FINDING MENTAL DISORDERS WITH MATH
AMAZONIAN STARS | Charles Harless 17MPH was one of the winners of the Global Health Institute Student Photography Contest. He writes of this photo: A malaria research hut exudes light as the Milky Way shines beautifully in the clear Amazonian night sky. In a region of the Amazon Basin classified by the national government as the “deep Amazon,” indigenous villages are small and spread out and lack running water and electricity. This makes studying the rampant malaria in the region exceedingly difficult. In order to conduct its ongoing research, the Peruvian Institute for Infectious Diseases brings a small electrical generator to power their devices. Additionally, a simple light microscope used to diagnose malaria strains is illuminated by a single standard headlamp within the hut seen in this picture.

Challenges of studying malaria in the Amazon
FEATURES

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DEAN’S MESSAGE 4

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AUN LOR 97MPH

The recipient in 2002 of the first Matthew Girvin Service Award for early leadership in public health, Aun Lor has dedicated his life to public health, human rights, and ethics.

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YING GUO

Ying Guo and her colleagues in the Center for Biomedical Imaging Statistics collaborate with researchers, many from the school of medicine, who are trying to understand the underlying brain anomalies of mental disorders. Illustration by Mario Wagner.
Our continuing commitment

As we move into the shifting policies and priorities that come with a new administration in Washington, D.C., it seems a good time to reaffirm our commitment to our mission of promoting health, preventing disease, and reducing disparities at home and around the globe. We advance that mission through conducting rigorous research that informs policy and interventions and through educating the next generation of public health leaders. We continue to view the work of public health as vital to the well-being of the global population.

Our commitment to advancing the science of public health is unwavering, as evidenced by the work being done in our Center for Biomedical Imaging Statistics. Biostatisticians in the center develop the statistical tools that enable researchers to analyze the vast and complex data from today’s sophisticated brain scans. These tools have allowed researchers to identify biomarkers of depression and other mood disorders and predict treatment outcomes, thus helping to reduce human suffering.

When you view health as a basic human right, as we do at Rollins, you are compelled to work to reduce disparities. Rollins diabetes researchers address this on several fronts. Diabetes affects all countries, but the poorest countries and individuals are least able to cope. Our researchers are seeing how well interventions that have proven successful in the U.S. translate into low-resource settings. Closer to home, our researchers are heading a newly established diabetes translation research center. One of the goals of the new center is to find ways to reduce the disparities in our own back yard, where younger, less affluent minorities with diabetes routinely fare much worse than their older, more affluent, white counterparts.

Rollins researchers are tackling a leading health risk factor of which most of us in the U.S. are totally unaware—indoor air pollution. The wood, dung, or crude charcoal burning cookstoves used in many homes across the globe blacken the lungs as well as the walls. Rollins is leading a five-year, $30 million study on the impact of cleaner stoves and fuels.

As much as we enjoy touting our research, educating tomorrow’s public health researchers and practitioners is arguably our highest calling. We are honored that Deborah McFarland, associate professor of global health, was recognized with the 2017 ASPPH Teaching Excellence Award. Deb joins five other Rollins faculty who have been honored with ASPPH teaching awards in previous years. Our contribution in training tomorrow’s public health leaders has perhaps never been more important.

Enjoy this issue of Rollins magazine and remain strong in your faith in the importance of the work that you do.

James W. Curran, MD, MPH
James W. Curran Dean of Public Health
The climate-health connection

Rollins faculty are part of a team that has received an award of $25,000 from General Electric to fight obesity, diabetes, and other diet-related diseases.

The Southwest Atlanta Coalition for Healthy Living aims to improve health outcomes by linking services at the HEALing Community Center, founded by Emory/Grady physician Charles Moore, with nutrition and healthy eating programs at the Wayfield Foods store on MLK Drive in southwest Atlanta.

The coalition will train Wayfield employees on healthy eating and food preparation. These "health ambassadors" will assist shoppers with making healthier food purchases, linking them with other in-store programs, and providing information on services at the HEALing Community Center. The center will provide nutrition prescriptions for healthy foods to patients.

Representatives from Rollins will support the process through training health ambassadors and evaluating the program. Southwest Atlanta is one of the city’s most under-resourced areas. More than half of the community’s population lives below the poverty line and 98 percent of its children qualify for free or reduced lunches.

Collaborating to combat diet-related disease

Rollins researchers will soon take their research into orbit, partnering with the National Aeronautics and Space Administration (NASA) in a new satellite mission to study air pollution.

NASA chose Rollins as a joint recipient of its $100 million award—$2.3 million of which will come to Rollins—to study the effects of air pollution on the population through a satellite mission, according to Yang Liu, associate professor of environmental health. He noted that this is the first time a NASA space mission has incorporated a public health component.

“We’re the scientific guinea pig,” Liu said.

The Rollins research group, led by Liu, co-created the project idea with NASA’s Jet Propulsion Laboratory (JPL). The mission will construct and use a Multi-Angle Imager for Aerosols (MAIA) device to record airborne particulate matter, which will collect data on the effects of pollution on public health from at least 10 locations with major metropolitan areas.

Once constructed by JPL, the MAIA device will be mounted on a compatible Earth-orbiting satellite. “Even though it’s a small mission, it’s actually the first of its kind in which we get to work with NASA engineers to build public health into the DNA of this instrument,” Liu said.

The Rollins team will analyze the data to make predictions about public health issues such as birth outcomes and cardiovascular disease. The team will also serve as the public health liaison between JPL and other institutions in the complete research group. Recruited by Liu, the complete group has teams at University of California, Los Angeles, Harvard University, University of British Columbia, and University of Dalhouse.

Because the device will orbit via satellite, it will provide a more holistic view of air pollution data than the commonly used ground monitors.

“It’s very difficult to cross to a completely different scientific community and convince them that this mission is not only worthwhile but also feasible,” Liu said. “Hopefully, Emory will make a mark in NASA history.”

