she contacted Damian Dupuy, MD, a professor of diagnostic imaging, to find out more. By her senior year at Brown, she knew she wanted to pursue IR. Alexander helped lead the Medical School's IR Interest Group, and she joined the Society of Interventional Radiology. "It was inspiring to learn about the breadth of radiology. I wanted to expose more students to it," she says.

In addition to hosting the annual symposium, Brown's IR Interest Group helps put together a preclinical elective for first- and second-year medical students to introduce them to the field and create shadowing opportunities. The group also connects students with mentors, who can help guide their medical education.

"My mentors really helped me," Park says. "Without them, I don't think I would have been able to keep up my interest in IR." ***—Aneeqah Naeem '20 MD'24***

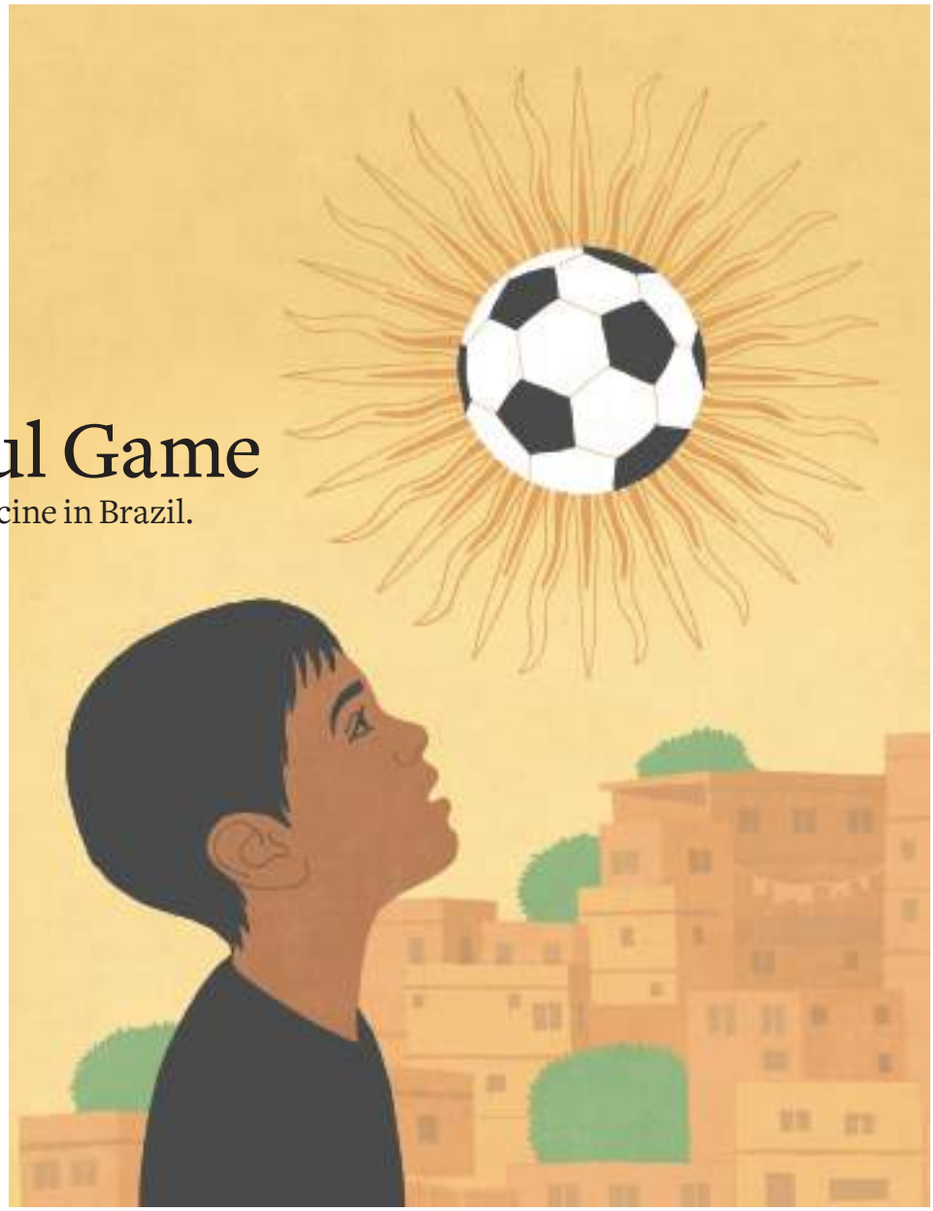
> "It was inspiring to learn about the breadth of radiology."

ISHAN SINHA '16 MD'20

LOOK HERE: Jason Iannuccilli '00 MD'05 RES'10 demonstrates an ablation therapy at the regional IR symposium at Brown last year.

The Beautiful Game

Soccer is a sociocultural vaccine in Brazil.



JAMES STEINBERG

I arrived in Rio de Janeiro early one morning in June 2016 to the sound of angry police officers on strike, holding a sign that read in English, "Welcome to Hell." Less than a month before I arrived, a human hand had washed up on the shore of Copacabana, just blocks from where I would be staying.

I had seen that infamous sign and heard these gruesome stories on CNN at home in Massachusetts a week before. More than once I considered canceling my plans to spend a month in Rio to study an NGO's sports-for-development program based in a favela, the summer before starting medical school at Brown.

Really what had been bothering people in Rio was the Olympics. It was to start that July and the citizens of the city were ambivalent at best—like they are about most decisions made by their politicians. On the sand, in the restaurants, and in taxis was a general confusion: why are we spending money on this, the Olympics, when those millions of dollars could be put to better use?

Like health care, so the northern half of the country could not only eradicate the threat of Zika, but have a health care network robust enough to care for the pregnant mothers and children plagued by it. Or infrastructure, to keep superbacteria out of revenue-generating beaches. Or education and jobs, to ameliorate the gap between the richest of the city and the poorest—Rio's infamous wealth inequality.

In that political limbo, lives are forgotten. The greatest disgrace is that some are forgotten more than others, and they are forgotten more consistently. Or, put another way, there are some who are forgotten more systematically than others.

For many, the real question was, why aren't we putting this money toward the favelas?

Favelas were being displaced to make way for new hotels to accommodate world-traveling sports fans. The discord that erupted was an acute exacerbation of a chronic division between the wealthy elite and the urban poor, one with a history of a refusal to recognize communities of people as citizens, of denial of adequate health care and education, and of violent eradications of residents—a history at odds with the country's motto: *Ordem e Progresso*.

Despite the ambivalence, most still seemed to look forward to watching the Olympic soccer team led by Neymar, who would go on to score the goal that would bring a glimmer of gold at such a tumultuous time for his country. It's hard to overstate the cultural impact of this beautiful game. It is evident from the coffee-scented streets of Ipanema in comfortable cafes with Wi-Fi, to snack shops of the sloping, colorful hills of the favelas: nothing bridges that gap between wealth and poverty quite like the bounce of a ball at the feet.

CITY OF GOD

I was there to witness what I like to think of as a sociocultural vaccine—an intervention or project that can instill change in a community by inoculating a vulnerable population with something against the sociopolitical injustices that engender poverty, those that are inherited through generations who have been cast away from surrounding communi-

ties with far more resources. In this case the patient population receiving the vaccine was a group of 60 to 80 children, ages 6 to 18, living in a favela in the shadow of Cristo Redentor.

The vaccine? Soccer, of course.

It was administered twice a week in two different settings: one a classroom in the form of sessions addressing sexual health, gender stereotypes, and violence; the other in the form of organized soccer scrimmages led by a coach named Leonardo. Leonardo had grown up in the very same favela at a time of even greater unrest, but was able to leave and pursue a degree in physical education and return to help.

At around 3 p.m. on Fridays, groups of children would arrive at the *quadra*, a fenced-in soccer court of cement with goals at either side.

"This kid right here is the biggest *frangueiro* in the favela," my guide Marcão, another coach, joked within earshot of the goalie as we arrived. In Portuguese *frangueiro* is a goalie who often allows easy goals, a *frango* a goal that should've been saved. (*Frango* also means chicken—I never understood the connection.)

Marcão explained what Promundo, our NGO, was up against. Although the favela was "not as bad as it used to be," the children often came from fractured homes and schools where teachers would sometimes not show up. And in this disorder, they would sometimes look to the dangerous world of drug trafficking for a sense of community.

But Promundo gave them an alternative; they come for the soccer and stay to learn that they have a community to return to, twice a week. If Rio's solution to solving crime was to quarantine favela residents, Promundo's is to build change within those confines.

GAGOS PALAVRAS

In the three weeks of my visits, the children came to welcome me, happy to see me each time. They made an effort to include me, and even gave me a nickname, *gagos palavras*, which was a jab at my Portuguese, translating to "eating words." But soccer brought us closer; I grew to know these kids in between the victories and defeats.

They were polite and inquisitive, wondering why I had a different accent, what America was like, which players and teams I supported. If these were the children the world was afraid of, I didn't see why. "Here the reaction [instead of violence] is to talk face to face. … I was always picking fights with everyone. I've changed a lot," one of them told me. Promundo reports that 90 percent of the children enrolled in their program no longer use violence with their peers. And when violence and lives of crime are no longer options, real change can happen: two of the older children chose to follow in Leonardo's footsteps and apply to college for physical education.

On my last visit, the day ended with the youngest kids taking their turn on the *quadra*. Boys and girls split into two teams as some of the older children stayed on the sidelines to watch.

Six-year-old Bruno stood at least a head shorter than any of the other 6-year-olds, but he had the most fans on the sidelines. He was a small boy but he spoke loudly, almost aggressively, with a would-be intimidating facial expression to match. But he was anything but. My impression was that he felt like he had to act tough because he was so small—which made him an instant fan favorite.

When he got the ball, Marcão yelled "Vai Bruno!" while the older spectators joined in. Bruno got the ball in front of the goal and scored. We all went wild, and Bruno cracked a modest smile.

But then he scored again.

To the glee of everyone watching, he ran to the other side of the court and slid onto his knees like Neymar in the Olympics. By the time he completed the hat trick, his face had changed completely: he was grinning from ear to ear to the chants of his name—his little moment of glory.

For me, that moment was emblematic of the work that this NGO and others like it do: empower children, with a crowd of people who care behind them.

Children, in a sense, become transpositions of themselves as they grow older—who they are given not just genetics, but the sociocultural ecosystem in which they grow. Soccer became a constant to these children in the disorder they have been left in. It became a ritual which, with supervision, they could latch onto as they grow into who they might become.

Constants, in a young life, bring Order. Order itself implies that there is someone who cares enough to put it there—somebody who cares about the right things like this NGO and organizations that prioritize the needs of the communities in which they serve.

And with a bit more Order, the chance of Progress.

Bryan Rego *was a neuroscience concentrator at Brown and is interested in refugee and immigrant populations, global mental health, and international health policy. If you are interested in supporting Bryan's goal of starting a soccer-for-development program for recently resettled refugee youth in Providence, contact him at Bryan_Rego@brown.edu.*

ESSAY

BY CAROLINE BURKE MD'20

Getting to Know You

A new program provides a social orientation to medical school.

I vividly remember my first day of medical school two summers ago: the anxious drive to the Jewelry District with my roommates, the nervous chatter with new classmates as we waited to take our ID photos, the overwhelming kickoff lecture about how the preclinical years would be like drinking from the proverbial firehose.

While I initially thought it was "just me," I soon learned that those first-day-of-school jitters were nearly universal among my classmates. Inspired to change the tone of this sometimes rocky and anxiety-prone transition, four members of the MD Class of 2020—Sarah Bourne, Esther Henebeng, Sugi Min, and I—pitched the idea of a three-day pre-orientation program for the Warren Alpert Medical School.

We launched the FOAM, First-Year Orientation to Alpert Med, with the mission of easing the start of medical school by providing new students the opportunity to bond with their classmates, connect with upperclass mentors, and explore the surrounding area through a weekend of fun, non-academic activities.

After nine months of partnering with the Office of Student Affairs, recruiting and training leaders, advertising to accepted students, and coordinating logistics, FOAM launched in July 2017 for the MD Class of 2021. In our inaugural year, an impressive 60 percent of the first-year class participated, led by 25 upperclass team leaders.

The program provided two options: FOAM-Out, a set of backpacking and camping trips around New England; and FOAM-In, a three-day exploration of Providence and Rhode Island (for those who prefer sleeping indoors!). In both programs, first-years spent the weekend with a small group of classmates led by two second-year leaders. After three days of hiking, swimming, touring Newport, and exploring the RISD museum, all participants concluded the weekend with an all-FOAM wrap-up dinner at the Medical School.

> "What I liked most was meeting and bonding with classmates before the start of classes."

First-year participants reflected on the positive impact the program had on their transition to medical school in our post-FOAM survey:

- "Getting to know a handful of classmates was an essential lifeline during the first week and a good way to enter school in a non-stressful way."
- "I had an absolute blast, and I'm sure that the friendships I formed during FOAM will be long-lasting ones."
- "What I liked most was meeting and bonding with classmates before the start of classes. Starting school tomorrow, I feel so much less nervous than I did before knowing that there will be familiar faces on the first day!"

After such a successful inaugural season, we are excited to plan for next year—and are already working with the incoming FOAM directors to continue developing and expanding FOAM for the MD Class of 2022. We are grateful for the support of the Office of Student Affairs, the Brown Medical Alumni Association, the Admissions Office, and our dedicated student team leaders.

