

pulse

*Saving Sight with
Novel Technology & Outreach*

EYE ON THE FUTURE



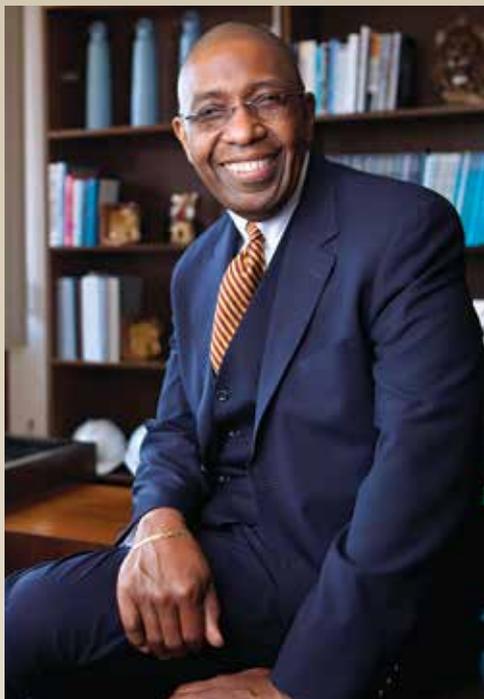
PLUS:

New Institute Targets Infection,
Inflammation

Future Docs Value Compassion

Innovative Implants for Pain

Message from the Dean



Last year, during an event attended by New Jersey Governor Chris Christie and Rutgers Biomedical and Health Sciences Chancellor Brian L. Strom, MD, MPH, we at Rutgers New Jersey Medical School celebrated the opening of our state-of-the-art Institute of Infectious and Inflammatory Diseases. Comprising multidisciplinary teams of world-class scientists, the Institute—which is known simply as the I3D—pursues novel approaches to detecting, treating and preventing a variety of current and emerging diseases that threaten the lives and wellbeing of countless people worldwide. The innovative work carried out at the I3D represents the dawning of a thrilling new era in biomedical research and we are proud to be at the forefront of such a remarkable endeavor. On the pages that follow, you can read more about the I3D and other exciting initiatives at New Jersey Medical School, including:

- A breakthrough treatment that uses implants to change the nervous system through electrical stimulation.
- The work that is being done to champion diversity and inclusion.
- And the efforts that are underway to develop new therapies in the area of translational medicine.

In January, Dr. Strom provided the Rutgers Biomedical and Health Sciences community with a progress report highlighting some of the significant advances that have been made at the institution in the last year. In his message, Dr. Strom pointed to, among other things, programs and initiatives that have been developed to help guide RBHS for the next five years. Among the individuals named to lead a program (the Infection and Inflammation Signature Program) was our very own Senior Associate Dean for Research William C. Gause, PhD. Dr. Gause, who also helps to lead our I3D, stands as an example of the talented faculty that we have at New Jersey Medical School. Furthermore, our efforts in the areas of education, research, health care, and community service show our commitment to being of value not only to the RBHS community but to the people who live within and beyond the borders of New Jersey.

In health,

A handwritten signature in black ink, appearing to read "R. Johnson".

Robert L. Johnson, MD, FAAP'72

The Sharon and Joseph L. Muscarelle Endowed Dean • Rutgers New Jersey Medical School

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SPRING 2015



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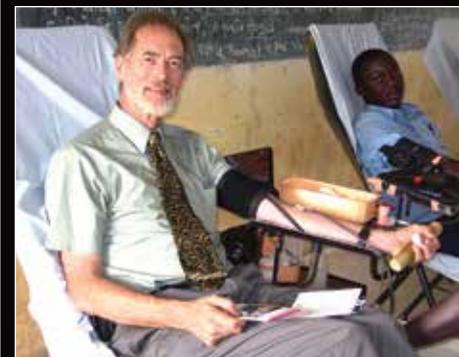
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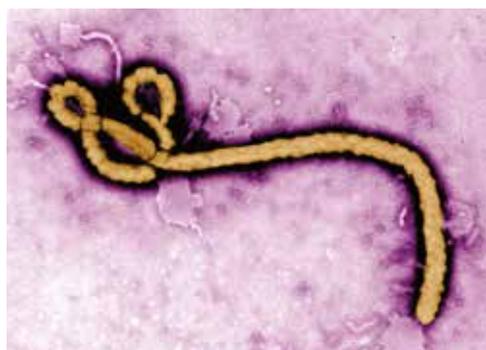
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FYI

Notable



VIRAL WORRIES

Ebola, influenza and measles hit the headlines frequently in late 2014 and early 2015. Fears about contagion were rampant; concerns about deadly outbreaks sparked high-anxiety; vaccine controversies were aired; and trustworthy information was sorely needed.

David Cennimo, MD, assistant professor and infectious disease specialist; **Glenn Fennelly, MD**, chair of pediatrics and a pediatric infectious disease specialist; **William Halperin, MD, MPH, DrPH**, chair of preventive medicine & community health; **David Perlin, PhD**, executive director of the Public Health Research Institute at NJMS; **Ziad Sifri, MD**, associate professor of surgery and a co-founder of the International Surgical Health Initiative; and **Nila**



MATCH DAY emotions were already sky-high before fourth-year NJMS student Israel Saramago proposed to third-year NJMS student Enid Sun on-stage at the event. The NJMS Match rate was 98.3 percent, compared to 94 percent nationwide. Saramago will go to the University of North Carolina. And, yes, Sun said yes. It's a match!

Dharan, MD, assistant professor of medicine and an infectious disease specialist, were all contacted by the media to better inform the public about these infections in order to counteract fears spread by misinformation.

AHEAD OF THE CURVE

In December 2014, the NIH awarded **David Alland, MD**, professor and chief of infectious diseases at NJMS, a \$640,000 grant to develop a rapid detection test for the Ebola virus. "With a small finger prick, blood sample, or swab from a cheek or some saliva, we would be able to take the sample, put it into a cartridge and have results within a half hour," Alland says. Current tests can



only be done in a specialized lab by skilled technicians. "In a place like Africa, the patient can die before the results even come back," he states. Alland will work with the biotechnology company Cepheid to develop the test. The same team used similar technology to develop a rapid test for diagnosing tuberculosis. They are also working on rapid diagnostic tests for other viral illnesses.

MEDWINGS VS BITEWINGS

The 2015 Charity Hockey Game—featuring the NJMS Medwings vs the Rutgers School of Dental Medicine's Bitewings—was played on March 20 before a crowd of fans at Newark's Prudential Center to benefit the Emmanuel Cancer Foundation. This year's event raised more than \$15,000 for children with cancer and their families.