To boldly go where public health hasn’t gone before

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ELEVEN EMORY FACULTY WERE AMONG THE 300 ATTENDEES OF THE RECENT CLIMATE AND HEALTH CONFERENCE LED BY FORMER VICE PRESIDENT AL GORE AT THE CARTER CENTER. GORE SAID MORE ATTENTION NEEDS TO BE PAID TO THE HEALTH CONSEQUENCES OF CLIMATE CHANGE.

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CLIFTON NOTES

K.M. Venkat Narayan has been elected to the National Academy of Medicine. Election to the NAM is considered one of the highest honors in the fields of health and medicine and recognizes individuals who have demonstrated outstanding professional achievement and commitment to service. Narayan, the Ruth and O.C. Hubert Professor of Global Health in the Hubert Department of Global Health and director of the Emory Global Diabetes Research Center, is one of the world’s leading researchers on type 2 diabetes.

Prior to joining Rollins, Narayan spent 10 years at the Centers for Disease Control and Prevention, leading science efforts in his role as chief of the diabetes epidemiology and statistics branch. He was also an intramural researcher at the National Institute of Diabetes and Digestive and Kidney Diseases and worked on the first diet-exercise intervention study in the Pima Indians.

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Role of person-to-person spread in drug-resistant TB epidemic

South Africa is experiencing a widespread epidemic of drug-resistant tuberculosis (XDR TB), the deadliest form of TB. Person-to-person transmission, not just inadequate treatment, is driving the spread of the disease, according to a study published in The New England Journal of Medicine and written by Neel Gandhi, associate professor of epidemiology and global health.

The study identified numerous opportunities for transmission not only in hospitals, but also in community settings, such as households and workplaces. This has important implications for efforts to prevent the disease, which have traditionally focused on ensuring that patients receive accurate and complete TB treatment.

“These findings provide insight as to why this epidemic continues despite interventions to improve TB treatment over the past decade. Public health and research efforts must focus more intensely on identifying and implementing additional or new interventions that halt transmission,” says Gandhi.

Drug-resistant TB is a significant global epidemic. Reported in 105 countries, XDR TB is resistant to at least four of the key anti-TB drugs. In most settings, treatment is effective less than 40 percent of the time, with death rates as high as 80 percent for patients who also have HIV.

Conference confronts South’s opioid epidemic

The opioid epidemic that is ravaging the country is hitting some areas of the South particularly hard. The region is experiencing dramatic increases in rates of overdoses, hepatitis C, and neonatal abstinence syndrome. Concerns about possible future trajectories for the Southern epidemic are high because the region has historically invested less in its public health and drug treatment infrastructure than other regions.

To begin to address the epidemic, Rollins hosted a two-day conference, “The Southern Opioid Epidemic: Crafting an Effective Public Health Response” Organized by Hannah Cooper, with colleagues from New York University, Vanderbilt, and the University of Arkansas, the conference drew academic researchers, state and municipal health department scientists, and leaders from multiple federal agencies, including NIH, CDC, and the National Institute on Drug Abuse. The goal was to foster collaborations on research and interventions. “People are already starting to put together proposals that grew out of the conference,” says Cooper, associate professor and vice chair in behavioral sciences and health education. “We will continue to check in with the working groups that have formed and see how we can support them going forward.”

Investigators also connected with funders, gaining valuable insight into their priorities. Although there is uncertainty about public health spending under the new administration, federal funders at the conference were eager to support researchers’ efforts. “There is actually bipartisan support for addressing the opioid epidemic as a public health crisis now,” says Cooper. “That’s partially because the opioid epidemic is hitting areas that have historically voted Republican—Southern and rural counties.”

Funding for the conference came from the Emory Conference Center Subvention Fund, which is awarded by the university’s Center for Faculty Development and Excellence.

Study determines how long Zika remains in body fluids

The Zika virus remains in semen longer than it does in blood, urine, and other body fluids, according to a recent study published in The New England Journal of Medicine. The study, led by the CDC and including Rollins researchers, looked at men and women in Puerto Rico who were infected with Zika. Half of the participants had detectable virus particles in semen one month after the start of symptoms and 5 percent after three months. By comparison, half had Zika in their blood after 14 days and 5 percent at 54 days. In urine specimens, half of the participants had virus particles at eight days and 5 percent at 39 days. Regarding vaginal fluids and saliva, Zika virus particles were largely undetectable after one week.

“The findings of this study are important for both diagnostic and prevention purposes,” says Eli Rosenberg, assistant professor of epidemiology and scientific co-investigator of the study.

| BY THE NUMBERS |
| The amount of prescription opioids sold in the U.S. nearly quadrupled since 1999. —CDC |
| 12 states have more opioid prescriptions than people. 7 of these are in the South—Alabama, Kentucky, Louisiana, Mississippi, South Carolina, Tennessee, West Virginia. —CDC |
| 33,091 Americans died from drug overdoses in 2015. —CDC |
| $55 billion in health and social costs are related to prescription opioid abuse each year. —U.S. Department of Health and Human Services |

“Creating the Healthiest Nation: Climate Changes Health”

American Public Health Association’s 2017 annual meeting will be in Atlanta

Save the Date | NOV 4 – 8, 2017

CLIFTON NOTES
Mapping HIV by state, country, metro

The South is generally known as a hot zone for HIV/AIDS, but a recent study by Eli Rosenberg, assistant professor of epidemiology, breaks down for the first time HIV rates for men who have sex with men (MSM) by state, county, and metropolitan area. The cities with the highest rates included Columbia, S.C.; El Paso, Texas; and Jackson, Miss. In these cities, more than 25 percent of MSM had been diagnosed with HIV, as compared with the national average of 15 percent.

“This is really the first time we’ve been able to examine the HIV infection burden at such fine levels of geography,” says Rosenberg.