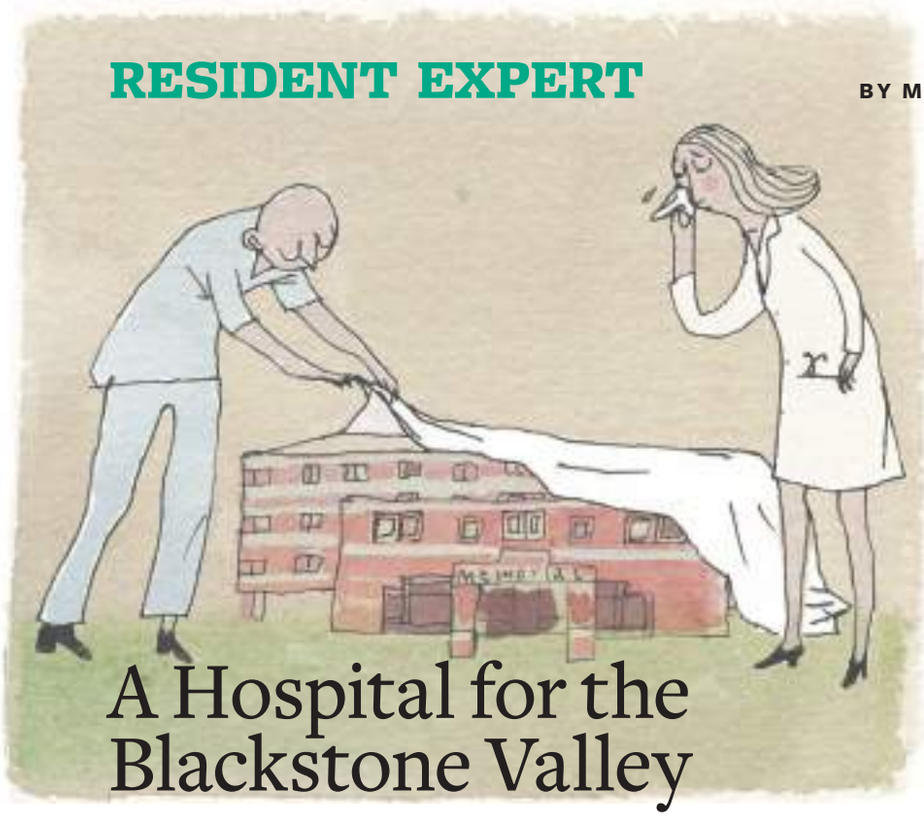
Visit *www.foamatbrown.com or email foam@brown.edu for more information.*

JULIA HADLEY MD'20

TOP OF THE WORLD: First-year students FOAM-Out. Back row, left to right: David Liu, Ruben Lesnick, Jeffrey Lam, Tina Hinman. Front row, left to right: Tony Yao, Hannah Kerman, Julia Bassell, Nina Kvaratskhelia.

RESIDENT EXPERT

BY MINOO D'CRUZ '11 MD'16 RES'19



A Hospital for the Blackstone Valley

A resident reflects on the closing of Memorial.

At the turn of the 20th century, funded by a generous bequest from William F. Sayles, a community-based infirmary known as The Pawtucket General Hospital opened a 30-bed facility to serve the workers of the Blackstone Valley. As an "instrument of public good," the hospital promised to treat anyone, regardless of ability to pay.

Throughout the next few decades, the renamed Memorial Hospital underwent phenomenal growth to include pediatric, maternity, emergency, surgical, and intensive care services, functioning as a comprehensive general hospital. In 1975, as hospitals across the state established a relationship with Brown University's new medical school, Memorial became the home of the emerging and all-encompassing field of family medicine.

The same year, the Division of Family Medicine established a residency program affiliated with Brown, which I am privileged to be a part of. Within the walls of the hospital and the adjoining primary care clinic, my predecessors trained in collaboration with internists and specialists to provide care across the life cycle to some of the most underserved and diverse communities in the state, including many who immigrated from Latin America, Cape Verde, and West Africa.

Despite the hospital's growth, Memorial found a way to maintain its "small-town feel." As trainees, it wasn't unusual for the hospital's telephone operator to recognize us by voice and vice versa. Across the departments, faculty came to know most trainees personally, significantly decreasing our stress level when calling a consult in the middle of the night. The stairwell between the Hodgson and Wood buildings was a common meeting place, as physicians, nurses, and staff traveled between the basement cafeteria and their respective departments.

On any given day as a family medicine resident, you could see patients in your clinic in the morning, stroll across the parking lot to "Wood 2" (the maternity care unit) at lunchtime to check on your prenatal patient's labor progress, and then suture head lacerations on your ER rotation in the afternoon. If the stars aligned, you might run up to deliver your patient's baby and perform a newborn exam before your drive home—all in a day's work. This quaint, self-contained model of practice resonated with many graduates, who now comprise almost two-thirds of family medicine physicians in Rhode Island.

The closure of Memorial Hospital has a far-reaching impact on its providers and the community it serves. For many Blackstone Valley residents, this is the only hospital they have ever used, for births, deaths, and everything in between. Some employees have worked there for decades and served multiple generations of families.

As family medicine physicians, we mourn the dissolution of a full-spectrum model of care that Memorial Hospital embraced. However, the tumultuous period of change has borne opportunities to expand our presence within inpatient settings across the state, allowing for more exposure to our field and for increased interdisciplinary collaboration. And even as our patients migrate to other hospitals, we continue to care for them under our newly established inpatient services while remaining committed to providing exceptional primary care based in the Blackstone Valley.

We may no longer meet in the stairwells, but we will always carry with us the camaraderie and spirit that resonated throughout our beloved community hospital.

Minoo D'Cruz *plans to practice full-spectrum family medicine. With gratitude to Jeffrey Borkan, MD, PhD, professor and chair of family medicine, for his historical contributions.*

BLAIR THORNLEY

BY PHOEBE HALL
PHOTOGRAPHS BY DAVID DELPOIO

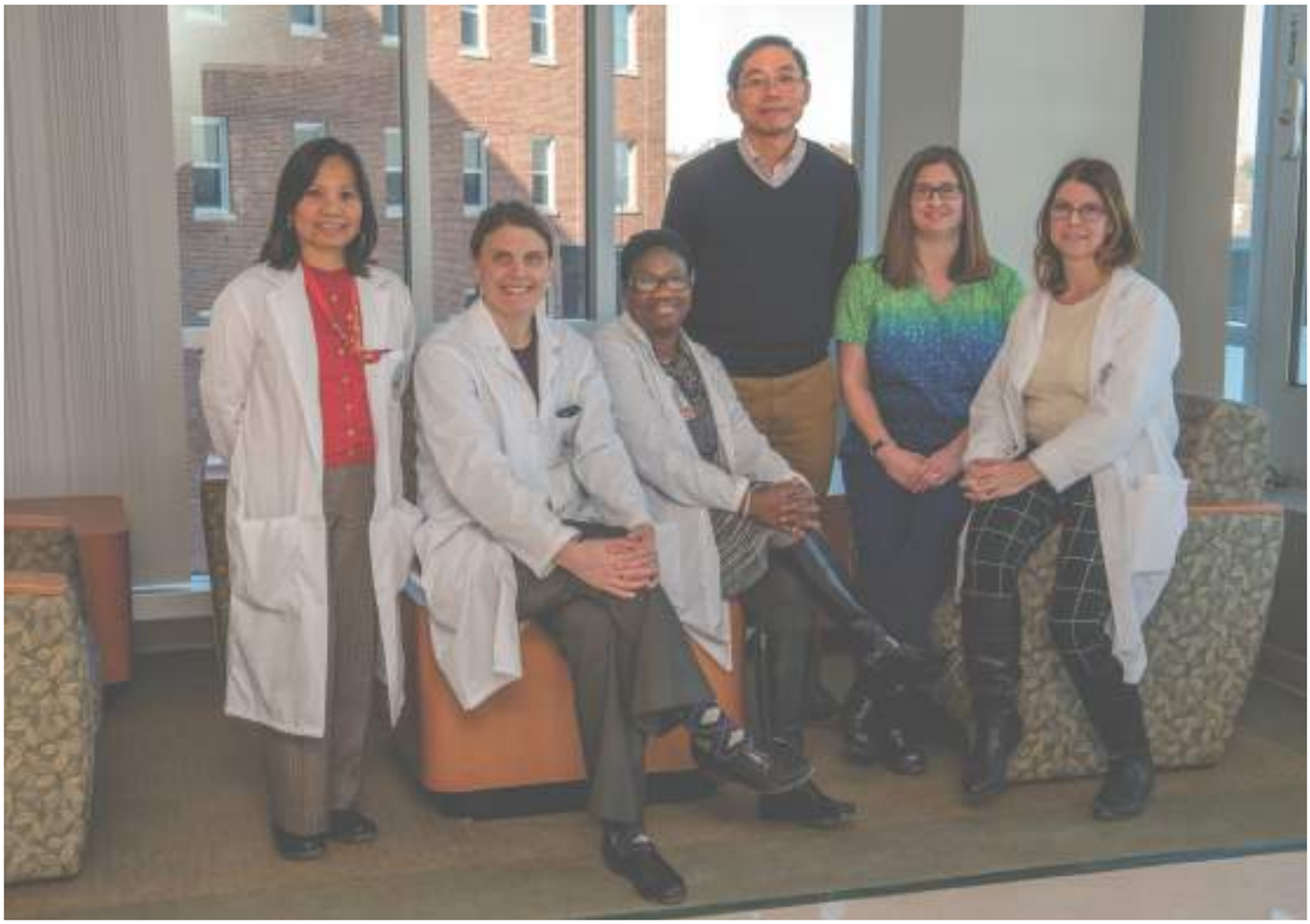
The Good Fight

Hepatitis C is the deadliest infectious disease in the US. The VA has a strategy to defeat it among veterans.

Homelessness, mental health disorders, and substance use can be barriers to care for patients with hepatitis C. Many state Medicaid programs, including Rhode Island's, restrict treatment to healthy, sober individuals. But those clinical challenges aren't stopping Veterans Administration providers in their quest to cure as many veterans with the virus as possible.

"We've had a veteran who came in every day to get directly observed therapy, which is something we do for tuberculosis, but we've never really done that for hepatitis C," says Amanda Noska, MD, MPH, F'15, an infectious disease physician at the Providence VA Medical Center.

HOME FRONT: Veteran Nicholas Manzo, left, who has hepatitis C, meets with Marlene Callahan, PharmD, and Kittichai Promrat, MD, at the Providence VA Medical Center.



THE PVAMC HEP C TEAM: From left, pharmacist Marlene Callahan, infectious disease physician Amanda Noska, nurse practitioner Yetunde Shittu, hepatologist Kittichai Promrat, linkage-to-care nurse Christina Furtado, and nurse practitioner Shelagh Wood-Gouveia.

"That worked really well for him, and he has been cured of hepatitis C," Noska says. "He otherwise never would have gotten treatment."

In 2014 the VA declared war on hep C. It had 168,000 veterans in the system with the virus, and those numbers were on the rise, due not only to baby boomers who may have lived, asymptomatically, with the disease for decades, but also to injection drug use, fueled by the opioid crisis.

The agency negotiated lower prices for new, highly effective, but notoriously expensive direct-acting antivirals and has allocated more than $1 billion annually to buy them. By August 2017, the VA reports, it had treated more than 96,000 patients. The cure rate of the new drugs is about 95 percent.

"I really think we're going to be able to wipe out hepatitis C from the VA system in the next couple of years," says Kittichai Promrat, MD, a hepatologist at the Providence VA who heads the local arm of the nationwide initiative to treat all veterans with the virus. "They prioritize hepatitis C as an important issue that they need to address. That's the first step. And then they allocate enough resources for us to do this type of work."

Promrat, an associate professor of medicine, says there's been a "paradigm shift" in the VA's approach to hep C. Rather than wait for veterans to come to them already suffering from serious liver complications, the VA seeks them out before they get sick—with screening reminders that pop up in the electronic medical records of at-risk patients, calls and letters inviting them to come in for testing, and other outreach. As of July 2017 the VA says it had tested 79.5 percent of patients born between 1945 and 1965 and nearly 90

"I really think we're going to be able to wipe out hepatitis C from the VA system in the next couple of years."

percent of its homeless population, two groups with the highest prevalence of hep C.

They expanded treatment capacity by allowing primary care physicians, clinical pharmacists, nurse practitioners, and physician assistants to provide care, and using telemedicine to reach more patients. "Many patients may not want to come in all the way to Providence," Promrat says. "By having that option, it's really helped improve treatment uptake."

The VA's hep C teams also collaborate with specialists in its mental health, substance use, and homeless clinics. "Many [veterans] do have issues—drug and alcohol use, mental health, homelessness—that need to be addressed at the same time," Promrat says. "We just can't tackle this alone."

BOOTS ON THE GROUND

Noska, an assistant professor of medicine, sports a button on her white coat that reads, "Born 1945-1965? Ask me about Hep C!" ("I have a T-shirt too," she says.) She sees veterans in the homeless clinic every Friday. "We've done a bunch of innovative things," she says, like directly observed therapy. "It's really very patient centered. … Just developing a really strong rapport with the patient is actually paramount to getting some of our veterans into care."

Integrated, comprehensive treatment is easier when everything is under one roof—starting with the test. "In the conventional civilian population, you'd refer somebody to Rhode Island Hospital to get a liver elastography," Noska says. "If they no-show that appointment, you're dead in the water." At the VA, she simply sends her patients downstairs. Similarly, she or Promrat might get a call from a primary care provider or social worker in another part of the hospital, and they'll swing by to see the patient. "The VA makes it easier to coordinate and expedite care," Noska says.