New Jersey's Favorite Kids' Docs

Who are New Jersey's favorite "kids' docs" and what are their specialties? According to *New Jersey Family* magazine's December 2014 issue, 54 of them are faculty members at NJMS:



Lydia Charles, MD, family medicine
Marnie Doubek, MD, family medicine
Lawrence Rosen, MD, family medicine
Peter Benincasa, MD, medicine
Richard Luka, MD, medicine
Peter Carmel, D.MED, MD,
neurological surgery
Sue Ming, MD, PhD, neurology
& neurosciences
Adam Aronsky, MD, pediatrics
George Azzariti, MD, pediatrics
Azzam Baker, MD, pediatrics
Zeyad Baker, MD, pediatrics
Naimat Bokhari, MD, pediatrics
Basil Bruno, MD, pediatrics
Arthur Butensky, MD, pediatrics
Barbara Cerame, MD, pediatrics
Elizabeth Chalom, MD, pediatrics
Martin Cohen, MD, pediatrics
Donald Cotler, MD, pediatrics

Kathleen Cuddihy, MD, pediatrics
Nermine Doss, MD, pediatrics
Amina Elkassir, MD, pediatrics
Arthur Fost, MD, pediatrics
Ave Gozo, MD, pediatrics
John Gregory, MD, pediatrics
Kathleen Haines, MD, pediatrics
Robert Handler, MD, pediatrics
Joseph Holahan, MD, pediatrics
Ginger Janow, MD, pediatrics
Andrzej Klos, MD, pediatrics
William Kottler, MD, pediatrics
Richard Lander, MD, pediatrics
Suzanne Li, MD, pediatrics
Kenneth Lieberman, MD, pediatrics
Richard Marcus, MD, pediatrics
Lisa Michaels, MD, pediatrics
Piotr Oko, MD, pediatrics
Mannan Razzak, MD, pediatrics
Roger Rivera, MD, pediatrics

Francine Samuels, MD, pediatrics
Howard Schlachter, MD, pediatrics
Ashish Shah, MD, pediatrics
Mohamed Tantawi, MD, pediatrics
Mona Tantawi, MD, pediatrics
Antonio Thomas, MD, pediatrics
Arthur Torre, MD, pediatrics
David Weinstein, MD, pediatrics
Jennifer Weiss, MD, pediatrics
Scott Zucker, MD, pediatrics
Michael Armento, MD, physical medicine
& rehabilitation
JenFu Cheng, MD, physical medicine
& rehabilitation
Martin Diamond, MD, physical medicine
& rehabilitation
Robert Fieldman, MD, surgery
Moneer Hanna, MD, surgery
Todd Morrow, MD, surgery

MORE NJMS EXPERTS IN THE NEWS

NJMS faculty members are often called upon by reporters for their input on topics of vital interest to consumers. Here are a few of our very own experts in the news:

Anne Mosenthal, MD, chair, Department of Surgery, was quoted in *The New York Times* online article, "A Surgery Standard Under Fire," on March 2, 2015. As a trauma surgeon who launched a palliative and end-of-life care program at University Hospital—with Patricia Murphy, an advanced practice nurse specializing in ethics and bereavement—she was contacted for her knowledge and insights regarding the needs of critically ill patients and their families.



David Perlin, PhD, executive director, Public Health Research Institute at NJMS, weighed in on "Why California's Superbug Outbreak Isn't as Scary as it Seems," featured by *NPR* on February 19, 2015. The superbug being discussed is CRE



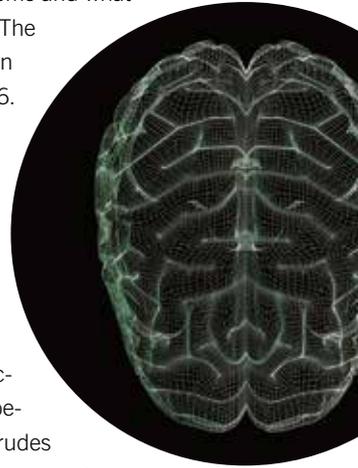
or Carbapenem-resistant enterobacteriaceae, a family of bacteria that clings to two particular types of endoscopes and are very resistant to antibiotics. Perlin comments: "The outbreak is a reminder of a serious underlying problem: the rise in dangerous drug-resistant germs. But it's unlikely to spread further. UCLA appears to have identified and eliminated the source of infection."

Tibor Rohacs, MD, PhD, associate professor, Department of Pharmacology, Physiology & Neurosciences, explains in *Science News for Students* why capsaicin—which makes hot chili peppers "hot"—can lessen muscle and joint pain when applied to skin. He and his team recently uncovered the biological steps of this pain-relieving process and published their findings in the February 10 issue of *Science Signaling*.



Antonios Mammis, MD, assistant professor, Department of Neurological Surgery, answered questions about how deep brain stimulation relieves Parkinson's symptoms and what the surgery itself entails. The Q and A was published on *NJ.com*—on February 26.

Sue Ming, MD, PhD, professor, Department of Neurology, discussed how electronics affect teens' sleep on *PBS* on March 4. "Daily or frequent excessive nocturnal cellphone use, especially when the usage intrudes into the sleep schedule, can lead to chronic sleep insufficiency, which, in turn will affect general well-being and health," Ming said. "In addition, sleep is essential to consolidate learning and memory. Anyone who suffers from chronic sleep deprivation may not perform at their intellectual capacity academically." In other words, don't take the cell phone to bed with you!



Petros Levounis, MD, MA, chair, Department of Psychiatry, discusses his concerns about e-cigarettes loaded with cannabis oil, the psychoactive ingredient of marijuana in "No Smoke, but Haze Around E-Joint," on January 12 in *The New York Times*. E-cigarettes could pave the way to reliance on actual cigarettes, especially in teens, say some addiction specialists, and could adversely affect the developing brain. "In some ways, e-joints are a perfect storm of a problematic delivery system, the e-cigarette, and in addition a problematic substance, cannabis oil." He also discussed new treatments for binge eating disorder in *MedPage Today*, a medical news service, in January.





GRANTS FOR BREAK-THROUGH RESEARCH

On January 7, New Jersey Health Foundation (NJHF) awarded 28 grants totaling \$1.2 million to faculty members of Rutgers Biomedical and Health Sciences (RBHS). Twenty-three grants of \$35,000 each provide seed or bridge funding for researchers exploring a variety of areas including: regulation of cancer metabolism; safe use of antipsychotic medications in children and teens; control of sepsis; neurotropic agents for treating Parkinson's disease; Lyme disease detection; anti-fungal drug development; and the mechanism of anti-tuberculosis activity of statins. In addition, three grants of \$100,000 and two of \$50,000 were awarded to advance research relevant to the RBHS signature programs.

NJMS researchers were awarded 14 of the grants. NJMS faculty who received seed or bridge grants are: Luis Ulloa, PhD, MS, associate professor, surgery; Lanbo Shi, PhD, assistant professor, Public Health Research Institute (PHRI); Arkady Mustaev, PhD, as-

sistant professor, microbiology, biochemistry & molecular genetics; Maria Gennaro, MD, professor, medicine, PHRI; Samuel Joseph Leibovich, PhD, professor, cell biology and molecular medicine; Mark C. Siracusa, PhD, assistant professor, medicine, Chancellor Scholar; Robert Ledeen, PhD, professor, pharmacology, physiology & neurosciences; Nikhat Parveen, PhD, associate professor, microbiology, biochemistry and molecular genetics; Abraham Pinter, PhD, professor, medicine, PHRI; David M. Lukac, PhD, associate professor, microbiology, biochemistry and molecular genetics; and Steven E. Schutzer, MD, professor, medicine.

In addition, two NJMS researchers were awarded grants of \$100,000 each: Teresa L. Wood, PhD, pharmacology, physiology & neurosciences, professor and Rena Warshow Endowed Chair in Multiple Sclerosis and vice chair for research, who will investigate new ways to promote remyelination in multiple sclerosis; and Raymond Birge, PhD, professor, microbiology, biochemistry, and molecular genetics, who will focus on devel-

oping small molecule inhibitors that block a family of receptors that is overexpressed in almost all human cancers, and could serve as anti-cancer drugs.

William C. Gause, PhD, senior associate dean for research, University Professor, medicine, and director, Center for Immunity and Inflammation, received a \$50,000 grant for research into new pathways to promote immunity and lung health.

A NATIONAL HONOR

The Alliance for Academic Internal Medicine (AAIM) awarded **Maria Soto-Greene, MD**, the 2014 AAIM Diversity Award, recognizing her as "an individual who has improved diversity within a medical school or has worked to ensure patients of all races and ethnicities receive the highest quality care."