His study found that six states exceeded the national average of MSM diagnosed with HIV in 2012—and all of them were in the South. Of the top 25 metro areas in terms of prevalence, 21 were south of the Ohio River. Why the high concentration in the South?

Although Rosenberg’s study is purely epidemiologic, he says that the research naturally leads to some educated guesses about the reasons behind the trend. It could be that the South is, by and large, poorer and more rural, with worse public transit and less access to adequate testing or care than other parts of the country. Then there is the cultural and religious bias that abounds in the region—the stigma attached to homosexuality, HIV/AIDS, and race. The next step, Rosenberg says, is to incorporate other data resources that would break the map down further—by age, education, poverty, and race.

Prevalence of HIV diagnoses among men who have sex with men (MSM) per 100 MSM, by U.S. states and District of Columbia, 2012.

Students launch advocacy series

On a bright, unseasonably warm late February afternoon, dozens of Rollins students passed up the opportunity to sit in the sun or share a laugh with friends. Instead, they gathered in a classroom to listen to a representative from the Georgia legislature give tips about how to lobby effectively.

“In this political climate, I feel like it’s important for me to learn how to advocate for issues that are important to me,” says Anna Shao 18BMPH, who attended the event.

The seminar, “Lobbying 101,” was the second event in the student-led Rollins Advocacy Series. The series grew from student concern after the presidential election. After being approached several times by students looking for opportunities to learn advocacy skills, Rollins Student Government Association president Tina Mensa-Kwao 18MPH reached out to the leaders of the other Rollins student organizations. Together, they cobbled together the series, which kicked off in mid February with a seminar titled “What is Advocacy?”

Several other events are scheduled, each organized by a different student organization. Topics include environmental justice, advocacy in public health emergencies, and the local legislative process. The series also includes an effort every Thursday during lunch called “Tabling for Change.” A table is manned by a student who encourages fellow students to call their representatives. Sample scripts on various topics related to public health are available, along with a list of all state representatives and their phone numbers.

“I am thrilled the students are organizing these workshops,” says Karen Andes, assistant professor of global health, who spoke at the first seminar. “They are asking the same questions that many of us are right now—what can we do?”

The series will run through the end of the semester, and then Mensa-Kwao and other student leaders will see if there is demand to continue it.

McFarland honored for teaching excellence

Deborah McFarland, associate professor of global health, was awarded the 2017 ASPPH Teaching Excellence Award. The Association of Schools and Programs of Public Health, in conjunction with Pfizer Inc., gives awards to graduate public health faculty who are noted for their excellence in teaching, research, and mentorship. McFarland is the 10th Rollins faculty member to garner an ASPHPH award, six of which (including McFarland) are for excellence in teaching. Rollins faculty have also been recognized for public health practice, research, and student services.
In the years since I began working in this field, diabetes has grown to become one of the biggest public health threats we face,” says Narayan, Ruth and O.C. Hubert Professor of Global Health. “The spread of some of the ills of a modern lifestyle—sedentary behaviors, a diet of processed and unhealthy foods, and an increase in obesity—has made diabetes a worldwide crisis. And at least in its most common form, it is substantially preventable."

Narayan and his team of researchers in the Emory Global Diabetes Research Center are looking at what needs to be done to reach a world free of diabetes.

First-world problems
In the U.S. and other high-income countries, diabetes is a good news, bad news scenario. On one hand, people who have diabetes today fare better than they did 20 years ago. They are living longer and suffering fewer complications, such as heart disease, kidney disease, amputations, strokes, and blindness. On the other hand, more people are developing diabetes than experts even projected, with some 29 million people in the U.S. living with the disease today. One in four people with diabetes remains unaware and almost 90 percent with prediabetes don’t know their blood sugar is elevated. And the drop in complications is not enjoyed equally. Minorities, people with low incomes, and younger adults tend to suffer more than their white, affluent, and older counterparts.

"We have gotten very good at caring for and controlling..."
Changing HIV risk behavior was pretty challenging, but sexual behavior is episodic. However, you eat meals three times a day, so you have more opportunities to succeed or fail each day.

- Ralph DiClemente

Mohammed Ali, left, and Ralph DiClemente collaborate in the translation research center. K.M. Venkat Narayan, right, heads the Emory Global Diabetes Research Center.

Burden in low-income countries

Despite the great strides in treating diabetes in high-income countries, much about the disease in low- to middle-income countries remains a mystery. Can interventions that have been proven effective in places like the U.S. be successfully translated in poorer countries? Why are thinner and younger people in some countries developing diabetes, and how does this form of the disease differ from the more common type that occurs in overweight people?

The gap in knowledge has a straightforward explanation. About 75 percent of the burden of diabetes is borne in low- and middle-income countries, but more than 95 percent of the research is being conducted in high-income countries. Narayan and his team have been working to build up the research base in low- and middle-income countries, particularly in India and Pakistan.

Mary Beth Weber, assistant professor of global health, partnered with the Madras Diabetes Research Foundation in Chennai, India, on a study that showed the interventions that have proven successful in the U.S. and elsewhere in preventing prediabetes from advancing to diabetes can work as well in India in some segments of the population. After three years, the study group that got the recommended intervention—lifestyle education plus the glucose-lowering drug metformin if needed—was 30 percent less likely to develop diabetes than the control group.

Weber is now planning an implementation study to see if this type of diabetes prevention program can be implemented at worksites in India. She and her team are modifying the educational curriculum and training peer educators in HIV to provide the interventions where they might have the most impact.
Some participants, however, did not respond as well to Weber’s intervention, and this group seems to represent a different phenotype of the disease. These people were thinner—some with BMIs as low as 18.5—and younger than the typical person with type 2 diabetes, and their disease characteristics were different from those in obesity-related type 2 diabetes.