Experts who have been sounding the alarm about hep C, some for many years, say new approaches like the VA's are the only way to defeat the disease, which kills more than 19,000 people in the US annually. "The world has the tools to prevent these deaths," the National Academies of Sciences, Engineering, and Medicine noted in a press release last year, as it laid out a plan to get rid of viral hepatitis by 2030. But doing so requires a bold financial commitment in testing and treatment, as well as prevention measures like needle exchange—"a significant departure from the status quo."

"We're all supposed to be scaling up, revving up, moving faster," says Lynn Taylor, MD RES'00 F'05, director of Rhode Island Defeats Hep C. "The VA is a bright spot in the state."

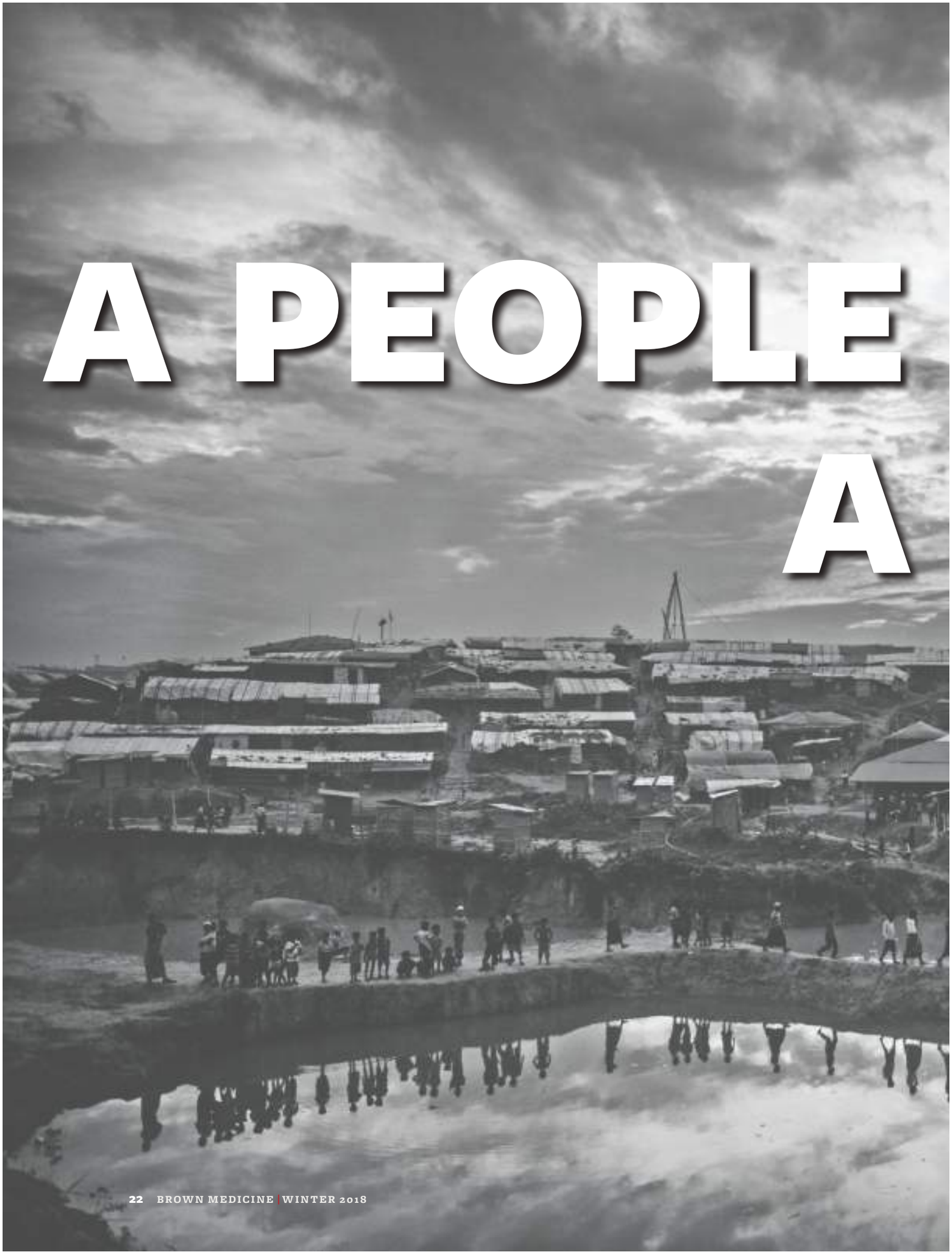
Taylor helped establish colocated, integrated care—"one-stop shopping"—at The Miriam Hospital, where until recently she directed the HIV/Viral Hepatitis Coinfection Program; and at CODAC Behavioral Healthcare, a nonprofit treatment and recovery program in Rhode Island, where she's now director of HIV and Viral Hepatitis Services.

But she says she can only do so much under the restrictions placed by the state's Medicaid program. Rhode Island limits treatment to people who have reached a certain stage of advanced liver disease and who don't use illicit drugs, and generally allows only certain specialists (usually GI and infectious disease docs) to prescribe treatment. "The evidence does not support withholding treatment," Taylor says. "We need to identify [hepatitis C] early. … We need to get people treated and cured soon after diagnosis so they don't get sicker … and so they aren't spreading hep C."

And then there are the "benefits beyond cure," including decreased recidivism and substance use, she adds: "Patients tell us they think, 'I'm worth it, they're investing in me, they want my hep C cured,' and they are motivated to work on other issues."

Many challenges remain for the VA. Its success depends on continued Congressional allocations, identifying everyone who has the virus, and addressing the remaining barriers for those veterans who can't get or don't want treatment. The Providence hep C team is in regular contact with their counterparts at other VA hospitals, so they can share what's worked and what hasn't, and brainstorm new ideas. They're also preparing for a certain proportion of patients who, after they're cured of hep C, will develop fatty liver disease, Promrat says: "There's still more work. That's for sure."

But for so many veterans, the VA is preventing liver cancer and liver failure and saving lives. "It's a unique situation because I can't think of a chronic viral disease that we can cure," Promrat says. "This thing doesn't come up probably again in my lifetime."

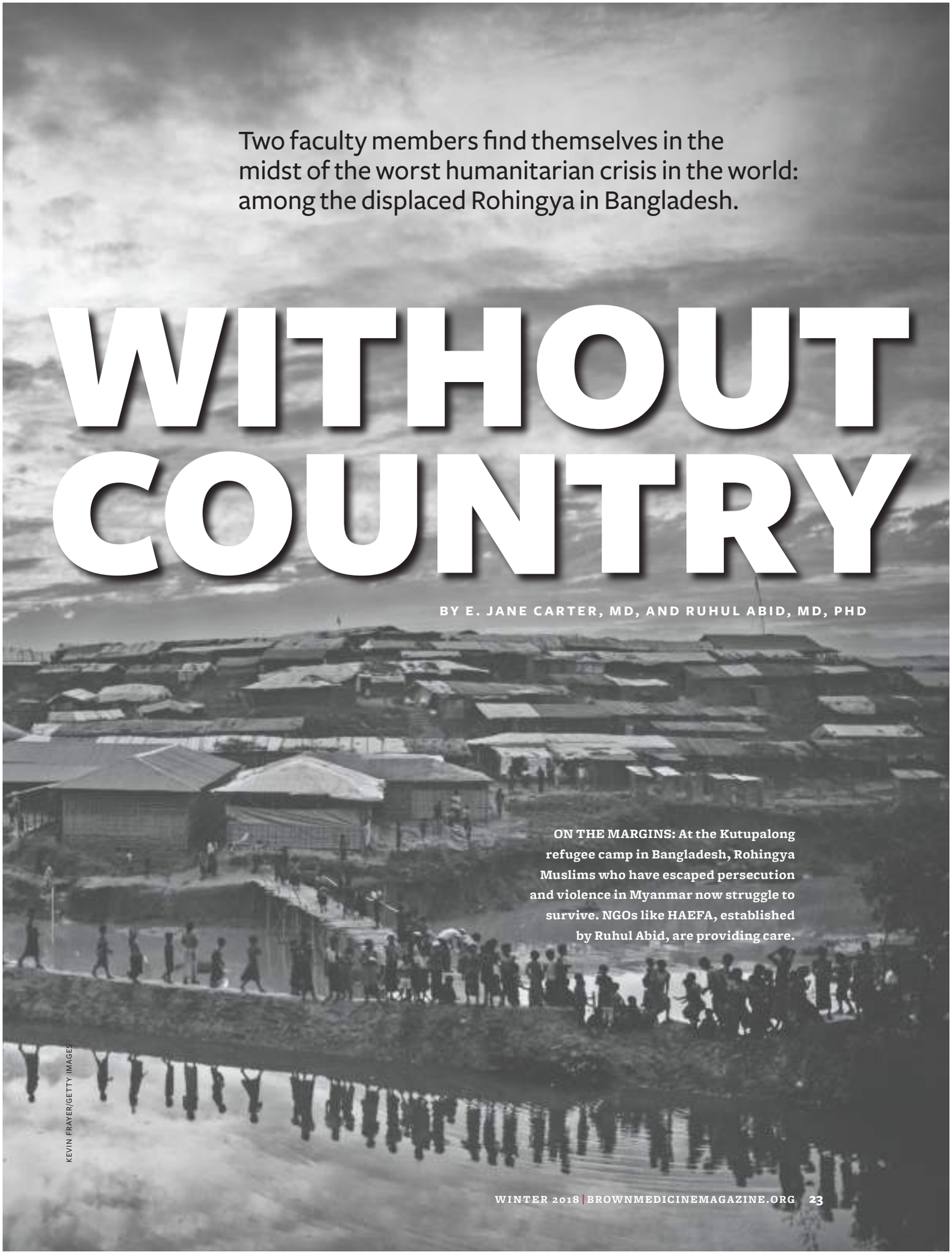


A PEOPLE A

Two faculty members find themselves in the midst of the worst humanitarian crisis in the world: among the displaced Rohingya in Bangladesh.

WITHOUT COUNTRY

BY E. JANE CARTER, MD, AND RUHUL ABID, MD, PHD



ON THE MARGINS: At the Kutupalong refugee camp in Bangladesh, Rohingya Muslims who have escaped persecution and violence in Myanmar now struggle to survive. NGOs like HAEFA, established by Ruhul Abid, are providing care.

KEVIN FRAYER/GETTY IMAGES

Although the line is long with people waiting to see the doctor, there are no complaints. Headaches, fevers, diarrhea, skin rashes—the usual primary care issues. I have participated in many of these clinics: in western Kenya, where I have worked for 20 years, and as part of the Travelers Aid medical van at home in Providence. Here, I am helping out at station no. 1, where we take height and weight. A young boy about 10 is in line and I ask through the interpreter what is his concern. He has a headache and points to a spot above his right ear. We take off his headscarf. It is a bullet wound tracing from his scalp and back across his head, and the upper part of his ear is missing. The wound is festering. That's when I remember: this is the Rohingya camp in Kutupalong, outside of Cox's Bazar, Bangladesh.

ORIGIN STORY

I received an email from Ruhul Abid in July 2017, asking me to attend a presentation on tuberculosis that his NGO, HAEFA (Health and Education for All), was making to the USAID mission in Bangladesh. The HAEFA project combined noncommunicable disease and tuberculosis screening efforts for factory workers and rickshaw pullers in Dhaka, Bangladesh.

Although Abid and I are both on the faculty at the Warren Alpert Medical School, our paths had never crossed until that email. Abid is in the cardiothoracic surgery department, where he studies the mechanisms to improve heart function after myocardial infarction (heart attack). I am part of the pulmonary division, concentrating on TB and the Brown Kenya Medical Exchange Program, with an office at The Miriam Hospital. The TB community is small and I wondered why I had never run into Abid previously. That email, which finally brought us together, was to take me on a remarkable journey.

In 2012, Abid saw a television report about a ready-made garment factory building in Bangladesh that collapsed and killed a large number of workers. A native of Bangladesh, with family still there, he decided to found HAEFA. Using his previous experience as a primary care physician in the tea plantations, he designed a plan to screen and link factory workers for common noncommunicable diseases: diabetes, hypertension, COPD, malnutrition, and preeclampsia. TB is also common in Bangladesh, but highly stigmatized. Abid added TB screening to his program, hypothesizing that linking TB with common diseases would reduce stigma.

Working in clothing factories in Dhaka is difficult; the emphasis is on productivity, not workers' rights. To negotiate with employers, HAEFA had to guarantee it wouldn't disrupt productivity levels. The entire interaction with the worker occurs within seven minutes. The HAEFA model became a series of four stations: registration; height and weight; blood pressure and finger stick for blood sugar and hemoglobin analyses; and physician examination, including TB screening questions. Information at each station is collected on an Android tablet in a prescribed format (think electronic medical record) and each patient has a unique identifier and bar-coded ID card. Patients who need follow-up care are linked to existing services in the community. HAEFA's initial work in 2016, funded through the UK's Department for International Development and Brown University's Global Health Initiative, screened 5,776 factory workers and 1,200 rickshaw pullers in Bangladesh.

A HUMANITARIAN CRISIS

Last July the area south of Cox's Bazar, known as Ukhiya, was mostly forestland, the hills covered by trees. But since August, 650,000 Rohingya from Myanmar have crossed over the Naf River to reach Ukhiya, and the Bangladesh government has designated the area as a campsite and has assisted in bulldozing the forest, setting up temporary shelters, building streets, providing food and water delivery, and coordinating international relief efforts.