Soto-Greene is vice dean at NJMS and a professor of medicine. In her more than 30 years at the school, she has advanced its cultural competency education for all four



years of the medical school curriculum. She has also served as the associate dean for special programs and the senior associate dean for education.

As director of the Hispanic Center of Excellence (HCOE) at NJMS for 20 years, Soto-Greene has earned a national reputation for promoting and implementing diversity and cultural competency programs. In 2012, she was awarded a five-year, \$3.5 million grant for the HCOE from the Health Resources and Services Administration. She is also the advisor to Student Health Advocates for Resources and Education (SHARE), a student organization that houses many of the NJMS student service initiatives. As a testament to her work, NJMS is ranked at or above the 90th percentile in the number of African American and Hispanic graduates and at the 70th percentile for faculty from these groups.

Soto-Greene was a member of the expert panel that developed a national cultural competence curriculum for the health professions. She is a past chair of the Association of American Medical Colleges (AAMC) Group on Diversity and Inclusion and a past president of the Hispanic-Serving Health Professions Schools (HSHPS). She most recently served as chair of the AAMC GDI Diversity Strategic Planning Working Group, which developed and published "Diversity and Inclusion in Academic Medicine: A Strategic Planning Guide." She was a member of the Advisory Council of the NIH National Center on Minority Health and Health Disparities.

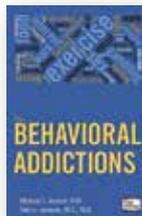
Soto-Greene earned her MD from NJMS in 1980 and completed internal medicine training at University Hospital. She is a board certified internist.

BOOKS, BOOKS & MORE BOOKS

NJMS faculty and alumni manage to find a little time to write, edit and publish books. Check out their recent titles:

The Behavioral Addictions

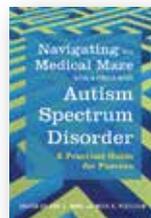
PETROS LEVOUNIS, MD, MA, AND
MICHAEL S. ASCHER, MD



Usable information about treating addictions of all types is in great demand. Levounis is an addiction medicine specialist and chair of the NJMS Department of Psychiatry, and author of several previous books. In this one, he and a co-author explore the diagnosis and treatment of patients who suffer from many different behavioral addictions, extreme forms of which share specific characteristics with severe forms of substance use disorders.

Navigating the Medical Maze with a Child with Autism Spectrum Disorder—A Practical Guide for Parents

SUE MING, MD, PHD, AND
BETH PLETCHER, MD



Ming is a professor of neurology and Pletcher is an associate professor of pediatrics and director, Division of Clinical Genetics, at NJMS.

Both are in the forefront of addressing the medical needs of those with autism spectrum disorder (ASD). From Amazon: "This comprehensive guide enables parents of children with an autism spectrum disorder to play an active and effective role in their child's medical care from diagnosis to early adulthood. With a focus on working with health care providers to ensure the best treatment for their child's unique needs, it includes: a description of the developmental and medical conditions faced by children with ASDs in lay terms; an explanation of common diagnostic tests; a presentation of conventional and alternative therapies and how they work; tips for managing day-to-day medical or behavioral problems; advice for parents considering enrolling their child in a research project; and all the latest medical information."

Bird That Wants to Fly

DIANE KAUFMAN, MD, WITH
ILLUSTRATIONS BY OLYA KALATSEI

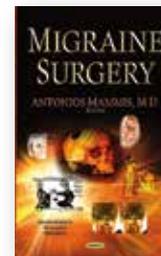


Kaufman is a child psychiatrist and was a longtime Department of Psychiatry faculty member. She recently retired.

From the review in the American Academy of Child and Adolescent Psychiatry's *Newsletter*, September/October 2014: "In a touching book written for children or even adults who have been hurt or are still hurting...child psychiatrist, poet, and author Diane Kaufman crafts an archetypal story of transformation from fear, self-loathing, and sorrow to courage, self-acceptance, and happiness. Children and adults who have been bullied, attacked, neglected, abused, raped, assaulted, suffered from domestic violence, or have struggled with substance use will find inspiration in this simple metaphorical tale."

Migraine Surgery

ANTONIOS MAMMIS, MD, EDITOR



From the description by Nova Science Publishers: "Chronic migraine is a condition which is prevalent and disabling, and which has a great impact on society as a whole. Across the spectrum of migraine patients, the most challenging are those deemed refractory to conventional therapy. These patients may be surgical candidates, and are best served in a multidisciplinary, patient-centered model of migraine care. This book should serve as a reference to any practitioner dealing with the migraine patient." Mammis is an assistant professor in the Department of Neurological Surgery and director of functional neurosurgery and neuromodulation. He specializes in the surgical treatment of movement disorders, pain syndromes, spasticity, and general neurosurgical pathology.



Where Are the Jobs for Researchers?

Earning a PhD in biomedical sciences does not necessarily lead to a career in research. For those who have invested five to seven years earning the degree, plus another two to four in a post-doctoral position, this may spell disappointment and problems in the job world. In 2014, the National Institutes of Health (NIH) selected seven institutions across the country—among them Rutgers Graduate School of Biomedical Sciences (GSBS) in collaboration with the Rutgers Center for Innovative Ventures of Emerging Technologies (CIVET)—to figure out what to do. **BY EVE JACOBS**

The job market for biomedical researchers is shrinking and that's not new. Studies looking back 20 years have confirmed diminishing career opportunities for academic researchers as well as industry researchers, leaving some PhDs high and dry when it's time for a job search. Most have invested at least eight years preparing for their careers.

The BEST (Broadening Experiences in Scientific Training) award to GSBS and CIVET comes with a \$2 million grant to forge full-speed ahead to better understand the problem and figure out solutions. It will underwrite innovative initiatives to help redirect at least some of these doctoral students into other related areas. "We need to come up with new nonacademic, non-research possibilities that still use the students' scientific training," says Stephen Garrett, PhD, Associate Dean of Student Affairs at GSBS and associate professor of microbiology, biochemistry, and molecular genetics at NJMS and one of the co-directors of this program, "because those are the only jobs that are increasing."

He says that less than 25 percent of biomedical research students currently find jobs as academic scientist-researchers. This means, of course, that more than 75 percent do not. Faculty currently wrestle with tough questions regarding the PhD programs, including: Should the numbers of students going on for PhDs be reduced? In fact, that is happening across the country. However, "We know that is only part of the solution, since we have no sure-fire way to know who will go on to be successful in academic research," says Garrett.

"Other questions include: Are there other jobs where the doctorate in research is useful and how should we advise students concerning these other jobs?" he continues. But the answers to these questions are often beyond the expertise of faculty, according to Garrett, since most faculty have spent little, if any, time outside of academe and the job picture is constantly changing.

Interdisciplinary Job Opportunities for Biomedical Scientists—or iJOBS—is a



Amit Chaudhari is a fifth-year MD-PhD student, who is finishing his doctoral work at Kessler Institute for Rehabilitation doing research on stroke. He expects to earn his MD from NJMS in 2017.