Classically, in type 2 diabetes, the pancreas beta cells initially have no problem producing insulin. The trouble is that the body’s cells become resistant and thus there is a problem regulating glucose, which builds up in the blood. Over years, the beta cells become exhausted as they have to work hard to produce more insulin to regulate higher glucose levels, and then they begin to fail. This type of diabetes, generally associated with obesity, responds well to weight loss interventions and metformin.

However, when Weber and Lisa Staimez, assistant professor of global health, looked at blood samples of Asian Indians with prediabetes, they found that there had already been dramatic change in their beta cell function. “This suggests that poor beta cell function might happen much earlier in this group as compared with those with typical type 2 diabetes,” says Staimez. “But we don’t know why.”

Some hypothesize that this early beta cell dysfunction may stem from historic undernutrition. Their bodies may be programmed by food scarcity to store fat differently and perhaps secrete less insulin. Indeed, thin Asian people actually have more body fat than a similarly sized person in the U.S., but in Asian individuals fat is stored around organs. This type of fat storage has been linked to higher risk for cardiometabolic diseases like diabetes.

This thin group does not respond well to traditional interventions, such as weight loss. “In the other groups, you are trying to improve insulin’s action, whereas here you might have to improve insulin secretion, which we don’t know how to do yet,” says Narayan. “There is a huge gap in the research in this form of diabetes.”

Staimez is starting one study on this group. She wants to know the impact on the child of a mother who is underweight or malnourished. She will look at infants of both normal weight and underweight mothers and compare their beta cell function at six months of age. “Understanding the way type 2 diabetes develops in this group could lead to some really innovative pharmacologic and lifestyle interventions,” says Staimez. “By understanding early life factors, this study may provide new insight on how to globally improve the worsening reality of diabetes.”

Just do it
If you want to prevent diabetes, which is better—popping a pill or jogging around the park? A hint—it’s the path of most resistance. “People who are at high risk for developing diabetes can reduce their risk by about 30 percent by taking metformin, the current gold standard medication. However, they can cut their risk by about 58 percent with 150 minutes of brisk walking per week in combination with diet changes.”

“We know the best intervention is lifestyle, but it’s been difficult to standardize it,” says Felipe Lobelo, associate professor of global health. “Doctors routinely prescribe metformin but not enough prescribe exercise, partially because it is typically not a covered benefit.”

He is working to change that as director of the Exercise is Medicine (EIM) Global Research Collaboration Center. The center, a partnership between the American College of Sports Medicine and Rollins, is the academic hub in charge of evaluating the EIM initiative, in collaboration with partnering health care systems, community organizations, and fitness and technology companies.

The center recently hosted a conference and “think tank” focusing on developing standards for wearable devices, such as Fitbit and Garmin, so they can be better integrated into health care delivery. “We looked into developing standards regarding the validity and value of devices’ measurement of physical activity, a minimal standard for appropriate behavior change strategies, and a standard for integration so that it can be easily transmitted to a physician or health care professional in a way that is clinically useful,” says Lobelo. “The conference was a first step. A working group will compile the findings and continue working toward developing these standards.”

Lobelo is also launching a pilot project in collaboration with Sharon Bergquist at the Emory Clinic. The clinic will integrate physical activity as a vital sign in the electronic medical record. Patients who say they are inactive will be given a printed exercise prescription, educational material, and the option of downloading an app that will allow them to share physical activity data with the clinic.

In the second phase of the project, the group will select 50 to 100 inactive patients with at least one cardiovascular risk factor and give them each a wearable activity monitor, along with a list of vetted community programs and places that offer safe physical activity options. For 12 weeks, patients’ activity data will be monitored and a system of personalized messages implemented to help them achieve and sustain behavior change. The group will follow them for another 12 weeks to see if they stick with any exercise program they adopted.

Lobelo recently finished a similar program with 230 hypertensive patients served by Mexico’s Social Security System primary care clinics. The study demonstrated that the EIM model linking counseling by the health care provider and referral to community exercise programs was effective in improving patients’ physical activity levels.

“We’ll see how much this group of Emory patients with the access to the wearable devices and messaging system increases their physical activity and if their health outcomes improve as a result,” says Lobelo. “This is a proof of concept project intended to show that this is feasible to do at Emory and other U.S. health care systems without a lot of resources, and then we’ll try to refine and roll it out on a bigger scale. Hopefully five years from now, every time you interact with your primary care physician, he or she will have information about your physical activity and incorporate that into your care.”

Lisa Staimez, far left, and Mary Beth Weber, middle, are studying diabetes in India. Felipe Lobelo, below, is working to incorporate exercise into health care.
FINDING MENTAL DISORDERS WITH MATH

The Center for Biomedical Imaging Statistics develops the complex analytical tools that allow brain scans to be interpreted

By Martha McKenzie • Illustrations by Mario Wagner

What if a brain scan could detect the presence of a mental disorder even before symptoms have emerged? Or predict which depressed patients would respond to a particular medication and which would not? Or determine the likely rate of progression of Alzheimer’s?

Ying Guo is working to transform such aspirations into reality using math. Really, really sophisticated math. Guo is director of the Center for Biomedical Imaging Statistics (CBIS). CBIS drives research and ultimately clinical practice by developing specialized statistical techniques tailored for data collected through biomedical imaging studies. The center includes another core faculty member—Suprateek Kundu—several affiliate faculty members, an application developer, postdoc fellows, and doctoral students in biostatistics.

The center often collaborates with researchers, many from the school of medicine, who are trying to find the underlying brain anomalies of mental disorders, drug cravings, and other mysteries of the mind. Guo and her team at the center provide the necessary mathematical muscle, devising the statistical models that can take in the vast, cacophonous universe of data produced by today’s sophisticated scanning technologies—sMRIs, fMRIs, and DW-MRIs—and pull out the meaningful tidbits of information.