Today the trees have been replaced by canvas and bamboo huts as far as the eye can see. The pit toilets fill within days. Water holes have been drilled in central areas. Long lines, separated by gender, await the food trucked in by relief organizations. Aid workers must leave each day at 5 p.m., when the Bangladesh army sweeps through to close the camp down, for security purposes. An informal economy has grown on the edges of the camp, selling groceries and small personal items. The roads are filled with supply trucks, as well as politicians—international and local—visiting the area.

Early in the crisis, HAEFA recognized both the need—as well as the applicability—of their model in the camp. Through Abid's contacts in Bangladesh, HAEFA asked the offices of the Directorate General of Health Services and the regional governor to set up two medical centers in the camps.

The NGO got permission to set up their camps in conjunction with the government camps. And this is how, in November, we came to be standing in the middle of the largest humanitarian crisis in the world today.

During our visit, HAEFA's two eight-member teams had been working in the Kutupalong and Balukhali camps for just over a month. There are several medical camps, set up by the government and by multiple NGOs. The HAEFA model is much as it was in the clothing factories. Patients visit a series of stations, where health care workers record information on handheld tablets. Each patient receives a laminated ID card so that when they return, the card can be swiped for record retrieval. By the time the patient sees the physician their electronic record is populated, with a red exclamation point flagging any abnormalities. A solar panel outside the medical tent feeds the battery that runs the computers and the Wi-Fi router that connect all the tablets, for smooth synchronization of the data; each evening the data are backed up to HAEFA's remote database. A local female health care worker fluent in both Bangla and Rohingya interprets for the doctor. Meanwhile, in the middle of the chaos, every physician takes the time to touch each patient. It's a principle instilled by Abid: even if it's just a finger on a pulse or a stethoscope on a chest, every physical exam employs human touch.

Even if it's just a finger on a pulse or a stethoscope on a chest, every physical exam employs human touch.

COURTESY RUHUL ABID

VIOLENT CONFLICT Jane Carter treats a child with a gunshot wound in Bangladesh.

The line at HAEFA is at least five times longer than at other medical camps. The group sees 200 to 300 patients per day, working until the army closes the camp at dusk. But no one complains to us about the wait. We think HAEFA draws more patients for three reasons: they see the technology we're using and receive a photo ID; they perceive the systematic approach to the evaluation, including blood pressure monitoring and glucose testing; and our physical exams include human touch.

These are not the best of conditions. There are overflowing pit latrines behind the HAEFA medical camp in Kutupalong. On day one of our visit, the heat and the stench were overwhelming; but the lines remained and the work went on. On day three it rained, and the water mingled with sewage and flowed down the street. In Balukhali, where the HAEFA camp is located in a valley near the base of a hill, the medical tent partially flooded. The physicians were drenched in sweat, with no place to take a break—to get a cup of coffee or glass of water. Yet the line of patients continued to move.

SUSTAINABLE HEALTH CARE

In addition to on-site treatment, HAEFA has established referral systems within the camp: for sexual violence victims, for diagnosis and treatment of TB, for safe delivery of pregnant women, for treatment of severe malnutrition, and for hospitalization for serious illnesses. Female health workers escort women identified in need by HAEFA; victims of sexual

violence can be brought to woman-friendly spaces and trauma centers set up by UN agencies while pregnant women are taken to adjacent maternity and delivery centers operated by the UN Population Fund (UNFPA), and malnourished children and women are escorted to the centers run by the World Food Programme. Although all these resources exist in the camp, they were established by independent agencies and in many cases don't effectively connect patients with the services they need.

For example, TB thrives in this type of environment; overcrowding and malnutrition drive TB epidemics. Initially HAEFA referred TB patients to the government screening center, but it turned out to be a 15-minute drive away, and none of the patients had transportation. After Abid's visit in December, HAEFA established a collaboration with the National Tuberculosis Control Program of Bangladesh and BRAC, a Bangladesh-based NGO, for diagnosis and treatment of TB. BRAC staff members are stationed in the HAEFA camps in Kutupalong and Balukhali to collect and carry sputum of presumptive TB cases to a nearby microscopy lab. HAEFA then records the lab reports in its database—and patients don't have to travel a long distance for sputum microscopy.

THE WAY FORWARD

As an emergency measure, the government of Bangladesh has taken on responsibility to loosely organize the camps since August 2017. HAEFA is providing care in conjunction with the Ministry of Health and Family Welfare. We saw many organizations on site—the World Food Pro-

WHO ARE THE ROHINGYA?

It's said that "Myanmar came to the Rohingya, the Rohingya did not go to Myanmar." The largely Muslim people has long struggled for rights and recognition in their homeland, formerly known as Burma. But historically, it was never their intention to belong to that country.

The Rohingya are an Indo-Aryan group who are believed to have migrated from the Ganges Valley as early as 3000 BCE to the Arakan region (present-day Rakhine State in Myanmar). Difficult terrain and high mountains geographically isolated Arakan. With a mixed population of Rohingya Muslims and Rakhine Buddhists, the region remained largely independent until 1784, when Burma invaded and annexed Arakan. The British ruled the country from 1824 to 1948, and the Rohingya supported them during World War II, while Rakhine Buddhists sided with the invading Japanese forces—furthering the divide between the Rohingya and other ethnic groups in the region.

Systematic persecution of the Rohingya began in 1978, but accelerated following the enactment of the 1982 Burma Citizenship Act by General Ne Win. This law denies citizenship to anyone who settled in Burma after 1824, when the British occupation began. Despite centuries of residence in Rakhine State, the Rohingya were stripped of their citizenship, losing their health care and other rights. Intermittent purges, from 1978 to 2017, displaced hundreds of thousands of Rohingya, with most fleeing to Bangladesh.

The most recent exodus of 650,000 Rohingya into Bangladesh—a country the size of Iowa—was precipitated by a military crackdown in August 2017, after a militant attack on a small border station. Most of the refugees live in overcrowded camps along the border, which have sheltered Rohingya for decades. UNHCR, the UN Refugee Agency, calls this "the fastest-growing refugee emergency in the world today."

A HUMAN RIGHT: Ruhul Abid founded his NGO to provide health care to factory workers and adapted that model for the Rohingya camp.

COURTESY RUHUL ABID

gramme, UN agencies, Doctors Without Borders, and the government of Turkey, to name a few. Major logistical challenges face the goodwill of the donors.

But what the Rohingya need is an effective health care system. In the immediate emergency response, the priority was providing the basics: food, shelter, water, safety. As time passes, the focus must shift to building the health care system—as well as providing access to jobs and schooling. Following our visit in November, we demonstrated to the UN Population Fund how HAEFA used handheld tablets to collect and organize health care records in the camps. The head of UNFPA arranged a presentation the following week to link HAEFA's system to reproductive health care providers throughout the camp. Other caregivers also need to link their patients to the appropriate facilities. These connections are only now emerging, with HAEFA leading as a "linkage builder."

The Bangladesh government has been doing excellent work by supplying shelter, food, and health care, including vaccines. Between 70 and 80 percent of the people in the camps are women and children, including around 32,000 pregnant women and 100,000 children between 1 and 4 years of age. They were deprived of any systematic health care or immunizations since Burma took their citizenship away in 1982 (see sidebar). In September, after reports of polio and measles in the camps, the Bangladesh government promptly provided emergency vaccines, including cholera. But a recent outbreak of diphtheria, which infected more than 3,000 people and has already claimed 30 lives, points to the vulnerability of this population.

On the signs at the camps, the Rohingya are called "Forcibly Displaced Myanmar Nationals." But are they Myanmar nationals? Their home country doesn't seem to want them back. Are they refugees—never expected to return to Myanmar, but to find a new homeland? Will they be moved to an island in Bangladesh, as has been proposed, where again they will wait for political recognition and basic human rights?

These larger questions loom. For now, we are physicians. We can provide care and logistics. For now, that is the best we can provide.

E. Jane Carter, *MD RES'86 F'90 is an associate professor of medicine (teaching scholar) and physician at The Miriam Hospital in the Division of Pulmonary/Critical Care. She is the immediate past president of the International Union Against Tuberculosis and Lung Disease.* **Ruhul Abid**, *MD, PhD, is an assistant professor of surgery (research) and a principal investigator at the Cardiovascular Research Center, Cardiothoracic Surgery Division, at Rhode Island Hospital.*

HAEFA *is a US-registered 501(c)3 nonprofit organization and solely dependent on fundraising to support their continued services in the Rohingya camps. For more information or to donate, please visit www.healthonwheels-usa.org.*

INSIDE LOOK: A video x-ray shows the position and subtle motions of a human healthy knee during landing from a one-leg hop. The visible wires and radio-opaque spheres are part of skin-mounted biomechanics equipment that synchronize with the XROMM measurements.

BRADEN FLEMING

BY DAVID LEVIN

WHAT MOVES YOU

Next-level imaging born and developed at Brown lets us see bodies in motion.

Behind an unmarked beige door in Brown's Biomedical Center, you'll find an unlikely menagerie. On any given day, you could encounter turtles, snakes, pigs, ducks, goats, sheep, or guinea fowl, each surrounded by a staggering array of medical machinery.

"You never know what you'll see in here. One time we had an alligator running on a treadmill. Today, we're looking at athletes' knees," says Braden Fleming, PhD, the Lucy Lippitt Professor of Orthopedics and a professor of engineering.

Those animals—and humans—are all here because of that machinery's unique ability: it can peer inside moving tissue, revealing how bone, muscle, ligaments, and cartilage work together to let living organisms walk, breathe, and eat.

The room, called the W. M. Keck XROMM Facility (for "X-ray Reconstruction of Moving Morphology"), is one of the first of its kind. It certainly *looks* unique: flanking a thick

blue rubber mat on the floor, two huge fluoroscopes—a sort of x-ray movie camera—are mounted on beefy metal structures. Across from them, suspended from the ceiling on thick steel arms, hang powerful x-ray sources, served by a special 440-volt electrical system. The two fluoroscopes record moving x-ray images from different angles, giving researchers two distinct views of a subject's bones. By combining data from the images, the scientists can effectively map a joint's motion in three-dimensional space.

Surprisingly, XROMM only requires minor modifications to existing x-ray machinery, says Elizabeth Brainerd, PhD, a professor of biology and of medical science, who founded the center in 2006. Instead of the standard 30 frames per second that most fluoroscopes capture, the XROMM system is set to record hundreds, even thousands of frames each second, letting scientists see minute changes within a joint as it flexes and twists.

For Brainerd, XROMM offers a means of conducting research that she had previously only dreamed of. "There have been a number of problems in my career that I've been interested in, but I sort of needed to give up on because there just wasn't the right technology available to be able to study them," she says. "Lung biomechanics, like how ribs move against each other as animals breathe—that's really been puzzling for centuries. How do humans and animals use muscles to expand the rib cage using muscles that only pull instead of push? We just haven't had the ability to measure rib shape and rib motion together in 3-D."

That's where the real power of XROMM comes in, she says. It not only lets researchers understand how individual points on each bone move; it also lets them reconstruct a fully accurate computer model of a joint with sub-millimeter accuracy. Using a CT scanner, scientists can create a static 3-D image of a subject's bones, then call on powerful animation software to superimpose it onto video x-rays taken in the XROMM facility.

"It's like a shadow puppet. You use the x-ray video to control the motion of the bones generated from the CT scan model," Fleming says.

The result looks like something out of Hollywood—a ghostly pig skull or disembodied iguana spine, floating against a white background on a computer screen, its component parts moving precisely the way they do in a living creature.

The technique opens up vast possibilities for researchers, Brainerd says. It can be adapted to capture images of fish feeding in water tanks; animals burrowing in sand; even birds in flight within small wind tunnels, providing images and data that would otherwise be nearly impossible to obtain.

The real kicker, though, is that the system may not just shed light on living creatures. It may also help reconstruct the evolution of animal motion, going all the way back to the early dinosaurs.

STOP MOTION

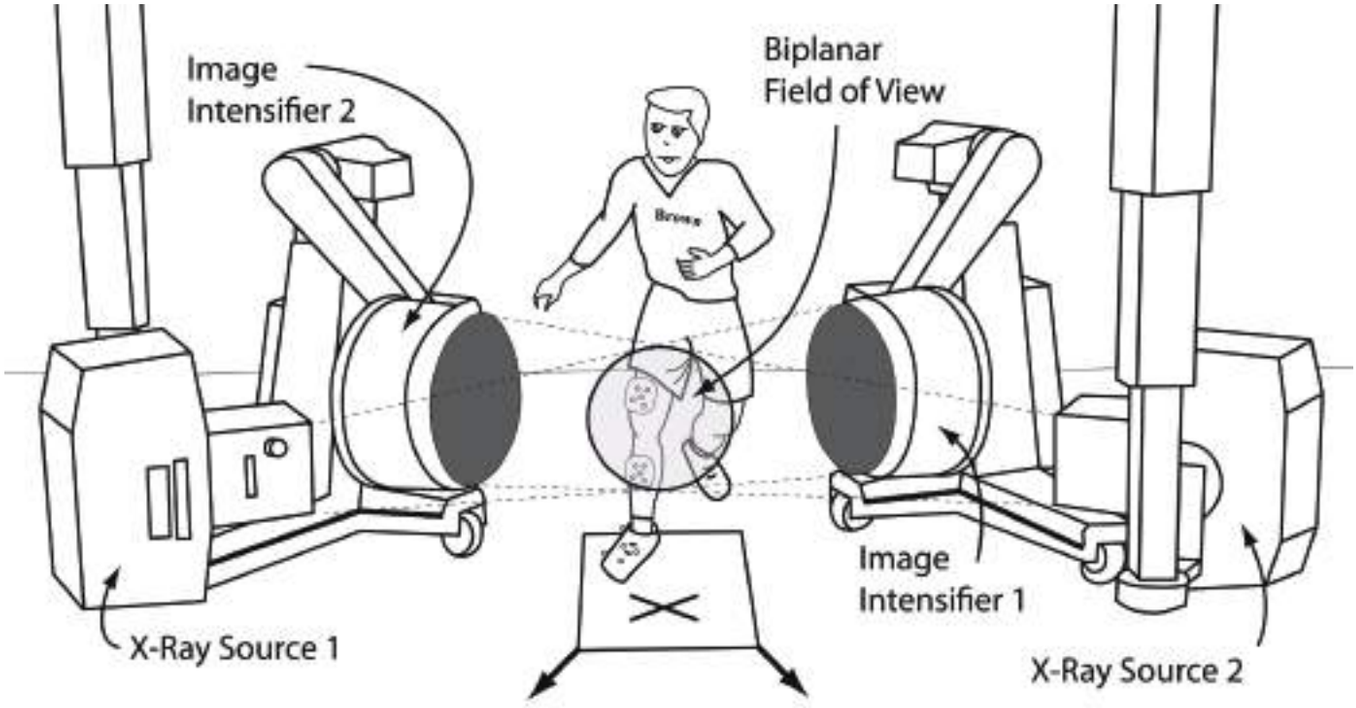
Stephen Gatesy, PhD, should know. He's an evolutionary biologist, and co-developed XROMM with Brainerd. He says that understanding the way bones functioned in extinct creatures has been an ongoing and somewhat quixotic quest.