Rutgers program that will develop strategies to get a grip on the job problem. Phase 1 of the program will look at “what’s out there for our PhD students and postdocs,” Garrett says. Brown bag networking lunches will feature small panels of researchers working in “alternative careers,” who will speak to students about their jobs and how they got there. At the session on January 20, which was held on the Newark campus, five speakers with very different portfolios demonstrated the applicability of technical and science degrees in the work world:

- **James J. DeCarlo**, with a degree in electrical engineering and a JD, specializes in intellectual property law; much of his work relates to his background in engineering.
- **Sidnee Pinho** earned undergraduate degrees in systems engineering and finance, and a master’s degree in marketing and finance. She is currently head of business strategy and management at Huron Life Sciences.
- **Alexander Habib**—who earned a master’s degree in health policy—is a manager of public affairs and communications for Johnson & Johnson.
- **Barbara Gladson**—with an MS in physical therapy from Columbia and a PhD in

pharmacology from GSBS—is director of the Rutgers Biopharma Educational Initiative/MS in Clinical Trial Sciences. She is also a professor of pharmacology at GSBS and at the Rutgers School of Health Related Professions.

- **Robert Goldberg, PhD**, is vice president and co-founder of the Center for Medicine in the Public Interest. Along with Peter Pitts, he hosts a controversial blog on the pharmaceutical industry and health care at www.drugwonks.com

Gladson told students: “Bringing to market new drugs and devices has become a complex process requiring the skills of specialized and talented clinical research professionals.” It is an opportunity that some GSBS doctoral students may find intriguing.

“What we have here in New Jersey are lots of pharmaceutical and biotech companies,” states Garrett. So, in the spring, student site visits will be arranged at these companies in



Tapan Shah is a third-year PhD student in biochemistry, microbiology and molecular genetics at GSBS, Newark.

five different tracks: industry development and business management; clinical and regulatory testing and support; intellectual property management; health data analysis; and science and health policy. GSBS in Newark and Piscataway currently trains 500 PhDs spread out over six years, plus postdocs, who are spread over three years.

“We train students and post-docs to conduct research,” says Garrett. “We—like simi-



Yaa Haber is a fourth-year PhD student in pharmacology and physiology at GSBS, Newark.

lar schools—have been preparing doctoral students and post-docs to take over a lab.” But for many, that model no longer works.

An eight-part course called SciPhD, which started on February 9, will focus on the “business of science,” including leadership styles, networking, negotiation, project management, finance, and communication and business skills for scientists. It is scheduled for three Sundays and five Monday evenings and will be offered every year for third-year students. This year it will also be offered to fourth- and fifth-year students.

“Some students may only benefit by finding out that going into industry or an alternative career is not what they want to do,” says Garrett, “but management and interviewing skills and hearing people’s ideas about how to get a job will be useful no matter what career path they choose.”

That’s Phase 1 of the program, says Garrett. In Phase 2, the students choose an industry track from one of the five different tracks and are paired with a GSBS mentor from that track who will meet with them a couple of times a year. The mentor may advise career-specific training for the student. For instance, if the student is interested in managing clinical trials, specific coursework in pharmaceutical management at a business school may be advised, according to Garrett. Students will also have the opportunity to

Continued on page 8

Surgeon with a New Mission

Justin Sambol, MD'97, associate professor of surgery, chief of the Division of Cardiothoracic Surgery, and vice chair of the Department of Surgery, was named senior associate dean for clinical affairs in January. His new duties will include overseeing the clinical operations of NJMS and growing the clinical practices of the medical school, as well as interacting with University Hospital (UH) on clinical agreements that affect both NJMS and UH. He will address issues arising between NJMS and its clinical affiliates, and will "broaden the medical school's footprint as much as I can while also continuing the care we have always given the medically needy of the city of Newark and surrounding areas," he says.

While his new responsibilities are crucial to the future of the medical school, Sambol intends to "continue as a practicing surgeon. That's my life." But this surgeon also has a sharp interest in the business side of medicine, and hopes to apply what he learned as past treasurer of University Physician Associates of New Jersey, the faculty practice of NJMS, as president of the NJMS faculty organization and president of the medical staff of UH. "I want to focus my skills in one job where I hope to make a difference," he says.

Sambol earned his BA in neuroscience from the University of Pennsylvania, where, he says, his roommates went to the Wharton School of Business and he absorbed a lot of knowledge (outside of the classroom). His father owned a small construction company in Jackson, so business concerns were often dinner-table conversation. Both Sambol and his brother chose medicine over business and both are NJMS alumni, graduating in '97 and 2000 respectively. Recognizing the critical connection of NJMS to her family, "my mother came up and spoke often at the family days for newly admitted students," he says. "She realized the importance of having the family feel a strong connection to the school."

How did Sambol choose his specialty? "I always wanted to be a surgeon — since I was a kid," he says. "I decided on cardiothoracic surgery because of the instant gratification in being able to help people. But my two children, who are 7 and 12, don't know yet what they will do when they grow up." ●



Jobs for Researchers

Continued from page 7

sign up for an externship and spend one afternoon each month (for up to nine months) on site "to watch what people there really do."

"The Phase 2 group will initially be limited to 35 participants, but may increase. This is for students or post-docs who are more committed to one of the five industry tracks than to academic medicine," he says.

Phases 3 and 4 will offer career fairs, job tracking and job placement with an assigned mentor, and interview preparation. Alumni who have finished the GSBS iJOBS program will be invited back to provide feedback.

Garrett says the challenge is to give the students new experiences without overwhelming them. "Their primary commitment is to their lab work," he says. "That's what they need to focus on." In the first two years in the PhD program, students take courses, spend long research hours in the lab, and study for their candidacy exam.

"At the end of their second year, they have more time to concentrate on their research because they're not juggling so much," he says.

The point of this program will be to figure out what works, and what does not, to successfully land a job with a PhD in biomedical sciences. "We can follow who gets jobs in the five tracks," says Garrett. "Success may be hard to determine in some cases but I think the program and the information will be useful to everyone."

"When I came through my doctoral program, there was still a sense that the main focus was academic research, and secondarily nonacademic research, but that has changed," says Garrett. "We hope this will go some way to finding out, 'What's next?'" ●

Principal investigators of the grant are James Millonig, PhD, senior associate dean, GSBS, and associate professor of neuroscience and cell biology at Rutgers Robert Wood Johnson Medical School, and Martin L. Yarmush, PhD, director of CIVET and the Paul and Mary Monroe Chair and Distinguished Professor of Biomedical Engineering.

A Brilliant App is Born

MD-PhD student Amit Chaudhari heads up a team that developed a new phone app, which matches patients with health care services in their locales. **BY MARYANN BRINLEY**

What if a patient in Newark with chronic conditions or disabilities could take easy advantage of local health care opportunities? With the tap of a finger on a cell phone?

In a city where people with comorbid conditions and unmet medical needs are systematically disadvantaged when seeking primary health services, where emergency room visits and hospital readmissions are out of control, and where medical and dental clinics, research treatment centers, and support groups are right around the corner, a simply designed phone app will soon be able to match patient to service. It's called CareGoggles.

Amit Chaudhari NJMS'17, an MD-PhD student who is finishing the Rutgers Graduate School of Biomedical Sciences (GSBS) doctoral work at Kessler Institute for Rehabilitation doing research on stroke, hates it "when the good in the world goes unnoticed." Good programs are looking for patients. Patients need good programs. Yet, there is an alarming disconnect. Chaudhari points out that a typical course of insurance-paid rehabilitation is only two weeks, but most patients need far more recovery time. "There are so many opportunities, clinical trials, for instance, for people who can't afford care. They just don't know about them."

This is where CareGoggles, the brainchild of Chaudhari, Kelsea Sandefur, Gabriel Felix, and Ted Alexander, comes in. This team, known as Health SAGA LLC, has a com-

bined experience of 12 years in medical rehabilitation. CareGoggles was Chaudhari's idea initially but when a chance to win funding for this mobile health application came up last year, the entire team got behind the project, presented it flawlessly and won the first leg of The Nicholson Foundation & Rutgers Healthcare Delivery Innovation Competition. This event or "idea-thon" was held last October and was "nerve-wracking," according to Chaudhari. "We had five minutes to present and we were competing against 14 teams." When the judges announced they had won \$5,000, the four team members were ecstatic. A spin-off, virtual challenge in April will offer the team a chance to compete for a grand prize of \$50,000.