“Imaging technology is changing so rapidly, which means the tools used to analyze it must change rapidly as well,” says Lance Waller, chair of the biostatistics and bioinformatics department. “Ying is part of an initial generation of statisticians focusing on this. She is collaborating hand-in-hand with...”
IMAGING TECHNOLOGIES 101

- **Structural magnetic resonance imaging (sMRI)** shows the tissue types across the brain.

- **Functional MRI (fMRI)** show changes in the neural activity level of different gray matter areas of the brain.

- **Diffusion MRI (DW-MRI)** shows the white fiber structural connections of the brain, or the wiring that connects various gray matter regions of the brain.

### Stress in the city

Tanja Jovanovic is assistant professor of psychiatry and director of the Grady Trauma Project, which studies PTSD in a civilian, inner-city population. Guo and her colleagues, Amita Manatunga and Limin Peng, work with Jovanovic on several studies involving brain imaging and PTSD.

In one study, Jovanovic used Guo’s models to validate previous findings. Earlier studies had linked a PTSD patient’s difficulty in controlling fear and anxiety with less activation in the control region of the brain (frontal and prefrontal cortex) and weaker connectivity between the emotional region (amygdala) and the control region. However, traditional statistical approaches to analyzing brain scans are often difficult to replicate, so there is less certainty that abnormalities discovered were, in fact, linked to PTSD versus being random.

“Ying’s stringent statistical models allow us to have more confidence in our findings,” says Jovanovic.

In another project, Jovanovic and Guo’s team are trying to develop brain imaging biomarkers associated with different PTSD symptoms, such as avoidance, numbing, and hyperarousal. “If we are able to find such biomarkers, treatments might be able to be better tailored to meet the specific needs of patients,” says Guo.

### Predicting Alzheimer’s progression

Often called the “long goodbye,” Alzheimer’s disease afflicts more than 5 million people in the U.S. Guo used fMRI data from the Alzheimer’s Disease Neuroimaging Initiative to track how brain connectivity changes over time. She compared brain images from people with Alzheimer’s, those with mild cognitive impairment, and those in a normal control group at baseline, six months, and 12 months. She was able to identify connectivity decreases between the sensorimotor and auditory networks and also between the default mode and auditory networks among the Alzheimer’s patients.

Guo and her team used those findings to build a predictive algorithm that can help forecast the rate of connectivity decline among various brain regions. “Our model takes into account each subject’s unique brain features, so it is individualized for each patient,” says Guo. “This tool could help forecast the progression of the disease, which could be useful in treatment planning.”

In another project, Jovanovic and Guo’s team are trying to develop brain imaging biomarkers associated with different PTSD symptoms, such as avoidance, numbing, and hyperarousal. “If we are able to find such biomarkers, treatments might be able to be better tailored to meet the specific needs of patients,” says Guo.

### Merging disparate data

In recent years, researchers have started using multiple types of neuroimaging—sMRI, fMRI, DW-MRI—in an attempt to get a more complete picture of a mental disorder. Traditionally, each separate type of scan required a separate analytical tool to parse the data, but mental disorders are not so neatly contained.

“A mental disorder may impact the brain in different ways,” says Guo. “It may affect functions, but it may also affect structural and anatomical aspects of the brain. If we could combine the information from more than one type of scan, it would have the potential to reveal so much more.”

“Toward this end, Guo and her colleague Jian Kang are working to develop a novel statistical tool that can analyze more than one type of scan, or in biostatistical parlance, multi-modality imaging. Then those scans could be jointly analyzed on that unified platform, something akin to the overhead projectors of old, where one transparency showing the body’s muscular system, for example, might be laid on top of one showing the skeletal system, resulting in a single image depicting the relationship of the two.”

Guo is using scans from the rich imaging database of Emory neurologist Helen Mayberg, who has been studying brain-based subtypes of depression for many years, to test the new analytical tool. “Studying the brain is not linear or straightforward,” says Mayberg. “My group has a lot of well-characterized data, and Ying is able to use that to develop unique statistical tools. In turn, those tools may allow our data to go to the next level and to say more than we originally anticipated.”

Guo also is working with Ki Sueng Choi in Mayberg’s lab to see if they can use multi-modality imaging to identify biomarkers for different stages of depression and to predict how well patients will respond to particular treatments.

“Innovative forms of scanning data have great promise, but they need equally innovative analytic tools to deliver on that promise,” says Waller. “Ying’s research aims to, and does, provide those tools.”
Whenever Thomas Clasen visits Ethiopia, India, or any of the other low-income countries where he often works on water and sanitation research, the same disturbing scene plays out again and again. Local research participants invite him into their home, and upon entering he is engulfed in thick, acrid smoke.

“People mainly use wood, dung, or crude charcoal-fuel stoves in homes,” says Clasen, the Rose Salamone Gangarosa Chair in Sanitation and Safe Water. “The smoke bellows out. Their walls and ceilings are caked with black soot.”

For Clasen, those blackened walls and ceilings were a message that his research on household-level environmental health hadn’t gone far enough. “Even though I was confident that water and sanitation interventions were important, it became very clear to me that there were other environmental exposures that were potentially more important than the ones I was there to address,” says Clasen.
In 2014, Clasen had an opportunity to expand his research to household air pollution by conducting a large randomized controlled trial in Rwanda that combined water filters with improved cookstoves. The work clearly struck a chord with funders. Now Clasen and an international team of researchers are embarking on a $30 million, five-year, randomized, controlled field trial to study the impact of cleaner cooking stoves and fuels on public health. The multi-country study is funded through the National Institutes of Health with support from the Bill & Melinda Gates Foundation.

“Indoor pollution is among the leading risk factors contributing to the global burden of disease,” says Clasen, who is a principal investigator for the study. “A low-cost, clean-energy stove intervention could really make a difference.”

An estimated 3 billion people around the world cook and heat homes with traditional stoves or open fires that use coal, wood, or animal dung as fuel. Clasen knows that the ubiquitous black soot from these fuels sources doesn’t just get on the walls and ceilings. Particulates end up in lungs, increasing the risk of pneumonia, the leading killer of young children.