"There's a long tradition in paleontology and anthropology where you grab two bones and rub them together and say, 'I guess they worked like this,'" says Gatesy, a professor of biology and of medical science. "But for anything more complex than a simple ball and socket joint, there's a lot we don't understand."

To get around this limitation, Gatesy and other evolutionary biologists often look to modern living animals to find bone structures similar to extinct species. Alligators, for example, have hip joints that are tantalizingly close to dinosaur species like sauropods, huge land-dwellers that walked on four limbs (think *Brontosaurus*). Likewise, the joints of modern birds may reveal some details about how animals like *T. rex* once moved.

Measuring the skeletons of birds while in motion hasn't always been easy, though. As a graduate student in the 1980s, Gatesy observed his mentors, including Ted Goslow, PhD, professor emeritus of biology, take some of the first x-ray videos of starlings in flight, offering a then-unprecedented look at what each bone and joint was doing along the way. Yet even that breakthrough provided only limited information—the two-dimensional x-ray effectively flattened each joint, superimposing every bone over its neighbors, creating images that were extremely hard to parse.

To squeeze more data from those x-rays, Gatesy realized, he would have to reach for techniques he'd picked up in his childhood hobby: creating stop animations with a super-8 film camera. "Rather than picking out points from a [2-D] x-ray—there's the shoulder, wrist, elbow—I thought, if we have 3-D models of bones, we should be able to rig that



XROMM WORKFLOW: While a subject performs a dynamic task, such as a jumping maneuver, researchers capture the bony motion using the XROMM system. The subject must perform the activity in the calibrated XROMM field of view, where the beams from the two x-ray sources intersect, indicated in the shaded circle. The image intensifiers capture the x-rays, and the team records the images using a high-speed digital camera attached to each image intensifier. Reconstructing the bony 3-D motion involves taking x-ray images (bottom left), moving them into a calibrated virtual 3-D space to match the subject's CT bone model to the contours of the bone visible in each of the two x-ray images (bottom middle), and then using animation software to reconstruct the dynamic 3-D motion of the bones (bottom right). To see the jumping maneuver and other videos, go to xromm.org.

BRADEN FLEMING

up into an animatable puppet, and re-align the 3-D model to a 2-D x-ray view."

Initially, Gatesy's colleagues did that with dried starling skeletons, carefully posing each bone to match its alignment in a single frame of the x-ray video, then measuring its angle with a protractor and calipers. Later, he adapted professional animation software to do the job, painstakingly drawing a digital "stick figure" of each bone as it appeared. Working frame by frame in this way, he could eventually create a basic 3-D computer animation of a limb or joint.

It was slow work, but Gatesy plugged away at it in his lab for years. Once Beth Brainerd arrived at Brown in 2006, however, she began to grasp the potential of his work. Together they received seed funding from Brown and then a grant from the National Science Foundation to develop new hardware and software, and XROMM was born.

"Things that used to take us a whole morning suddenly took us 30 seconds," says Gatesy. "It was Beth that really promoted looking outward to other colleagues and institutions to share our knowledge. Without that, I would still be doing it myself, hoping I got it right."

Brainerd and Gatesy combined their 3-D software efforts with a pair of x-ray fluoroscopes taken from a hospital floor. Thanks to funding from the Keck Foundation, their original prototype has since grown to its current room-sized device, complete with a wall of high-powered computers. Through each iteration, Brainerd says, the equipment has become more flexible and versatile, yet still remained safe enough to use on human subjects.

THE WHOLE PICTURE

That's good news for J. J. Trey Crisco, PhD, the Henry F. Lippitt Professor of Orthopedics and a professor of engineering. Crisco has helped study prosthetic devices for partial amputees, who often encounter ill-fitting artificial limbs. Normally, those prostheses are bolted to a hard plastic or resin socket that slides onto a patient's residual limb—but in many cases, the socket doesn't move precisely with the remaining tissue, resulting in poor control, skin breakdown, and other serious problems for its wearer.

"When you move the prosthesis, you're really controlling it by moving residual bone inside a limb," says Crisco, who directs the Department of Orthopaedics' Bioengineering Laboratory. "Even though there's muscle between the bone and a prostheses' socket, it's the bone that's driving motion. You want to minimize times when the bone is moving, but the socket isn't."

With XROMM, that may be possible in a matter of minutes. Crisco has been able to use the system to see exactly where a patient's bone sits inside a prosthetic socket, offering minute detail on how well it fits their residual limb. Using that data, he says, prosthetics companies will be able to both improve future designs, and better customize existing ones to patients' needs.

Crisco is also using the XROMM system to look at internal prosthetics, like those used to replace diseased or damaged joints. Although artificial shoulder, hip, and knee joints all work very well, he says, implants like prosthetic wrists are decidedly lacking. Compared to most joints in the human body, the wrist is incredibly complex, with eight separate bones and dozens of interlocking tendons and ligaments—but existing artificial versions are usually made up of just a single articulation. In many cases, that mechanism cannot approximate the motion of the entire wrist joint, causing unnatural motion that can lead to severe arthritis.

"There is very little understanding of how all those bones work together, how the forearm works together with the wrist," Crisco says. "We know certain wrist bones and ligamental structures are critical to wrist function, but as for what each bone does? We don't have the full picture by any means."

By bringing patients into the XROMM facility, Crisco adds, it will be possible to measure all eight wrist bones—

> "THINGS THAT USED TO TAKE US A WHOLE MORNING SUDDENLY TOOK US 30 SECONDS."

and their supporting tendons and ligaments—as they move their wrist and forearm through tasks of everyday living.

"XROMM will be critical to advancing our understanding of the wrist," he says. "We think it could lead to new therapies after injuries, and better joint replacement designs in the future."

POPULAR MECHANICS

But that future is a long way off. For now, researchers still struggle to make sense of why even simple joints like the knee often deteriorate after an injury.

Jillian Beveridge, PhD, a postdoctoral research fellow in the Bioengineering Laboratory, has a personal stake in that question. As a varsity athlete, she tore the anterior cruciate ligament (ACL) in both of her knees, requiring painful surgery and rehabilitation. Although in her case the damage was successfully reconstructed and she has been able to remain physically active, she says it made her wonder why people with identical injuries—and identical treatments—can have vastly different outcomes. While some patients recover as if the injury never happened, others experience crippling pain and osteoarthritis years later.

As a graduate student, Beveridge began to pick apart that question by recreating the injury in animal limbs. "We found that damage in the cartilage of the knee often directly corresponded to damage to the ACL in animal models, but we could never really tell if the same thing was happening in people," she says.

Beveridge and Fleming, her adviser, are hoping to do just that. They've taken 3-D images of dozens of patients' knees, looking for minute differences in the joints after ACL reconstruction surgery in which the torn ligament is replaced with a graft of tendon. What they've found using XROMM, she says, has been surprising.

"It turns out even a millimeter difference in a joint's mechanics can impact its health over time," she says. "We think that some ACL reconstructions could leave knees at greater risk of increased stresses to the joint that can lead to osteoarthritis."

"When people have the standard ACL surgery, their knee's motion is no longer exactly where it's supposed to be. We want to determine how close you need to be to keep the joint healthy over time," Fleming adds. "Right now, nobody really knows that. If you have a pool of patients that have ACL reconstruction surgery, 60 percent move on to have arthritis. So even a small difference can be significant."

If the researchers can understand why one patient's joint stays healthy years after surgery while another's is broken down and arthritic, it may help improve existing surgical techniques, and lower the number of patients who develop crippling arthritis in the joint years after reconstruction surgery. "To really know the best way to approach ACL treatment, we need to know basics of how the knee moves, how the joint is loaded, and what the biological response is," Fleming says.

On some level, Brainerd says, gathering basic data about biomechanics was the primary goal she had in mind when developing XROMM. Whether she's training it on human subjects or animals, her objective is the same: to gather as much data about basic biomechanics as possible, and make it possible for scientists worldwide to do so as well. With that in mind, the XROMM system's design and software are entirely open source, freely available to any scientist who wants to use the technology. It's a point of pride for Brainerd.

"Right now, there are a total of 28 systems out there that are based on our hardware design," she says. "We want as many people as possible that have access to the hardware to be able to do XROMM."

In the future, Brainerd wants to share far more than just software and specs with the research community. As the number of XROMM-capable facilities increases worldwide, she says, she is promoting an online hub to collect and share the data they generate, so scientists can build off of each other's progress.

"At this point my hope is scale. XROMM has gotten better and faster over the last 10 years, but we still only have data on a handful of species, and it's been very time consuming to get it," she says. A common database, however, would make it easier to bring in information from multiple studies and labs worldwide, creating a detailed picture of animal shape and diversity.

"I really just want a lot of people to use XROMM so we can do some broader comparisons—not just understanding how one animal works, but understanding how a whole bunch of animals work, how they evolved, and how they work differently," she says. "Why do the ribs of different animals look so different? Why are skulls so different? To me, that's what's fundamentally interesting."

David Levin *is a freelance science writer based in Boston.*

MOMENT

Thanks to You!

Dear Brown medical community,


MADELINE JOHNS

We are proud to share this special section to update you on *BrownTogether* campaign progress and our areas of focus—and, most importantly, to thank you for all that you do to support Brown and the Warren Alpert Medical School.

The Medical School continues its upward trajectory, boasting excellent students and faculty, ranking in the top quartile of medical schools by *US News and World Report*, and achieving record-breaking growth in research funding. These accomplishments would not be possible without the students, alumni, parents, faculty, staff, and community members who come to love Brown and leave their mark of excellence here.

And we have our sights set even higher. Of *BrownTogether*'s $3 billion fundraising goal, $300 million is designated for the Warren Alpert Medical School. To date, we have raised $117 million from generous supporters. Thank you to each and every participant—from the students who showed their support with a gift to the Brown Medical Annual Fund Student Challenge, to the anonymous donor who gave a multimillion-dollar gift to grow the research effort of the Brown Institute for Translational Sciences.

Through *BrownTogether* we are impacting the world in areas of health and medicine that will have a profound effect on the lives of many. I'm inspired by the opportunity to play a small role in garnering support for the development of a malaria vaccine, an Alzheimer's prevention database, and potential therapies for lung cancer, among other efforts. At Brown we're making the world a better place. Your support of research and medical education to train the next generation of physician leaders will have exponential impact.

Please read on to learn more about these accomplishments and how you can help us make a difference.

With much appreciation,
Bethany Solomon
Associate Dean for Biomedical Advancement

Progress to Goal

$117M **Goal: $300M**

UM

BROWN TOGETHER

INVESTING IN INNOVATION

Bridging the 'Valley of Death'

Translating a cutting-edge biomedical discovery to the mass market—usually through the commercialization of a device, drug, or diagnostic test—is a daunting task for even the most expert scientists.

Traditionally, federal agencies fund early-stage and clinically applied biomedical research, and industry picks up the tab if a project seems viable. But in recent years the gulf between those two funding stages has grown wider, and trickier to navigate.

Into this "valley of death" steps Brown Biomedical Innovations Inc., or BBII: a key component of a comprehensive strategic initiative to invest in the University's biomedical research enterprise. BBII is designed to support research that takes basic knowledge of diseases to a place where it can be translated to a treatment, device, or assay. This shifts the research toward more translational science and greater commercialization. In bridging that funding gap, BBII creates an environment that fosters faculty entrepreneurship.

Through *BrownTogether*, BBII has already received $3 million from donors and distributed its first round of funding in support of two promising technologies. One could help doctors diagnose neonatal abstinence syndrome, an

MIKE COHEA

Faculty members Kristi Wharton and Robert Reenan hope to find small molecules that will suppress ALS in a fruit fly model.

BBII fosters faculty entrepreneurship.

increasingly common condition in which babies who were exposed to opioids in utero experience withdrawal symptoms. The other technology is a fruit fly model of amyloid lateral sclerosis (ALS) used to discover mutations in a suppressor gene that mitigates the harmful effects of the disease.