"There are so many opportunities, clinical trials, for instance, for people who can't afford care. They just don't know about them," says Amit Chaudhari.

Since then, they have hired software developers to take their platform to the next level with 22 of the most-searched medical conditions on WebMD, including everything from stroke to diabetes and Alzheimer's. In English and Spanish, CareGoggles will focus on two primary areas: Using GPS technology, the app will alert users to relevant locally available primary health care services, including clinical research projects, with the kind of key contact information that is often hard to find online. It will also offer a diagnosis-specific notification tool to remind users of pressing issues, like taking medicine, keeping a doctor's appointment or self-monitoring in other ways. "We want the app to help prevent problems, not just manage conditions, and to empower patients to



The CareGoggles team (l to r): Gabriel Felix, Amit Chaudhari, and Kelsea Sandefur. Not shown: Ted Alexander

take responsibility for their own health."

Chaudhari points out that a significant number of Newark residents have smartphones so downloading and using this tool will be easy. "Mobile technology has become an integral aspect of modern life even in low-income, minority populations." Available on iOS or Android formats, the app does not ask for names or personal information so there will be no collection of private data. A user or anyone acting on behalf of a patient simply types in a health condition and with geo-tracking, up to 120 nearby sites and services will appear. This geographic feature "sets us apart from Google," Chaudhari explains.

A pilot program will be tested through the Student Family Health Care Center. Future marketing plans include hospitals, bus wraps and other health care settings. On discharge, all Newark patients should leave with CareGoggles installed. With a website, a Facebook page and a Twitter feed, the feedback on the app is coming in and it is positive. The "likes" are adding up, Chaudhari says. "It's pretty exciting." ●

Claudia Miranda: The Strength of Family Ties

(Inset left) Claudia's parents: Carlos Guillermo Miranda and Rosario Miranda and (right) Claudia with cousin Augusto Chuecas and grandmother Carmen Rosa Zelaya



Residents are an integral part of the fabric of life at New Jersey Medical School. In this issue of *Pulse*, we launch a new department, Resident Life, with a profile of first-year internal medicine resident, Claudia Miranda. Her story—and her outlook on life and the practice of medicine—are compelling.

BY EVE JACOBS

Terrorism brought Claudia Miranda and her parents to the United States. It was the worst of times and also the best of times. They managed to escape Peru during the waning days of the Shining Path, but they came with one doll, one suitcase, a little money, and a minimal command of English to a country where they had just a few relatives and would struggle for years on a bare-bones income.

For 6-year-old Claudia who had escaped with her life from a school-bus kidnapping, life would not feel stable again for years. She has no memory of the actual event, nor was it ever discussed in her home. Clearly her parents felt their only child was seriously at-risk. Her father was a pediatrician, enlisted in the Navy, and Claudia attended a Naval

Academy school. “We had code names, but if the code was broken, children of the military would be kidnapped and held for ransom,” she says.

On the run from Peru, they first settled in Long Island with extended family. Miranda was 7 but saw little of her mother, who worked double shifts at an envelope factory, losing much of her hearing because no protective equipment was provided. The family lived in an attic, where she spent most of her time alone or with her father after he returned exhausted from working the night-shift in a frame factory. “He had been chief of pediatrics in a Lima hospital, he was well-known and well-loved,” she says, “with tons of publications to his name. He had no reason to leave Lima except for me.”

It took 12 years until he was able to practice medicine again.

When her father was offered a job as a janitor at higher pay, she witnessed his struggle to maintain a sense of dignity. She learned from him that “any job you do well is a dignified living.” But she never forgets “to say hello to janitors—to everyone. I learned never to judge people by their circumstances.”

If her parents were miserable, they never showed it, she says. “But one night I woke up and heard my mother crying and my father comforting her. I felt it was something I shouldn’t watch.”

That night touched her in a way she never forgot. “I grew up a little more quickly. I became an old soul.”

A couple of years after their arrival in the U.S., everything changed for the better. Her aunt, uncle, and two cousins came from Peru to live in Paterson, followed a little later by her grandmother, and Miranda and her family moved there to join them. “We were surrounded by family—my grandmother babysat the kids,” she remembers, “and there’s a huge Peruvian community there as well.” She became very attached to her cousins and her grandmother, who is currently her apartment-mate.

Her father began working as a medical assistant for a Peruvian doctor in Paterson and started the long road to re-earning his medical degree, this time in the U.S. “He worked full-time at his job, 8 A.M. to 7 P.M., six days a week, and then he studied for his exams after work. I don’t know how he did it,” says Miranda. She remembers the family’s joy on the day he passed his last exam and their despair when, on first try, he was turned down by all of the 100 residency programs that he applied to.

The following year, he applied to just five and was accepted to do internal medicine at Raritan Valley Hospital. By now, he was well into his 40s. Several years later, the family purchased a house of their own in Paterson.

When Miranda left for Notre Dame University in Indiana, her parents moved to Tampa, thinking the rest of the family would

eventually follow them for the warmer weather, more like their native Peru. (It didn’t happen and they are returning to New Jersey.) At the time, Miranda was “adamantly against going into medicine—I saw all of the sacrifices my father made. The office might officially close at 7, but he would stay until 10—he was so devoted to his doctoring,” she says.

Miranda first majored in biology—she loves “cells, research, all of that.” But after a volunteering stint in a hospital during her second year of college, “I struggled with

“I try hard to be strong and level-headed, to hold myself together,” says Claudia Miranda. “What really gets me is when people are unhappy, suffering, and they are ignored. I feel it’s my duty to make people feel better.”

medicine versus biology versus writing. I had a hard time figuring out what I wanted to do with my life,” she states.

Medicine won out and when she called her parents and told them, “My father started crying,” she says. “I struggled against it but it was suddenly so clear that medicine is where I belong.”

Her parents’ “miracle baby”—they wanted seven children and struggled to have her—Miranda is serious beyond her years. “I try hard to be strong and level-headed, to hold myself together,” she says. “What really gets me is when people are unhappy, suffering and they are ignored. I feel it’s my duty to make people feel better.”

When it came time to apply to medical school, she wanted to return to the East Coast to be near family. She remembers her interview at NJMS: “I clicked with my inter-

viewer Lonnie Wright. We agreed on what is important in life—it’s all about values.”

Compassion and recognizing the dignity of each human being top the list of qualities she perceives to be indispensable in a doctor. “No one wants to be sick, no one wants to be in a hospital,” she says. “Each person has a family and a life outside of these circumstances.”

What does she like best at NJMS? “The faculty is not malignant here,” she says. “I’ve seen doctors go into a room just to hold a patient’s hand. I saw one of the docs spoon-feeding a patient at the VA Hospital. I feel like they are good people. I hear from friends in other places that that’s not always the case.”

Miranda is specializing in internal medicine—an “amalgamation of scientific issues and people stuff. There are so many opportunities for talking with patients and families,” she says. “That’s what’s important to me.”

Balancing her career and her home-life is critical. “Family is very important to me,” she says. “My grandmother is 80 and she’s my best friend. In my culture, it’s important to take care of each other.”

Does Miranda have time for interests outside of medicine and family? Yes, she says, “I’m a great admirer of Asian culture and my dream is one day to go to Japan. I heard Japanese music for the first time when I was 11 and I was swept away. I got a glimpse into another world.” She minored in East Asian studies in college and is still fascinated.