Evidence suggests that household air pollution contributes to low birth weight and stunted growth, as well as increases in the risk for cardiovascular and other longer-term diseases in adults, such as chronic obstructive pulmonary disease (COPD). Ultimately, that fine particulate matter can be blamed for 4.3 million premature deaths annually around the world. That makes this preventable condition one of the 10 leading risk factors for morbidity and mortality worldwide.

In 2014, the World Health Organization initiated standards for allowable indoor air pollution, setting a standard of 10 micrograms of fine particulate per meter cubed. Compare that with the present-day and commonplace situation that Clasen encounters. “We consistently see 200-500 micrograms per meter cubed, often we see 10 times that,” says Clasen. “That means we have to make a very dramatic reduction in exposure levels to reach the WHO targets.”

If the problem of household air pollution is massive in scope, so too is this new research trial. Over a 30-month period beginning in 2017, international teams of researchers from 16 collaborating institutions will recruit 800 households to participate in each of four countries: Peru, Guatemala, India, and Rwanda. All households will include a pregnant woman so that researchers can assess the impact of air pollution on growing fetuses and infants. An older adult woman will also be enrolled from a quarter of the households to assess effects in adults.

At the heart of the study is a hypothesis that switching away from fuels like wood, coal, and dung to a lower-emitting liquefied petroleum gas for fuel may significantly decrease household air pollution. That marks a shift in direction for the public health community, which has long worked to encourage the use of improved biomass cookstoves—stoves that used the same fuels but required less of them.

Study co-investigator Kyle Steenland is a professor of environmental health and epidemiology at Rollins. “It’s very exciting because no one has done a randomized trial to see whether lowering exposure to indoor pollution via a gas stove intervention can have significant protective effects on a variety of outcomes, including pneumonia, birth weight, stunting, and serious cardiovascular outcomes like blood pressure,” he says.

Still, the scale of the study presents many practical challenges to researchers. How do you bring stoves and enough gas to remote households and then provide information and education so that family members will set aside their old stoves and fuel sources? “Even though these stoves are beginning to be distributed into these lower income settings, they are still largely new,” says Clasen. “There’s a big challenge getting these people to use the new stoves as exclusively as possible,” says Clasen.

In addition, scientists will give participants wearable devices that can measure personal exposure to air pollution—another challenge. “You have to have people actually wear devices that measure fine particulates in the air they are breathing. Particulates end up deposited on a filter on the device that has to be carefully pre-weighed and post-weighed,” explains Clasen. “So just measuring exposure is complicated here.” Adults will likely wear sashes or vests with the filters built in; children’s devices will be enclosed in backpacks.

As part of the study, researchers will conduct multiple ultrasounds on participating pregnant women to measure gestational growth of fetuses. After the women give birth, researchers will make weekly visits to assess specified health conditions of the adults and growing children. That means the team is preparing for the logistical challenges of bringing ultrasound machines and other equipment to rural villages as well as ensuring ways to refrigerate and store blood and urine samples in remote locations.

While some health outcomes will be possible to study fully within the 30-month study period, scientists are also interested in exploring long-term health outcomes, such as cancers and cardiovascular disease. To that end, investigators—including Rollins professor Dana Barr—will be looking at biomarkers of environmental exposure and disease. Those biomarkers include indicators of cardiovascular function, inflammation, lipids, carcinogens, and risk of diabetes.

These goals are ambitious, given the other sources of air pollution that study participants will continue to be exposed to during the field trial. Says Clasen, “When these people go outside, they’re exposed to outdoor air pollution from open fires and waste burning. There’s heavy exhaust from motor vehicles. There’s kerosene lighting for householders that don’t have electricity. There are many sources of air pollution, and we are just addressing one.”

Jeremy Sarnat, associate professor of environmental health at Rollins and a co-investigator on the study, says that it is ambitious in scope and scale precisely because the problem of high-polluting fuels is of such global significance. “For me, success is really figuring out if there’s a scalable, cross-cultural intervention that shows some success at reducing the burden of disease. That’s something that’s been very elusive to date with this sort of exposure,” he says.

At the end of the trial, the researchers hope to find that the liquefied petroleum gas and more efficient stoves are effective in improving health outcomes. Says Steenland, “We hope to see better birth weight, less childhood pneumonia, and less stunting in the first couple of years of life.”
Promulgating PrEP

By now, many people who are at risk for contracting HIV have heard of PrEP. They know pre-exposure prophylaxis is extremely effective in preventing the spread of the virus. What they often don’t know is where to get it or how to navigate the insurance paperwork to pay for it.

Aaron Siegler has just made that job easier. A research assistant professor in epidemiology at Rollins, Siegler developed the PrEP Locator, the first national database of clinics that prescribe PrEP.

“PrEP has the potential to substantially reduce the number of new HIV infections in the United States, but only if people know how and where to get it,” says Siegler. “We know pre-exposure prophylaxis is extremely effective in preventing the spread of the virus. What they often don’t know is where to get it or how to navigate the insurance paperwork to pay for it. The drug also protects women who are in a partnership with HIV-positive men and IV drug users who share needles.

HIV-positive men and IV drug users who share needles.

In September, the PrEP Locator launched with more than 1,200 providers. Siegler also made it possible for other organizations to easily add the PrEP Locator to their sites. In September, the PrEP Locator launched with more than 1,200 providers. Siegler also made it possible for other organizations to easily add the PrEP Locator to their sites.

A California provider directory. They then verified the medical licensure of each provider. When a user logs on, the website determines his location and a map pops up with nearby providers and their contact information. The database is also searchable by zip code. Users can upload information about a provider that is not included on the list, and Siegler’s team will vet and add it. Since its launch, 35,000 people have used the site, and more than 300 providers have added themselves to the database.