INVESTING IN STUDENTS

All Together Now

Annual giving allows us to provide financial aid and support the education of medical students. To continue and to celebrate the key role the Medical School plays in the success of the campaign, the University has declared that all gifts to the Brown Medical Annual Fund will receive 100 percent credit and recognition within the Brown Annual Fund. What a tangible way to celebrate *BrownTogether*!

The 2018 Medical Annual Fund is off to a tremendous start thanks to the support of 1,153 alumni, parents, students, faculty, and friends (17 percent more than last year). Special thanks go to our Dean's Circle members (gifts of $5,000 or more), whose leadership accounts for 66 percent of the total dollars raised this year. I also want to thank all of those who have signed on as Partners in Distinction, making campaign commitments to the Fund of $75,000 over five years. This level of support allows us to consistently offer the resources our students need to thrive as future physicians.

We have a way to go to reach a record-breaking goal of $1.4 million by June 30, 2018, but I'm inspired by the sheer excitement on and off campus about the amazing accomplishments of the Warren Alpert Medical School. Let's keep it going!

Peter J. Panton '79 MD'82, PMD'15, PMD'21
BrownTogether Campaign Committee Chair
for the Warren Alpert Medical School

Nicholas Koen MD'20 and Rei Mitsuyama MD'20 discuss a poster at the Student Showcase in November. The BMAF provides funds for student research projects.

Full Ride

For the first time, the Warren Alpert Medical School is providing a scholarship to cover the costs of all four years of attendance for a deserving medical student of outstanding promise.

MADELINE JOHNS

Krissia Rivera '15 MD'21 is the inaugural recipient of the Preston C. Calvert and Margaret E. Guerin-Calvert Medical Scholarship.

The Preston C. Calvert and Margaret E. Guerin-Calvert Medical Scholarship was made possible by a commitment of more than $2 million from Preston C. Calvert '76 MD'79 and Margaret Guerin-Calvert '76. New graduates of the Warren Alpert Medical School are saddled with an average debt of $150,000. The Calverts' gift recognizes the real limitations that a student's finances may impose on choosing careers in basic and applied research, academic medicine, and other fields. They also note the critical role financial aid played in their own undergraduate, graduate, and medical education and their career paths at and after Brown.

The Calverts also have kept the day-to-day needs of the Medical School a priority with their their gift to become *Partners in Distinction*.

INVESTING IN RESEARCH

At War with Malaria

With Brown's deep commitment to lifesaving research, the creation of a center for vaccine biology and malaria research is an incredibly relevant goal for *BrownTogether*.

Malaria is the greatest single-agent killer of children on the planet and it disproportionately affects the world's most impoverished populations, stymying economic development and social stability. Focusing on people in malaria-endemic regions of Kenya and Tanzania, a research team led by Jonathan Kurtis '89 PhD'95 MD'96, the Stanley M. Aronson Professor of Pathology and Laboratory Medicine and chair of the department, has developed a novel approach to vaccine biology.

The team discovered that a small percentage of children develop resistance to malaria infection and identified the unique antibody that protects them from the severest forms of the disease and, ultimately, death. The Kurtis group's vaccine targets both infection and disease with an aim to reduce malaria-attributed mortality by 50 percent in children under 5. That's a quarter of a million lives saved every year.

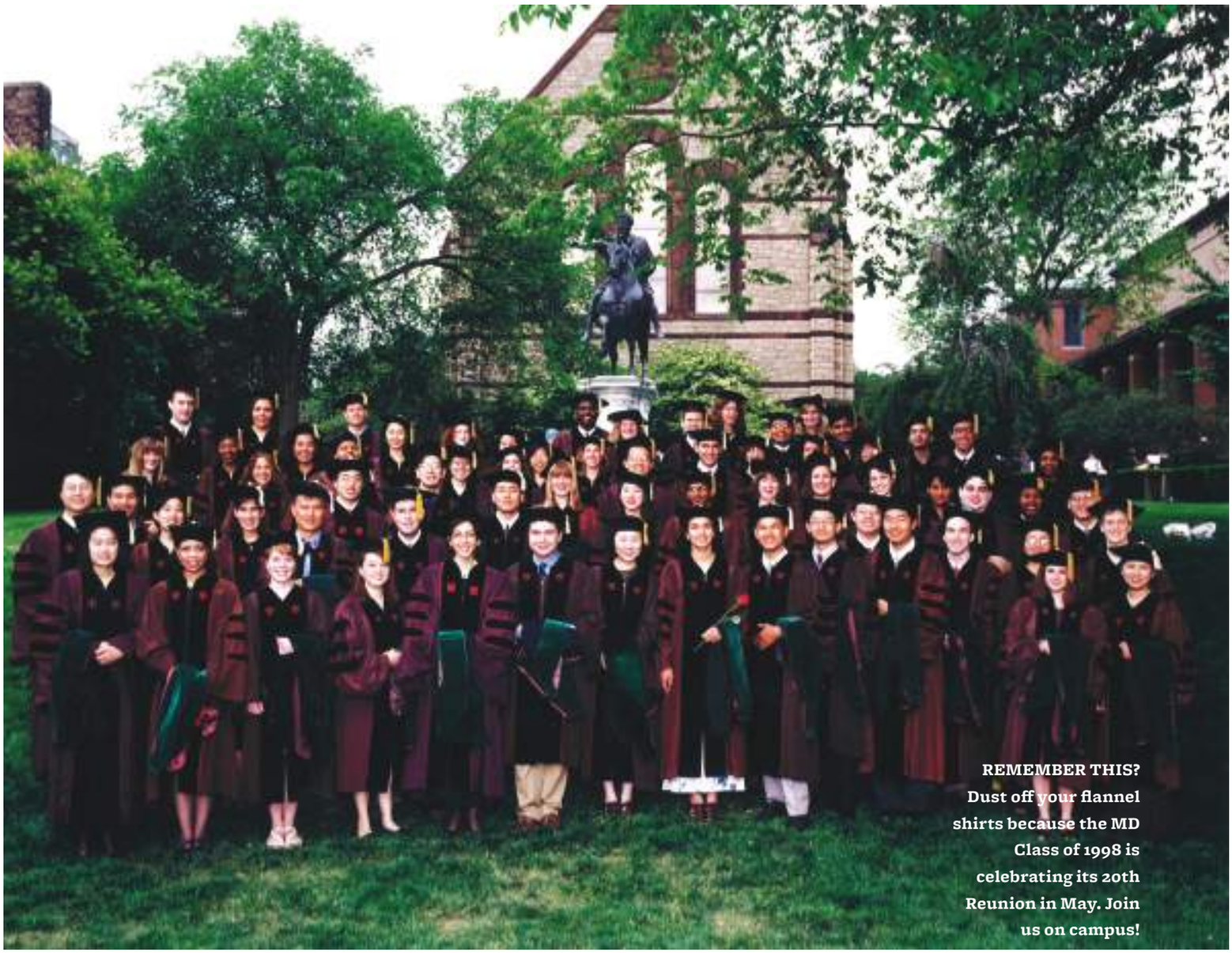
The team will conduct a clinical trial to assess the efficacy of the vaccine, recruit additional faculty to build on momentum within malaria research, and explore other diseases that could be tackled with their scientific approach.

Around the world, one child dies from malaria every minute.

David DelPoio

ALUMNI ALBUM

CHECKING IN WITH BROWN MEDICAL ALUMNI



REMEMBER THIS? Dust off your flannel shirts because the MD Class of 1998 is celebrating its 20th Reunion in May. Join us on campus!

WARREN ALPERT MEDICAL SCHOOL ARCHIVES

CLASS NOTES

ALUMNI

1978

Paul Broomfield '75 and his wife, Iris Wolf Broomfield '77, live in Dix Hills, NY, on Long Island. He practices gastroenterology in nearby Bay Shore. They have two adult children, Elizabeth and Mark.

1979

Michael Cropp, MBA '03, P'05, '09 was named the Lifetime Achievement honoree of the 2017 Buffalo 612' C-Level Executive Awards, which honors western New York's best top executives. He is the president and CEO of Independent Health, a not-for-profit health plan in Buffalo, which he joined in 1996 as chief medical officer. Prior to that he'd been a primary care physician and health care executive in rural Wisconsin, Rhode Island, and Massachusetts.

Peter A. Hollmann '76 is president-elect of the Rhode Island Medical Society. He will begin his one-year term as president in September. Peter is a geriatrician at University Medicine Foundation and a clinical assistant professor of family medicine at the Warren Alpert Medical School.

1981

Richard Brown '78 is the market medical director for West Michigan at ConcertoHealth, a provider of specialized primary care for medically fragile and elderly patients. Previously he was a professor of family medicine and director of the Wisconsin Initiative to Promote Healthy Lifestyles at the University of Wisconsin-Madison School of Medicine and Public Health, and chief executive officer and chief medical officer for Wellsys.

Gregory Miller '77 joined Collabria Care in Napa, CA, as the medical director of hospice and palliative care services. Previously he was medical director of palliative care for the Urban Central Region of Intermountain Healthcare in Utah and an adjunct associate professor at the University of Utah School of Medicine.

1982

Michael Migliori '79, P'11, '12, '14 received the Dr. Herbert Rakatansky Award for professionalism and humanitarian service from the Rhode Island Medical Society. He is a clinical professor of surgery at the Warren Alpert Medical School and the ophthalmologist-in-chief and director of ophthalmic plastic and reconstructive surgery at Rhode Island Hospital.

1983

Richard Toselli was appointed in December the acting chief executive officer at InVivo Therapeutics, a research and clinical-stage biomaterials and biotechnology company in Cambridge, MA, with a focus on treatment of spinal cord injuries. He oversees the company's clinical and regulatory strategy. A board-certified neurosurgeon, he will continue to serve as chief medical officer at InVivo.

1985

Scott Haltzman '82 is the medical director at Arbour-Fuller Hospital in South Attleboro, MA. Previously he was the medical director in the Department of Human Behavior at Fatima Hospital in North Providence. He is an adjunct clinical assistant professor of psychiatry at the Boston University School of Medicine, the author of four books about marriage and relationships, and a distinguished fellow of the American Psychiatric Association. He lives with his wife in Providence.

Lori Ullman is the interim chair of dermatology at the University of Buffalo, a fine artist, a classical vocalist, and a recording artist.

Lori Ullman was named the interim chair of dermatology at the University of Buffalo medical school in November. An associate professor and a member of the dermatology faculty since 2000, her fields of interest include cutaneous cancers and cosmetics. She's also a fine artist, classical vocalist, and recording artist.

1986

Tina L. Cheng MPH '83 was elected to the National Academy of Medicine in October. She is the Given Foundation Professor and Director of Pediatrics at the Johns Hopkins University School of Medicine, a professor of population, family, and reproductive health in the Johns Hopkins Bloomberg School of Public Health, and pediatrician-in-chief at the Johns Hopkins Hospital. (See *Brown Medicine*, Winter 2017.)

1991

Jeffrey Green, MBA '88 joined Bain Capital as a partner last February. He is part of a new fund at the firm dedicated to life sciences investing. He'd previously managed health care portfolios at Citadel and other firms. Before transitioning to finance, he was a Harvard Medical School faculty member and director of the emergency room at the Massachusetts Eye and Ear Infirmary. He lives in Dallas with his wife and three children.

1996

Ilse Bell is the senior director of quality and practice transformation at Health Initiatives Consulting, which advises providers, health systems, and others in delivering value-based care. An expert in workflow redesign, she's working to reduce costs and improve quality.

Jennifer Friedman, MPH, PhD '92, a professor of pediatrics and of epidemiology at Brown, is a member of the American Society of Clinical Investigators (ASCI), an honor society of

WHAT'S THE BUZZ?

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physician-scientists early in their career who translate findings in the laboratory to the advancement of clinical practice. She is one of just 80 members selected to join each year, out of hundreds of applicants.

1997

Rudrani Banik '93 opened a private practice in Manhattan, where she specializes in neuro-ophthalmology, migraine wellness, and comprehensive ophthalmology. She takes a functional medicine approach, which emphasizes nutrition and lifestyle changes for chronic eye disease as well as headaches. She's also an associate professor of ophthalmology at Icahn School of Medicine at Mount Sinai.

Brian Clyne EMHL'18 is the interim physician-in-chief for emergency medicine at Lifespan and interim chair of the Department of Emergency Medicine at the Warren Alpert Medical School, where he is also an associate professor and vice chair for education in the department. He also will serve as interim president of University Emergency Medicine Foundation and assume duties on the board of Brown Physicians Inc.

Jordan Orange '90 PhD'96 was named chair of pediatrics at the Columbia University College of Physicians & Surgeons and pediatrician-in-chief of NewYork-Presbyterian/Morgan Stanley Children's Hospital. He was previously professor and vice chair for research in the Department of Pediatrics at Baylor College of Medicine, where he was also director of the Pediatrician-Scientist Training and Development Program, the Jeffrey Modell Diagnostic and Research Center for Primary Immunodeficiency at Texas Children's Hospital, and the Texas Children's Hospital Center for Human Immunobiology. He served as chief of immunology, allergy, and rheumatology at Baylor and the Louis and Marybeth Pawleek Endowed Chair at Texas Children's.

> Marshala Lee is a supervisory medical officer and the branch chief of graduate medical education for the HRSA.

2005

Paul George, MHPE '01 RES'08 was appointed director of the clinical curriculum at the Warren Alpert Medical School in September, overseeing clinical clerkships including the Longitudinal Integrated Clerkship. Paul is also the assistant dean for medical education and the director of the Primary Care-Population Medicine Program. He has received numerous Dean's Teaching Excellence Awards and five consecutive Medical Senior Citations from the medical graduating class.