Miranda’s first memory of her adopted country is a powerful one: “We left the airport and saw homeless people—invisible people,” she says. Her family then had a frightening subway ride from Manhattan where they almost got separated by closing doors before her mother could push into the crowded subway car. “We had no cell phones and no English. How would we have found each other?” she asks.

“In Peru,” she says, “people are often very poor, but they are not invisible. They are part of a community.”

It’s a vision that guides her life. ●



NANCY CONNELL

A Microscope, a Cello and a Global Perspective

Nancy Connell has chaired the University's Institutional Biosafety Committee since its inception 15 years ago. This scientist brings an incredible amount of knowledge and experience to her post at a time when there are serious concerns in the U.S. and abroad about safe handling of potentially lethal microorganisms by lab researchers. She has recently been named to the Division of Earth and Life Studies of the National Academies. **BY EVE JACOBS**

Nancy Connell never set out to be a bigwig in the world of bad bugs. With a newly minted PhD in microbial genetics from Harvard and a cello and bow in hand (she is an avid cellist), she came to New Jersey in 1992 to join the faculty of New Jersey Medical School's Department of Microbiology and Molecular Genetics.

But it is Connell's abiding interest in the politics of science and the ethical considerations of lab research that landed her in positions of authority in relation to a host of potentially lethal microorganisms, and later to collaborations with the U.S. Army on matters of high military concern, as well as travel to work in areas of the world where some fellow scientists are loath to go.

You could say that's just life in the post 9-11 era, but Connell was clearly ahead of the curve. Her interest in bioterrorism dates back to the early '80s when she was chair of the Committee on the Military Use of Biological Research, a subcommittee of the Council for Responsible Genetics, in Cambridge, MA. That interest blossomed as the appeal of flower-power declined and matured when the world became more aware of the potential threat of weaponized infectious agents. Connell has been an officer in that war—more recently as a member of the National Academy of Sciences Committee on Advances in Technology and the Prevention of their Application to Next Generation Biowarfare Agents. Their charge was to study “how the rapid advances in genetic engineering and biotechnology could enable production of biological weapons with unique and unpredictable characteristics.”

Connell is a tuberculosis researcher by training and heads up a lab that continues to delineate the basic biology of the TB bacillus, which kills millions worldwide each year. But her interests, and work, outside of the lab have been even more impactful. “Learning the political issues of science was part of my graduate training,” she says, “and I always teach my students that science can't be practiced in a vacuum. Everything we do impacts society in some way.”

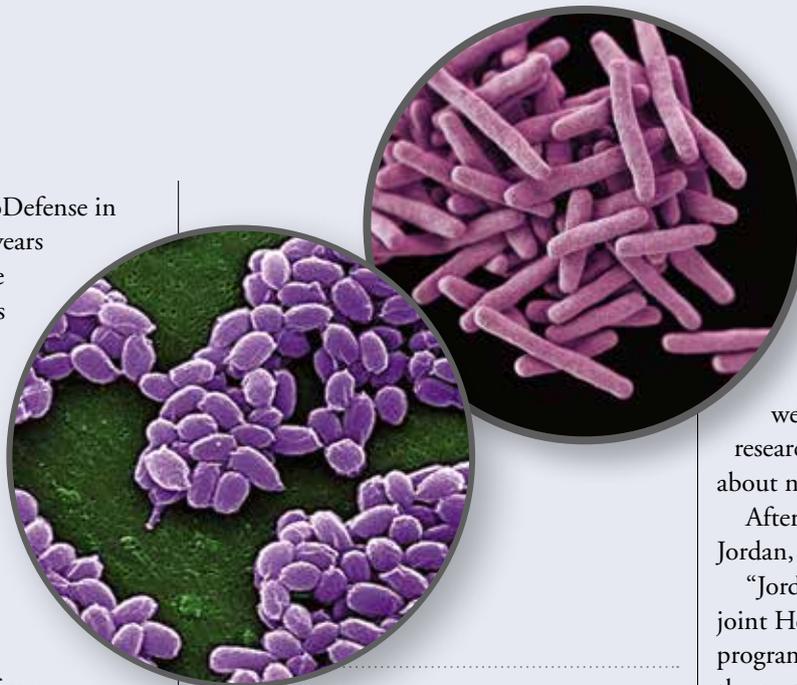
She helped lead a team that founded

the University's Center for BioDefense in Newark in 1999—a full two years before the second World Trade Center attacks—and served as its director for several years. The Center garnered millions of dollars in state and federal grants for research into faster detection and diagnosis of biowarfare agents and for development of biodefense preparedness training programs.

Anthrax, plague, tularemia, glanders, hanta virus, dengue fever, influenza virus, monkeypox (a close cousin of smallpox) and multi-drug resistant TB are among the diseases whose agents she has worked with. She directs a Biosafety Level 3 laboratory at the Center for the Study of Emerging and Re-emerging Pathogens at NJMS and heads up one of five “discovery cores,” that are part of a \$26 million grant awarded to David Perlin (see story on page 18). Connell's group does the initial testing of newly discovered drugs in some combination on 30 different organisms, some of them weaponized agents. Her major research focus is in bacterial antibiotic drug discovery.

A typical work day for Connell might mean travel to Washington, DC, to participate in a committee meeting; speaking to *USA Today* as their reporters investigate biosafety practices on BSL Level 3 labs; or slipping on her “cover-up suit,” booties, multi-layered safety gloves, HEPA filtered mouthpiece and laboratory goggles to do hands-on research. She is also a passionate educator and never turns down an opportunity to teach scientists, especially student-scientists, about the seriousness of their responsibility to ensure the safety of the laboratory environment, and the well-being of the immediate community and the wider global community.

Her current position as chair of the Bio-Safety Committee at Rutgers Biomedical and Health Sciences' Newark campus calls on all of her research experience and lab skills, as well as her concern for the well-being of her



Anthrax, plague, tularemia, glanders, hanta virus, dengue fever, influenza virus, monkeypox, and multi-drug resistant tuberculosis (TB) are among the diseases whose agents Nancy Connell has worked with.

fellow researchers, the university community and the surrounding community. A mistake made while handling potentially dangerous bacterium, such as the one that causes tularemia, for instance, could jeopardize the safety of many. There have been several recent incidents at the Centers for Disease Control and Prevention where laboratories handling potential bioterror weapons have been cited for failing to properly secure these agents and failing to provide appropriate training to those handling the organisms. Safety and proper training are high on Connell's priority list.

In fact, her perspective for this mission is global. Over the past four years, she has jumped on a plane for six-day jaunts to Malaysia, Egypt, Italy, Croatia, and most recently Jordan. Although travel is a great pleasure for her, she is there to do a job that she feels passionate about—running workshops for scientists on how to conduct research

properly. “I am welcomed, scientist to scientist,” she says. “These are post docs, young researchers. We raise awareness about dangerous specimens, particularly those that can be used as biological weapons. We teach methods for doing research responsibly. It's not political. It's about not doing science in a vacuum.”

After recently returning home from Jordan, Connell sent a description:

“Jordan was amazing. The project is a joint Howard Hughes-National Academies program and funded by the State. Several of the participants were young scientists from Yemen. It is astounding what they are doing: directing labs, teaching, and running ethics programs during a war. It's as though they have to find short windows of peace to carry these activities out. They are determined to continue their academic lives.

“We were there to see presentations of the projects that the participants in earlier workshops had carried out after they had finished the workshops and gone back home. I calculated that we have reached well over 1,500 people in the Middle East.