For Rick Perera, an Atlanta man who has been on PrEP for three years, the locator’s ability to identify which providers have PrEP navigators—people who can help clients through the labyrinth of insurance forms, financial assistance forms, and other related paperwork—is especially valuable. “It is a lot to take on,” says Perera. “In addition to the medication itself, you have quarterly office visits and testing. Insurance might pay for some or all of it. Financial assistance is available. But wading through all the paperwork that is required can be very hard. Being able to find a PrEP navigator is a tremendous service.”

But what if you live in an area that simply does not have a PrEP provider? Siegler worked with Patrick Sullivan, Charles Howard Candler Professor of Epidemiology, to develop a PrEP@Home kit that allows users to test themselves for HIV and STDs in their home. Their idea was for people who are already on PrEP to use the kit for maintenance, eliminating the need to visit the doctor quarterly. Siegler wants to see if the kit can be used to start people on PrEP in underserved rural areas.

PrEP@Home comes in bento boxes, with supplies, illustrated instructions, and an instructional video to allow the user to collect a urine sample, throat and rectal swabs, and a blood sample via a finger stick. "PrEP is such an important tool in addressing the HIV epidemic in our country," says Siegler. “It has the potential to really turn things around. So we’ll keep working to find ways to get it to everyone who needs it.”

For more, go to preplocator.org—Aaron Siegler

LOCATOR MAKES FINDING AND ACCESSING DRUG EASIER
T he Rollins School of Public Health is grateful to four very generous couples who have established new endowments to support outstanding students. Their gifts will be matched by RSPH though a program established by Dean James Curran using income from unrestricted endowments. Gifts ranging from $50,000 to $100,000 are matched on a one-to-one basis, enabling donors to create a scholarship that will exist in perpetuity.

Eugene and Rose Gangarosa established the first global field experience endowment in 1990 and later endowed two chairs in Water, Sanitation, and Hygiene (WASH). Their most recent gift funded the chairs in Water, Sanitation, and Hygiene endowment in 1990 and later endowed two outstanding students.

Eugene and Rose Gangarosa established new endowments to support the WASH program has been transformative, ” says Christine Moe, Eugene J. Gangarosa Scholar in Asian Indians and will also inspire other members of the Indian-American community to support similar initiatives.” Emory alumni Carolyn S. Hahn-Swanson 87N 87MPH and Howard C. Swanson 97B want to make sure others have the opportunity to pursue graduate education at Emory. The Hahn-Swanson Family Scholarship will provide scholarships for students who have demonstrated the capacity for leadership in public health. When possible, recipients will be students in the MN/MPH or MBA/MPH programs.

Several years ago, Kathleen M. Sokolik and Don E. Sokolik 71M became interested in the work of RSPh. Their enthusiasm led to a planned gift. This year, they made a generous gift to fund the Kathleen M. and Don E. Sokolik Global Field Experience Fund. As the student body has grown, so has the number of students hoping to gain experience in international settings. The Sokolik Fund will help make this possible.

Scholarship funds enable Rollins to compete with other leading schools of public health for the most outstanding students, decrease the amount of student loans, and make the field of public health accessible to the brightest and most committed scholars.

“The matching funds we are able to offer through income from the O. Wayne and Grace Crum Rollins Endowment Fund allow donors to double their impact,” says Curran. “The return on these investments can only be measured in the number of lives touched by these future public health leaders.”

Don E. Sokolik Global Field Experience Fund. As the student body has grown, so has the number of students hoping to gain experience in international settings. The Sokolik Fund will help make this possible. Scholarship funds enable Rollins to compete with other leading schools of public health for the most outstanding students, decrease the amount of student loans, and make the field of public health accessible to the brightest and most committed scholars.

“Don and I have been so pleased to see the dividends of our generosity in the work we have accomplished through Rollins College and in the lives of so many students,” says Paul K. Sangalang, M.D., professor and chairman, Department of Preventive Medicine.

Hours of Change. The first-time fundraising event drew more than 2,000 gifts totaling more than $580,000. Rollins faculty, alumni, students, staff, and friends were among the most generous in the challenge and instrumental in numerous Rollins successes throughout the 24-hour event. More than 500 gifts were made to Rollins funds. In addition, 246 gifts were made to the Center for AIDS Research, with donors coming from across the university, nationally, and internationally.

“I’m very proud, though not at all surprised, by the largesse of the community in supporting the Emory CARF mission,” says Carlos del Rio, Hubert Professor and chair of the Hubert Department of Global Health and principal investigator and co-director of CFAR.

What a difference a day can make.

On Feb. 8, immediately following the inauguration of Claire E. St erk as Emory’s 20th president, the university launched All In a Day: 24 Hours of Change.

Phdanthrop}

Growth in scholarship funding

Rollins Alumni Association Awards

Promoting preventive health care and championing the underserved

**Distinguished Achievement Award**

As director of the Office of the National Prevention Strategy at the Centers for Disease Control and Prevention, Brigette Ulin 97MPH has been integral to the creation and implementation of the nation’s first comprehensive plan for preventive health care. Beginning in 2015, she co-led teams from the CDC, the Department of Health and Human Services, and 17 departments within the National Prevention Council to conceptualize and draft the National Prevention Strategy. Since the adoption of the strategy, Ulin has been in charge of its implementation across the federal government, as well as preparing annual progress reports that are presented to the President and Congress. The National Prevention Strategy has provided a critical foundation for communities to address chronic illness by offering evidence-based recommendations for promoting risk reduction and healthier lifestyles. As a result of the strategy, multiple federal departments and public sectors have started prioritizing prevention and have integrated public health considerations into their policy decisions.