2009

Marie Audett '05 and her husband, Adam Knapp, welcomed their first son, Finley Alexander, on April 29, 2017.

Mark Scott II '05, a trauma surgeon, joined the Essentia Health clinic in Duluth, MN. He completed his residency in general surgery at Hennepin County Medical Center in Minneapolis and a fellowship in surgical critical care at MedStar Washington Hospital Center in Washington, DC.

2010

Margret Chang RES'14 joined the medical staff of Milford Regional Hospital in Worcester, MA, and Tri-River Family Health Center in Uxbridge, MA, where she practices internal medicine and pediatrics. She is also an assistant professor at UMass Medical School. She completed her medicine/pediatrics residency at Rhode Island Hospital.

2011

Marshala Lee, MPH, is a family medicine physician and a supervisory medical officer and the branch chief of graduate medical education for the Health Resources and Services Administration, managing the Children's Hospital Graduate Medical Education and Teaching Health Centers Graduate Medical Education programs. She earned her MPH from Harvard, where she was also a Mongan Commonwealth Fund Fellow in Minority Health Policy. She completed her family medicine residency at the University of Maryland Medical Center.

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Mark Aloia

COURTESY MARK ALOIA

Friendly Persuasion

Patient behavior change is the key to successful outcomes.

Psychologist Mark Aloia, PhD RES'95 F'96, an associate professor of medicine at National Jewish Health in Denver, is one of a relatively small number of board-certified clinicians working in behavioral sleep medicine. Foremost a clinical researcher, Aloia has one foot in industry, where he has an unusual title: vice president and global lead, behavior change, for the medtech giant Philips.

Aloia credits a rotation in sleep medicine while at Brown with igniting his interest in obstructive sleep apnea (OSA), specifically the problem of poor adherence to the disorder's primary treatment, CPAP (continuous positive airway pressure) therapy. Adherence to CPAP has historically been in the range of 50 to 60 percent. Aloia developed a "motivational enhancement" methodology, based on principles of motivational interviewing, and demonstrated in clinical trials that this approach boosted adherence.

His success prompted Philips Respironics, which manufactures CPAP devices, to recruit him as a clinical researcher in 2007. Aloia was on board to help the company solve this adherence problem just as it became a business problem: in 2013 Medicare began denying payment for CPAP if patients don't meet adherence criteria. Aloia helped develop an app, DreamMapper, for Philips, and a recent study of 172,000 patients found that 78 percent of people who used the app were adherent by Medicare's definition. Aloia notes that the app has 600,000 users; "the 22 percent improvement in adherence represents 120,000 patients who would have lost their devices," he says.

> "We have often thought, if only patients knew what we know, they would change their behavior."

While Aloia sees himself as a clinical researcher first, with his industry role he's at the heart of a movement to put technology in the hands of patients to help them achieve their health goals. Too often, these fail to do the job. Lacking a basis in health psychology, apps generally use patient-sourced data to inform and educate them rather than motivating them to change. This doesn't work for sleep apnea, he says—nor does it work in most other conditions requiring behavior change. Clinicians might make OSA patients aware that, if left untreated, their disease might lead to high blood pressure and heart failure, yet patients still don't comply. "We, as clinicians, have often thought that if only the patients knew what we know, they would change their behavior," Aloia says. "That doesn't work. Even many physicians don't adhere with their therapies."

Aloia has codified behavioral psychology tenets into five pillars that can be described by the acronym "PAUSE" ("because software engineers asked me to fit everything that I have learned about behavior change onto one slide," he jokes). That stands for Personalization, the need for an intervention to have personal relevance; Autonomy, meaning the patients are in control of their own choices; Urgency, the reason why the patient should change the behavior (daytime sleepiness impacting job performance, for example); Social support; and Empowerment, which comes from setting patient-specific, achievable targets along the way to major goals. "A target might be a 10 percent improvement. Reaching that … builds momentum and confidence," he says.

This methodology might apply equally well to parenting, says Aloia, who has two boys, ages 10 and 13. But, he admits, "I don't always practice what I preach!" ***—Mary Stuart***

EYE ON ALUMNI

He's a Survivor

A longtime fan lives the dream as a castaway on his favorite reality show.

Mike Zahalsky '95 MMS'98 MD'99 is no stranger to testing his limits. From completing three undergraduate concentrations and medical training at Brown to building a successful urology practice in southern Florida, he's not one to shy away from difficult endeavors.

Last year Zahalsky faced his biggest challenge yet: competing for $1 million against 17 other castaways on a Fijian island on season 35 of *Survivor: Heroes vs. Healers vs. Hustlers* and coming within a hair's breadth of the win. He took a break from his post-finale Los Angeles family vacation to provide a peek behind the palm fronds.

What prompted you to audition now?

I've always wanted to be on the show, but for so long I had three little kids, so it would've been terribly selfish to go. But last year I said, "Honey, one of these days I'm going to apply," and she laughed. ... So the next day I went to my office and made a 3-minute video. I sent in, maybe, the second take, and lo and behold—boom!

Mike Zahalsky

CBS VIA GETTY IMAGES

How long have you been a fan of *Survivor*?

My wife, Bari, and I have watched *Survivor* since the last episode of the first season and haven't missed one since. You know how, jokingly, everyone has a "hall pass" in their relationship? My wife's was Ethan, the winner of *Survivor* season 3, who happened to live three blocks away from us in New York City. Fast forward a few years and we named our son Ethan—I'm just glad the kid looked like me.

What about *Survivor* kept you and Bari watching since 2000?

I think it's probably the best family show on television. *Survivor* is fascinating because there's the physical challenge aspect that kids love and there's a mental aspect that adults love because it cuts you to the core of who you are.

How did you prepare for the competition?

I had run a marathon in January, but I worked on agility with a trainer three days a week, throwing beanbags, tossing rings, and running balance beams to prepare for the challenges. It sounds ridiculous, but that was the stuff that I knew I would struggle with.

As a longtime viewer, what were the biggest surprises when you were actually on the island playing the game?

The loneliness. You're in jail and you have nobody you can trust. It's a very pretty jail, but you're still in jail.

What were the best parts of being on a tropical island?

Bari came out for one of the reward

challenges, so she got to be a part of the experience too. We've been together for 16 years and we know that we were meant to be together, but going through this made us even stronger.

Which cast members do you keep in touch with now that filming is over?

Would you believe it if I said all of them? We're all in a group text. My 14-year-old daughter loves all the cute guys from the show—she'll have me FaceTime them for her friends.

Were there any great stories the viewers missed due to editing?

One of the most amazing moments I had was on day 37 of 39. Things are tense, there are only 48 hours left in the game, yet the last five of us have this moment where we're on the beach looking for an idol and I find a sea turtle nest. The babies are covered in ants and dying and we saved 22 of them that day. It was amazing. It was one of the best days of my life—despite the fact that I got voted off.

What has the reception been since you've gotten back to Florida?

It's changed my life in ways you wouldn't think. The mayor of my town had a watch party for the season finale and I've gotten an honor from the county. It's incredible. People stop me in the street every day.

How has that been for you?

I love it. It's my 15 minutes of fame and I'm going to enjoy every second of it. ***—Liz Droge-Young, PhD***

For more behind-the-scenes *intrigue and our coverage of the entire season, go to brownmedicinemagazine.org/blog/tag/survivor.*

Albert Lin '07 RES'14 F'17 joined the Southcoast Physicians Group in Fairhaven, MA, in the fall. He served as a clinical instructor and was a chief cardiology fellow at Brown. Board certified in internal medicine, he also completed advanced training in echocardiography and his boards in nuclear cardiology. His interests are advanced valvular and structural heart disease. In his free time, Albert enjoys swimming, hiking, CrossFit, and spending time with his children.

Dhvani Shah '07 joined Capital Digestive Care as a hospitalist in September and is seeing patients at Sibley Memorial Hospital in Washington, DC. She completed her internal medicine residency at Yale-New Haven Hospital and her fellowship in gastroenterology and hepatology at Montefiore Medical Center. She has published research on liver disease, esophageal disorders, and IBD. She enjoys traveling, yoga, and spending time with her family.

2012

Thomas Kim '08 is an assistant professor in the College of Medicine Department of Radiation Oncology at the University of Arkansas for Medical Sciences, where he sees patients in the Radiation Oncology Center. His research interests include breast, gynecologic, and gastrointestinal malignancies. He completed his residency at Northwestern Memorial Hospital in Chicago.

2013

Ravi D'Cruz RES'16 F'19 was selected as the incoming American Academy of Pediatrics' District I Fellow Representative for TECaN (Training and Early Career Neonatologists). He is a neonatology fellow in the Department of Pediatrics at Women & Infants Hospital.

Ayesha Nzeribe '08 and Rhys Dunnigan Hatch '08 were married September 9, 2017, at Conscience Bay Meeting House in St. James, NY. She is a fifth-year general surgery resident at Stony Brook University Hospital, and he works at Rising Sun Woodworkers in Cutchogue. They live in Selden.

Ryan Rossi '08 completed his internal medicine residency at the Roger Williams Medical Center and began practicing at Coastal Medical's Greenville, RI, office in October.

2014

Grace Price '10 completed her family medicine residency at the University of Arizona and joined the staff of the Community Health Center in Southwest Harbor, ME, in October. Her interests include family practice, prenatal care, family planning, chronic disease management, and preventive health care. As a med student fluent in Spanish, she founded Clínica Esperanza in Providence. In her free time, she loves to read, knit, and hike with her husband, Chris.

Thomas Kim is an assistant professor in the Department of Radiation Oncology at the University of Arkansas for Medical Sciences.

RESIDENTS

1984

Theodore Christopher, MD, professor and chairman of the Department of Emergency Medicine at the Sidney Kimmel Medical College of Thomas Jefferson University, is president of the Pennsylvania Medical Society. He is the past president of the Pennsylvania Chapter of the American College of Emergency Physicians, where he received the chapter's Meritorious Service Award. He also has served as a Pennsylvania delegate to the AMA for many years. A graduate of the internal medicine residency program at Brown, he lives outside of Philadelphia with his wife of 33 years, Claudia, and has three daughters.

1989

Vanessa Britto, MD, F'91 MSc'96 became the assistant vice president and executive director of health and wellness at Brown in January. She had been the director of health services for Wellesley College since 2001. She completed her internal medicine residency and a fellowship in general internal medicine at Rhode Island Hospital, and earned her master's in community health from Brown.

1990

Gary Bubly, MD, a clinical professor of emergency medicine and of medicine at the Warren Alpert Medical School and a physician with the University Emergency Medicine Foundation, is the inaugural vice chair for clinical integration and innovation in the Department of Emergency Medicine.

1991

Karen Smigel, MD, practices internal medicine at Coastal Medical in East

EYE ON ALUMNI

Fabled scrubs, designed by Olga Lemberg.

COURTESY OLGA LEMBERG

Dress for Success

A doc with a flair for design launches a line of sophisticated scrubs.

A few years out of residency, Olga Lemberg MD'08 was working an overnight shift. She entered a patient's room, introduced herself as the supervising physician, and went through her regular patient care routine. When she finished, a family member asked, "So do you know when the doctor will be stopping by? We have some questions for them."

This is not a unique scenario. A study published in the *Journal of Women's Health* found that women physicians are less likely to be addressed using their professional titles than their male colleagues, which may "amplify isolation, marginalization, and professional discomfiture expressed by women" in medicine.

More than that, for patients, "staff often blurs together from the patient's point of view—it can be tough to tell who does what just by looking at how a person is dressed," Lemberg says. Not to mention she just didn't like the pajama style of scrubs.

And so Fabled was born. In July, Lemberg launched her line of fashionable scrubs that allow women physicians to not only express their personal style, but also confer an appearance of authority.

Hailed as the "Everlane of scrubs" by *Racked*, Vox Media's style and shopping site, Fabled's togs are slim-fitting and chic, not baggy and shapeless. They're functional, too: Lemberg made sure physicians can carry everything they need, with loops and deep pockets for easy storage of keys, badges, pens, and notepads.

The two-year design process was challenging, she says. She went through dozens of prototypes before landing on a design that was just right. Sourcing fabric took over a year, because it "had to launder easily and be resistant to wrinkling, while at the same time being soft and drape well," she says.

Trying to build a business while working as both a hospitalist and urgent care pediatrician in the Bay Area was no easy feat. A lot of late nights went into Fabled: she'd come home after a day shift and spend all night working on her designs. She says her husband joked, "You wake up thinking about scrubs and go to bed thinking about scrubs!" (Since she's something of an expert at juggling multiple interests, Lemberg also writes a blog about work-life balance for health professionals, at www.thisisfabled.com/blogs/in-the-wild.)

Lemberg made sure physicians can carry everything they need, with loops and deep pockets for keys, badges, pens, and notepads.

While Lemberg doesn't have a background in business, her parents were both entrepreneurs and she credits her resourcefulness and work ethic to them. As for design, it wasn't as much of a leap as it seems; design and medicine both require a unique and creative approach to problem solving, she says.

"A physician often faces missing information, equivocal results, or frankly the unpredictability of the human body due to its complex, dynamic nature," she says. Design also requires this nonlinear thinking. It can involve "understanding a problem from various perspectives in order to gain new insights, testing multiple possible solutions at once, or even just allowing yourself to see a solution you weren't expecting to see."