“Today the four Yemenis spoke, all women, all in headscarves and covered to the wrist and toes: one named Fatima (there are two) kept pointing out in her slides which one was her, in a row of women indistinguishable in black burkas. Comparing her presentation to the one from Morocco, she said: ‘Morocco is all color, but we all know that it is what is in the mind that counts.’

“Then she reached in her briefcase and pulled out a full veil and showed us how she can convert from headscarf to burka in an instant. Indeed, it was a lesson in how to organize ethics programs during a war: Wait for the ‘window of peace.’

“They have no electricity for hours/days as a regular thing, occasional shelling, certainly a coup d'état yesterday,” Connell concludes. “My colleague and I are going to buy them each a small solar panel so they can at least charge their phones on the bad days.” ●

You can email her at: connell@njms.rutgers.edu

DAVID CENNIMO, MD'01

A Passion for New Jersey

NJMS is central to the life of this teacher, clinician and residency program director. He invites all alumni to participate in helping to prepare future graduates of the medical school. **BY EVE JACOBS**

David Cennimo, MD'01 is dedicated to the Garden State. He would be the first to tell you he's a "true Jersey Boy"—passionate about all that goes on here. Born in Bayonne and raised in Union, he earned his BA from Drew University in Madison in 1997 and then spent 14 years post-college training at NJMS in Newark. First, he earned his medical degree in 2001 and then finished a four-year combined residency in internal medicine and pediatrics in 2005, followed by two fellowships, first in adult infectious diseases and then pediatric infectious diseases, which he completed in 2011. He chose to stay in Newark and has no plans to leave any time soon.

Cennimo loves New Jersey's diversity—of people, places, activities, opportunities. As an undergraduate, he had a wide range of interests, enjoying Drew's beautiful campus and liberal arts culture, which he says taught him how to think and solve problems. While majoring in biology and chemistry, he nevertheless found time for traditional liberal arts courses and for honing his interpersonal and leadership skills through extracurricular activities, as well as researching and defending a chemistry-honors thesis. In fact, despite having "zero musical talent" (making him the "furthest thing from a real Jersey boy"), he developed a great appreciation for musical and dramatic theater while at Drew and still attends shows there frequently.

When it came time to choose a career, Cennimo seriously considered veterinary medicine and medicinal chemistry/pharmacological research before understanding that "human medicine"

is where he belongs. He jumped into the medical school application process late in the cycle and NJMS accepted him off the waitlist in the summer of 1997. After spending a day at the medical school, including a tour of the hospital, Cennimo's decision was easy.

"That was it," he says. "I knew I was heading to Newark." The diversity of patients, the busyness of the emergency room, the opportunity to care for very sick

patients in the intensive care units, and the hard-working dedication of the medical staff all called to him.

He also clearly remembers the words spoken at his White Coat ceremony: "The reason we give you a white coat right away is to use it. Put it on and go to work." He did. His first year as a medical student "was filled with patient interaction," he says. "That's one of our biggest strengths here and it's unusual. You come here to learn how to do hands-on medical care and that learning starts right away." It confirmed his choice to pursue "human medicine" and started to open his eyes concerning how to combine his academic pursuits in infectious disease with patient care.

Curiosity led Cennimo to apply for residencies and fellowships across the country, but he discovered there was "no place like home. Truthfully," he says, "no place called

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ZAKIYA QUALLS

Many Interests, but One Love—Science

BY GENENE W. MORRIS

Zakiya Qualls is a woman of many interests. A guitar- and violin-playing Rastafarian, she is fascinated with holistic health and runs her own Afro-centric décor business. But at her core, Qualls is a scientist determined to make the kinds of discoveries that could one day save lives.

From the moment that Qualls took her first biology course as a curious and precocious child enrolled in the Talented and Gifted Program at Heather Hills Elementary School in Bowie, MD, she knew that she was going to be a scientist.

“I just fell in love with it,” says Qualls, a PhD student at Rutgers Graduate School of Biomedical Sciences (GSBS) in Newark. “I knew I didn’t want to be a physician. I didn’t want to prescribe. I wanted to actually create the medicines that would cure people.”

It’s the challenging aspects of research—the trial and error; the problem-solving; the troubleshooting; and the findings—that Qualls sees as intriguing and rewarding.

Her talents as a student and scientist have garnered her recognition (as an undergraduate she was featured in a 2010 *New York Times* article headlined, “The Country Can Learn a Lesson From These Students”) as well as awards, coveted scholarships, and internships with the National Institutes of Health.

After earning a full scholarship to study at Howard University in Washington, D.C.—a historically black college attended by her great grandmother, grandmother and mother—and graduating *cum laude* from the school in 2011 with a degree in biological sciences, Qualls could have gone to just about any graduate school in the nation. She chose to pursue her PhD at GSBS because, she says, of its facilities, its faculty, its collabora-

tions with other highly respected institutions and its proximity to the culturally diverse communities of New York.

“I did interviews with a lot of schools,” says Qualls, 25. “I really liked the environment here. I felt they cared...I didn’t even go to the school yet, but sensed they were invested in my future, not just in the school.”

An Alfred P. Sloan Foundation Scholar and a Foundation of UMDNJ Society of Research Scholar, Qualls works in the lab of Abraham Pinter, PhD, of the Public Health Research Institute at NJMS. There, she explores her research interests, including immunology, virology, and immunopathology while working on her dissertation project which aims to understand how HIV-1 escapes the host neutralizing antibody response by masking sensitive immune targets.

Her work as a student scientist has allowed her to travel to different parts of the United States and, most recently, to Canada and South Africa for conferences on HIV prevention and vaccine development.

As for the future, Qualls, who grew up taking violin lessons and taught herself how to play the guitar as a stress reliever, is open to the possibilities. Recognizing that positions in academic science can be difficult to come by for young PhDs, she has set her sights on industry. “Hopefully, I can do a post-doc working for a pharmaceutical or biotech company,” she says.

Qualls, who creates Afro-centric décor featuring African textiles, designs and patterns including switch plate covers; throw pillows; lamp shades; tissue-box covers; and canvas prints, would also love to somehow combine her love for science with her interest in holistic health. As a practicing Rastafarian, Qualls’s lifestyle puts great emphasis on living a life that is in harmony with nature. However, she says, a lot of information disseminated about “natural living” is not rooted in modern science. That’s where she believes her background as a scientist can come into play. “I feel I could bridge the two.”

Regardless of where her future takes her, Qualls says, “it’s going to involve some type of science.” ●

JOHN PAUL SÁNCHEZ

Champion of Diversity and Inclusion

BY TY BALDWIN

Growing up in the Bronx in the 1970s, '80s, and '90s, John Paul Sánchez, MD, MPH, was well aware of “the 96th Street Divide.”

“The New York neighborhoods below 96th Street represented a different kind of community, especially when you considered the residents’ socioeconomic status, racial and ethnic makeup, and their political empowerment,” says Sánchez, who joined NJMS last fall as assistant dean of diversity and inclusion, and assistant professor in the Department of Emergency Medicine.

“Because I had the good fortune to be taken to Central Park and the area-museums, I could sense the differences. Bronx residents’ style of communicating—in so many vibrant languages—their dietary habits, and cultural celebrations were undercut by a decrepit infrastructure of burnt-out buildings and impoverished surroundings. Witnessing the struggle of family members who were trying to navigate the health care system, I wondered about the various factors that contribute to social and health disparities. I think living that experience drew me not only to medicine but to public health.”

When Sánchez was a teenager, a member of his extended family passed away from AIDS. “It was mentioned, but it wasn’t discussed in great detail. I didn’t know how he became infected. Feeling how this disease affected my family and at the same time coming to understand my own sexuality as a gay man was just overwhelming. I knew that I needed to understand this disease in detail if I was going to survive.”