Prior to her current post, Ulin spent many years with the CDC’s National Center for Injury Prevention and Control, where she was responsible for the management of projects addressing the prevention of youth violence, child maltreatment, and teen dating abuse. As part of her focus on violence prevention, Ulin managed a national initiative called Choose Respect, aimed at helping young people ages 11-14 years form healthy relationships to prevent dating violence before it begins. Under her leadership, the Choose Respect initiative received the Horizon Health Education Award from CDC’s Public Health Education and Promotion Network. Ulin began her career at the CDC developing national education campaigns for the National Center for Infectious Diseases, where she was widely recognized as one of the nation’s leading experts on the integration of viral hepatitis prevention with HIV and STD counseling and testing. Ulin earned her MPH in behavioral science and health education nearly 20 years ago but has remained an active member of the Rollins community. She has mentored and hired countless students, served on a variety of committees, and is a member of the Alumni Association Board, and is a current member of the Emory Career Network and Rollins Community Advisory Board.

**Matthew Lee Girvin Award**

Since earning her MPH in 2008, Lieutenant Commander Felicia Warren 99OX 01C 08MPH, United States Public Health Service (USPHS), has dedicated her career to protecting and advancing the health and safety of some of the world’s most vulnerable and underserved populations. In her recent role as acting deputy director in Liberia for the CDC, Warren brought her leadership experience in the field to managing the country office’s daily operations. She served as CDC eight years ago as a program analyst, where she coordinated HIV/AIDS surveillance activities to assess clinical and behavioral characteristics of HIV-infected adults receiving care in the U.S. In 2011, she began working with the CDC’s Center for Global Health as a public health analyst. In this role, she provided technical assistance on projects in Vietnam, Uganda, and South Africa, where she helped develop the 2014 South Africa PEFPAR Country Operational Plan, a $200-million initiative that required the collaboration of multiple nonprofits, NGOs, and government agencies. During that time, Warren also served on the Outreach Investigation Team in the CDC’s Emergency Operations Center, where she helped investigate outbreaks of Salmonella javiana in 2016 and Acanthamoeba keratitis in 2017. She also earned several awards from the CDC and the USPHS, including the USPHS Presidential Unit Citation for extraordinary courage and the highest level of performance in action through the U.S. government’s Ebola response.

Back home in the U.S., Warren is now a public health advisor at the CDC’s National Center for Injury Prevention and Control in the Division of Violence Prevention, where she provides program expertise to the Violence Against Children and Youth team. She has earned many distinguished awards throughout her career and was most recently nominated for USPHS Public Health Professional Advisory Group Junior Officer of the Year for demonstrating exemplary commitment to the mission and values of the USPHS. In her spare time, she volunteers as a site selector for the Council on Education for Public Health, advising on accreditation standards for public health programs and schools.
The passing of a founding father

Thomas F. Sellers Jr. died in January surrounded by family and friends. Sellers was instrumental in the founding of the Rollins School of Public Health.

In the 1980s, when he was chairman of the Department of Community Health in the School of Medicine, Sellers championed the establishment of Emory’s community health program, which eventually grew into RSPH. On his retirement, his colleagues and friends joined together to honor that effort with an endowed scholarship in his name.

Sellers taught infectious disease medicine and preventive medicine in the SOM for more than 30 years. He recounted his medical days in his 2009 book, What’s Up Doc: A Lifetime in Medicine: 1946-1990. He also published a collection of his poetry, Beware the Poet, in 2015.

Sellers had public health in his bloodstream. His father was a public health leader in Georgia for 42 years and the inventor of a tool for diagnosing rabies. His son, Wade, was in the first class to graduate from Rollins in 1990, the year it became a school.

The family has requested that gifts in memory of Sellers be made to the Thomas F. Sellers Jr. MD Scholarship Fund at the Rollins School of Public Health. Online gifts may be made by going to emory.edu/give.

In many ways, the Rollins School of Public Health owes its existence to Tom Sellers, and he is greatly missed.
A champion for human rights

Aun Lor 97MPH has dedicated his life to advancing public health, human rights, and ethics. As senior science advisor for the Center for Global Health Science Office at the Centers for Disease Control and Prevention (CDC), Lor helps ensure the scientific integrity and quality of the CDC’s global health research and program activities. This means, among other things, that Lor makes sure that the institution includes diverse perspectives in developing, implementing, and evaluating public health activities that also respect the values, beliefs, and cultures of the people and communities affected.

Lor’s passion for human rights grew from a childhood in which he was denied them. He was three years old when the Khmer Rouge came to power in Cambodia. For four years, young Lor lived in constant fear for his life and the lives of his loved ones. He and his family, along with millions of others, were forced from their homes to the countryside to work in the rice fields. Lor’s father was the first to die, possibly from being poisoned by a Khmer Rouge supporter. His three older brothers and his sister followed one by one, succumbing to starvation and overwork.

After the murderous Khmer Rouge regime was overthrown, Lor emigrated to Columbus, Ga., with his mother and three remaining brothers. He eventually found his way to Emory, where he earned a BS, an MPH in global health, and an MA and a PhD in medical anthropology. Along the way, he evolved from a shy, quiet student to an outspoken advocate for health and human rights. As a student, he co-founded an international student association focusing on health and human rights. That group laid the groundwork for the Emory Institute of Human Rights. Each year Lor returns to campus to lecture in a class on health and human rights, where he shares his experiences from the Cambodian genocide.

Rollins recognized Lor’s contributions first in 1997 when he was chosen by his classmates to give the Rollins student commencement address. Five years later, he was awarded the first Matthew Girvin Service Award for early leadership in public health. He has held various positions with the CDC, to all of which he has brought his knowledge, experiences, and passion for public health.
During the summer monsoon season in Mumbai, India, commuters attempt to make their way home despite flooding. The city of more than 20 million sits at a low sea level and lacks effective drainage infrastructure. Scientists point to climate change as being a key cause of flooding in the region. Hundreds die due to floods in India each year, and hundreds more are forced to take shelter in government-run relief camps. Olivia Paige 18MPH was a winner of the Global Health Institute Student Photography contest with this photo.