Fabled is quickly gaining traction. After some prominent features in magazines like *Elle Australia*, demand for the designer scrubs is growing, Lemberg says. She hopes to offer more colors this spring, and add new styles by next year.

"Some of the most memorable feedback I receive revolves around customers telling me how often their patients and their patients' families compliment them on their scrubs," Lemberg says. "The scrubs bring my customers joy, boost morale, and give them confidence. There's not much more rewarding than that as a designer." ***—Aneeqah Naeem '20 MD'24***

Providence. Previously she was the medical director of South County Health Primary Care in Narragansett, RI. She is a clinical assistant professor of family medicine and a small group leader at the Warren Alpert Medical School.

1995

Renee Eger, MD '85, became a certified menopause practitioner after passing the certification exam last year. An assistant professor of obstetrics and gynecology, clinician educator, at the Warren Alpert Medical School, she specializes in minimally invasive gynecologic procedures, evaluation of abnormal Pap smears, and abnormal bleeding.

Russell White, MD, MPH, a clinical professor of surgery at the Warren Alpert Medical School, received the 2017 L'Chaim Prize for Outstanding Christian Medical Missionary Service. A cardiothoracic surgeon at Tenwek Hospital in Kenya, Russ treats many patients whose heart valves are scarred by rheumatic heart disease. He will use the $500,000 award to train local surgeons to repair valves, to pay for antibiotics for children with strep—which causes valve damage when untreated—and other local health concerns. Russ supervises Brown surgery residents on the four-week elective rotation at Tenwek Hospital.

Carolyn Young, MD, a clinical assistant professor of pathology and laboratory medicine at the Warren Alpert Medical School and vice president and chief medical officer of the Rhode Island Blood Center, joined the board of directors of the CharterCARE Foundation. Her research resulted in the Rhode Island Blood Center being the first in the country to accept donors with tattoos.

ALUMNI ALBUM

1999

Tracey Guthrie, MD, a clinical associate professor of psychiatry and human behavior and of medical science and the director of the General Psychiatry Residency Program at the Warren Alpert Medical School, was named the assistant dean for diversity in the Division of Biology and Medicine in November. In her role she will expand the Office of Diversity and Multicultural Affairs' outreach efforts among faculty and other constituencies.

2000

Lynn E. Taylor, MD F'05 was named a 2017 HCV Change Maker from the Economist Intelligence Unit Path to Zero Program. The HCV Change Makers recognition program celebrates the creative efforts of 18 individuals or organizations who have contributed significantly to eliminating hepatitis C. In February Lynn became director of HIV and Viral Hepatitis Services at CODAC Behavioral Health and a research professor in the Department of Pharmacy Practice at the University of Rhode Island.

2009

Keelin Garvey, MD, was appointed medical director of forensic psychiatry at InnovaTel Telepsychiatry. Previously she was statewide psychiatric medical director at the Massachusetts Partnership for Correctional Healthcare, where she provided clinical care to inmates with serious mental illness. She completed her general psychiatry residency at Brown and her forensic psychiatry fellowship at the University of California, Davis.

2014

Sara DiNardo, DMD, was awarded the 2017 Medical Staff Association Service to Patients Award. The award honors one physician who has demonstrated outstanding contributions to patients above and beyond the call of duty, including promotion of clinical knowledge, professionalism, leadership in medicine, and excellence in practice management. Sara completed the residency in oral and maxillofacial surgery at Rhode Island Hospital and is a clinical instructor in surgery at the Warren Alpert Medical School.

2017

Dennis Goulet, MD, MPH, joined the Division of Emergency Obstetrics and Gynecology at Women & Infants Hospital last fall. A graduate of the University of Washington School of Medicine, he received his MPH at Dartmouth and completed his residency at Women & Infants. His interests include minimally invasive gynecologic surgery and patient advocacy.

Oleksandr Halytskyy, MD, joined the Ozarks Medical Center in West Plains, MO, as a hospitalist. He earned his medical degree from Jagiellonian University Medical College in Poland and was chief medical resident in the internal medicine program at Memorial Hospital of Rhode Island.

Matthew W. G. Propert, MD, practices internal medicine at Coastal Medical in East Providence. He completed his residency at Rhode Island Hospital, The Miriam Hospital, and Providence VA Medical Center. He likes to play soccer, hike, and spend time with his family.

Heather Rybasack, MD, MPH, F'18, began serving as the deputy medical director to the Cumberland Rescue Service in the fall. An emergency medical service fellow at Brown, she provides medical oversight for the service and responds to emergency calls. A graduate of Case Western Reserve University School of Medicine and the Boston University School of Public Health, Heather completed her emergency medicine residency at Rhode Island Hospital.

Russell White, a cardiothoracic surgeon in Kenya, received the 2017 L'Chaim Prize for Outstanding Christian Medical Missionary Service.

2018

Marcos Lepe, MD, an anatomic and clinical pathology resident, received the 2017 Resident of the Year Award from the College of American Pathologists in October. He tweets @marcoslepe and he's the social media section editor for the *Archives of Pathology & Laboratory Medicine*. He'll begin a fellowship in cytopathology at Penn later this year.

2019

Dominic Decker, MD, MS, married John Pierce on September 30 at the First Unitarian Church in Providence. Dominic is an internal medicine resident at Rhode Island Hospital. He earned his master's degree in narrative medicine at Columbia and his medical degree at the University of Minnesota. John is a planner for MASCO (Medical Academic and Scientific Community Organization) in

Boston. The couple met as undergrads at the Catholic University of America.

FELLOWS

1995

Rajen P. Oza, MD, a hematologist/oncologist, joined the medical staff of Geisinger Community Medical Center's Cancer Center in Scranton, PA. He earned his medical degree from Government Medical College, India, and completed a three-year fellowship in hematology/oncology at Brown/Roger Williams Medical Center.

2007

Eda Cengiz, MD, MHS, was named an inaugural member of Arecor's Global Diabetes Scientific Advisory Board. An associate professor of pediatrics (endocrinology) at the Yale School of Medicine, she completed her fellowship in pediatric endocrinology and metabolism at Brown/Hasbro Children's Hospital. Eda is an elected board member of the International Society for Paediatric and Adolescent Diabetes.

2013

Rabih El-Bizri, MD, is a pulmonologist at Elmhurst Rehabilitation & Healthcare Center in Providence. He is affiliated with Roger Williams Medical Center and was a clinical assistant professor of medicine at the Warren Alpert Medical School. He received his medical degree from Lebanese University in Beirut.

2016

Laura Amorese-O'Connell, MD, a rheumatologist, joined Harrington Physician Services in Southbridge, MA, in August. A native of Venezuela, she earned her MD at Zulia University School of Medicine in Maracaibo and completed her rheumatology clinical research fellowship at the Warren Alpert Medical School. She is a clinician educator in the Department of Rheumatology at the Providence VA Medical Center.

2017

Jared Fridley, MD, is a neurosurgeon at the Comprehensive Spine Center at Rhode Island and Newport hospitals. He specializes in complex spine surgery, degenerative spine disease, spinal trauma, tumors, and peripheral nerve surgery, and researches spine surgery outcomes and spinal cord injury. Jared is an assistant professor and the director of the Spine Surgery Outcomes Laboratory at the Warren Alpert Medical School.

OBITUARY

FACULTY

MARTIN E. FELDER, MD '52

Martin Felder

Martin Felder, 87, died December 31, 2017, in Carlsbad, CA. Born and raised in Fall River, MA, he graduated from Brown in 1952 and from Tufts University School of Medicine in 1956. After internship and residency in surgery at The Ohio State University he joined the US Public Health Service, completing his service as a lieutenant commander.

Dr. Felder started his private practice in Providence in 1963, and was instrumental in the development of Brown's medical school. He served as chief of general surgery at The Miriam Hospital and was a member of numerous medical societies, including the New England Surgical Society. He was actively involved in medical education and was awarded the rank of emeritus professor of surgery upon retirement in 2003.

Marlene Cutitar '83 MD'86 RES'92 trained under Dr. Felder and says that his legacy will live on at Brown. "His devotion to his family, his friends, the craft of surgery, his patients, the surgical education of medical students, surgical residents, colleagues, and The Miriam Hospital were unparalleled," she says.

He was a Silver Life Master in duplicate bridge, a collector and connoisseur of fine wines, and an avid golfer.

Dr. Felder is survived by his wife, Velma Felder; two sons, Mark of Laveen, AZ, and Lawrence of Scottsdale, AZ; four grandchildren; and one sister.

Per his wishes, donations in Dr. Felder's memory may be made to the public library of your choice.

COURTESY LARRY FELDER

IMPRESSION

What the Brain Saw

"P01R" is one of the paintings by artist China Blue on view at the Warren Alpert Medical School until March 6. The exhibit, called The Brain's Eyes, is the culmination of her two years as artist-in-residence at the Norman Prince Neurosciences Institute at Rhode Island Hospital. The works explore the concept that there is no place in the human brain that does not respond to visual stimuli. In her artist statement, Blue writes, "Humans are visual creatures, with our eyes as the gateways that let us not only see art but explore its supravisual (beyond vision) elements to form and manipulate a mental model of something that is greater than the sum of its objective visual sensations." Paintings like this one translate the literal data found in the brain scans of patients into imaginative representations of complex neural networks. Blue also collaborated with neuroscientist Peter Snyder, PhD, to make 3-D prints of the images he collected for his study of the human retina's microvasculature. ***—Kris Cambra***

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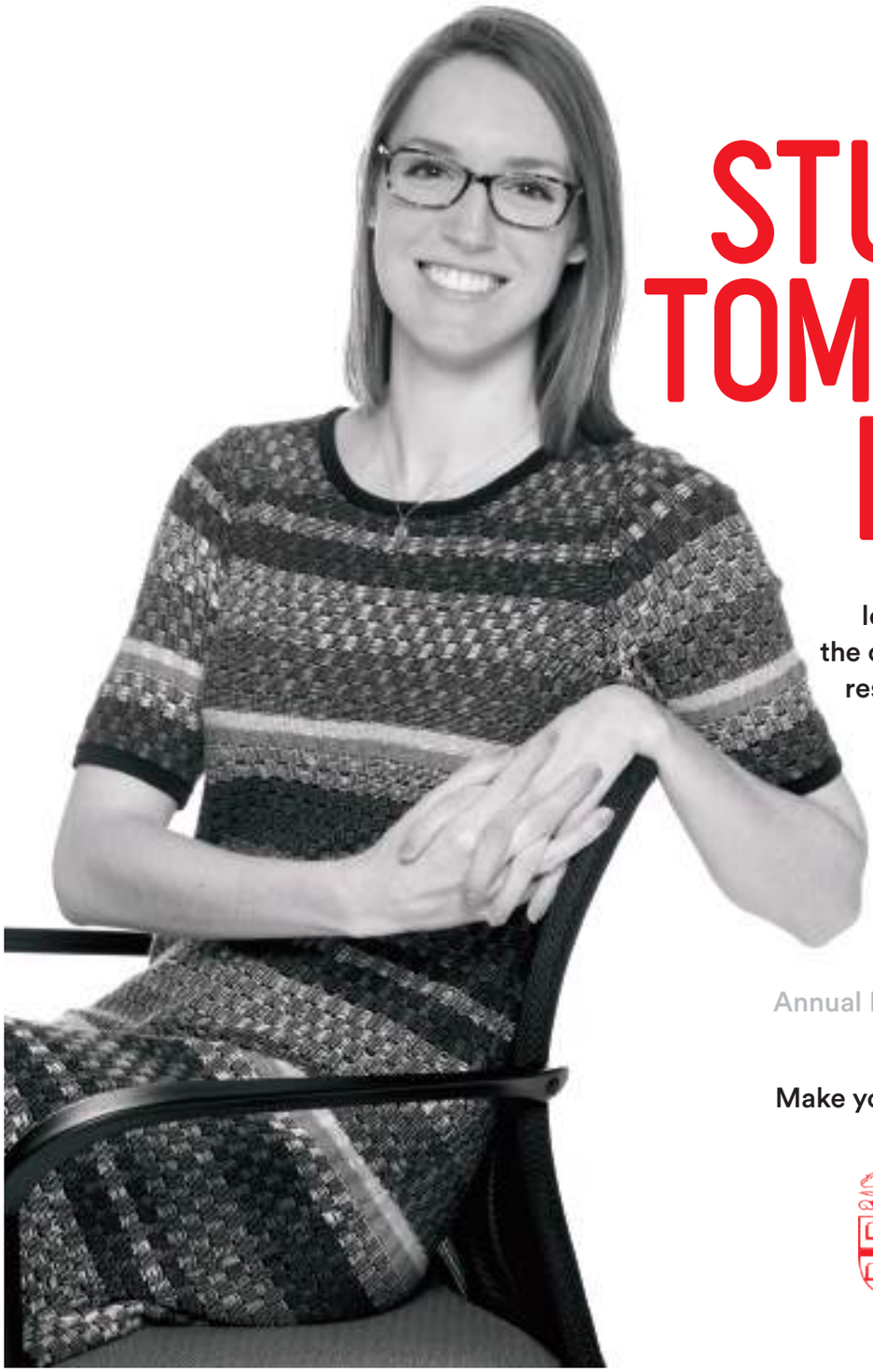

TODAY'S STUDENTS/ TOMORROW'S DOCTORS

"I'm extremely grateful for the diverse learning experiences I've had outside of the classroom. The opportunity to conduct research, engage with Providence youth, and serve my home community have defined my time as a Warren Alpert medical student. The BMAF makes this possible."
—Margaret "Margie" Thorsen '15 MD'19

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BROWN TOGETHER