John Paul Sánchez (center) with NJMS students (l-r): Julia Kirchner; Jason Domogauer, also a PhD student at GSBS, Newark; Jilyan Decker; and Alvin Nyaboga

Local news often reported on how the Bronx was disproportionately affected by the AIDS epidemic, Sánchez remarks, but he realized that the borough suffered many other disparities. “We were markedly overwhelmed by other health conditions, including substance abuse, mental health issues, chronic disease and problems emanating from poor living conditions.”

During college at NYU, Sánchez “took all of the typical pre-med courses—biology, chemistry, organic chemistry, and physics. But I felt something meaningful was missing; the courses never discussed the patient or community health.”

Between his junior and senior years, Sánchez faced something of a crossroads. He had been offered a prestigious summer internship at Weill Cornell Medical College, which had a solid reputation for preparing college students for medical school. He had also been accepted to a summer enrichment program on public health at the Centers for Disease Control and Prevention and the Morehouse School of Medicine, in Atlanta. His father thought Cornell seemed the safer choice, but Sánchez followed his passion.

“I went to Atlanta and had a transforma-

tive experience. It was the first time I had met Latino and African-American physicians who were not only caring for patients but who were also focusing on community health issues like HIV/AIDS, asthma, and toxic landfills. That’s when I made the decision that without a doubt I would not only become a physician but also a researcher.”

Sánchez earned his master’s degree in public health at the Yale School of Public Health and then worked for a year as an epidemiologist at the New York City Department of Health. He then spent two years as a researcher at the Albert Einstein College of Medicine before beginning medical school. Following his residency in emergency medicine at Jacobi/Montefiore, Sánchez sought out an academic appointment and was referred by the director of the Hispanic Center of Excellence at Einstein to Maria Soto-Greene, MD, director of the Hispanic Center of Excellence at NJMS.

“Dr. Soto-Greene was interested in the teaching, research, and community service work I was engaged in around LGBT health, especially regarding the intersection of sexual and racial/ethnic identities,” Sánchez states. “She was about to assume a new position as

chair of the Association of American Medical Colleges Group on Diversity and Inclusion (GDI), and she asked me to consider participating on the national committee to help with efforts to promote medical schools' inclusion of LGBT identity."

Sánchez decided on a faculty position at Einstein, but was able to sit on the GDI committee. "Serving on the committee to champion LGBT issues, and interacting with the AAMC and student, resident and faculty leaders from academic health centers across the country, provided me with a unique education and real-world set of experiences."

Last year, when Sánchez sought out a position where he could focus on diversity and inclusion work, the position of assistant dean of diversity and inclusion at NJMS fit best with his personal and professional aspirations. "Although coming to Newark meant leaving the Bronx, I knew that, in Newark, I would be giving back to a community that is similar to the one that raised me."

Sánchez, who is board-certified in emergency medicine, adds that his position at NJMS is "an incredible opportunity to practice, and serve Newark and the academic community." He works in the emergency room at University Hospital, teaches medical students and residents, is involved with trainee and faculty recruitment and development, and does research, primarily in the area of workforce and career development to explore the best ways to promote diversity and inclusion in academic medicine. He is principal investigator for a national initiative, entitled Building the Next Generation of Academic Physicians, which raises the awareness of diverse medical students and residents of academic medicine as a career option, and provides resources for embarking on an academic medicine career in research, education, and/or leadership.

"In my role I have the privilege to help create an environment where people can bring forth their different cultural perspectives and life experiences to enhance collegial learning, high quality patient care, and scholarship at NJMS." ●

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Passion for New Jersey

Continued from page 14

to me in the same way. I say to my students: 'Other locations may have a name and reputation, but is there anything better about the learning experience?'"

"Nothing," he tells me, "nothing at all."

"Opportunity" is the word that peppers Cennimo's description of his life at NJMS. The faculty, he says, gave him many early opportunities to explore his options and develop teaching skills under the mentorship of expert teachers. James Oleske, MD (who in 1981 recognized that infants could contract at birth the disease that came to be known as AIDS) helped the young medical student define, and start to focus his efforts on, his career goals. Working with patients at the Student Family Health Care Center, a student-run volunteer clinic that cares for patients with no insurance coverage, also provided him with a breadth of experience.

"The opportunities for success and fulfillment have just kept on coming," he says with gratitude. "Even the chance to do



David Cennimo is director of an intense second-year course called Disease Processes, Prevention, and Therapeutics. It covers pharmacology, nutrition, clinical preventive medicine, clinical medicine, and pathology.

fellowships in both adult and pediatric infectious disease was one that required coordination with several departments.

"This flexibility," he says, "has meant a lot to me and is one of the reasons I chose to pursue my career here." He is now at the point in his career where he feels ready to give back by creating opportunities for medical students and new doctors to train in New Jersey.

Cennimo is currently the director of "an intense second-year course" called Disease Processes, Prevention, and Therapeutics, which covers pharmacology, nutrition, clinical preventive medicine, clinical medicine, and pathology. He is also the Medicine-Pediatrics residency program director, a position that he says is "especially fulfilling since this is the program that trained me." In addition, he treats both adults and children with infectious diseases on an outpatient basis, as well as doing inpatient teaching at University Hospital (UH). "I get to do everything I enjoy," he says. "I don't think it gets much better than this."

University Hospital also has personal meaning for Cennimo. His father received years of lung cancer treatment from NJMS and UH students, residents and physicians. In memory of his father, Cennimo established an endowed scholarship that will be awarded to an NJMS student in perpetuity. "He got good care and was so happy to be part of the teaching-learning process here that it seemed a fitting way to honor him," he says.

Cennimo, the teacher, is always searching for new and better learning experiences for his students. Knowing that many NJMS alumni do important work just outside the walls of academia, he wondered out loud, "Is there any way to use this article to reach out to alumni who might want to help train a medical student in their offices for a half-day each week?"

The *Pulse* editors assured him that his story would likely peak the interest of others wanting to keep good Jersey docs in the Garden State. You can reach him at: cennimda@njms.rutgers.edu or 973-972-6481. ●

HOW TO WIN THE WAR

Pulse spent a day catching up with William Gause, David Perlin, Nikhat Parveen and Salvatore Marras, just four among so many researchers engaged in this battle. **By Maryann Brinley**

It's a scary struggle. Forget guns, bullets, bombs and drones. Humans are entangled in a far more lethal world war than the conflicts often described in the news. The numbers and potential kill factors are frightening. Ebola is just one recent enemy amidst many. Every year, two million people develop hospital-acquired infections, for example, and existing antibiotics are often useless. ● The good news: When it comes to fighting the battle against infection, inflammation, disease and immunity gone haywire, there are new weapons in the research labs. Let's talk about helminth worms, for instance, or enzymes with crab claws to unhinge bacteria, and secrets in dirt. Let's also applaud the rapid battlefield tests being designed by NJMS researchers. There is an overall plan taking shape with strategic headquarters at the Institute for Infectious and Inflammatory Disease (I3D) on the NJMS campus in Newark.

IBD

Diabetes

Borrelia burgdorferi

Anaplasma phagocytophilum

Francisella tularensis

Escherichia coli

Mycobacterium tuberculosis

AIDS

Babesia

Brucella melitensis

Acinetobacter baumannii

Cardiovascular disease

Ebola

Yersinia pestis

Malaria

Burkholderia mallei

Klebsiella pneumoniae

Enterococcus faecium

Rickettsia spp.

Burkholderia pseudomallei

Fungal Disease

Asthma

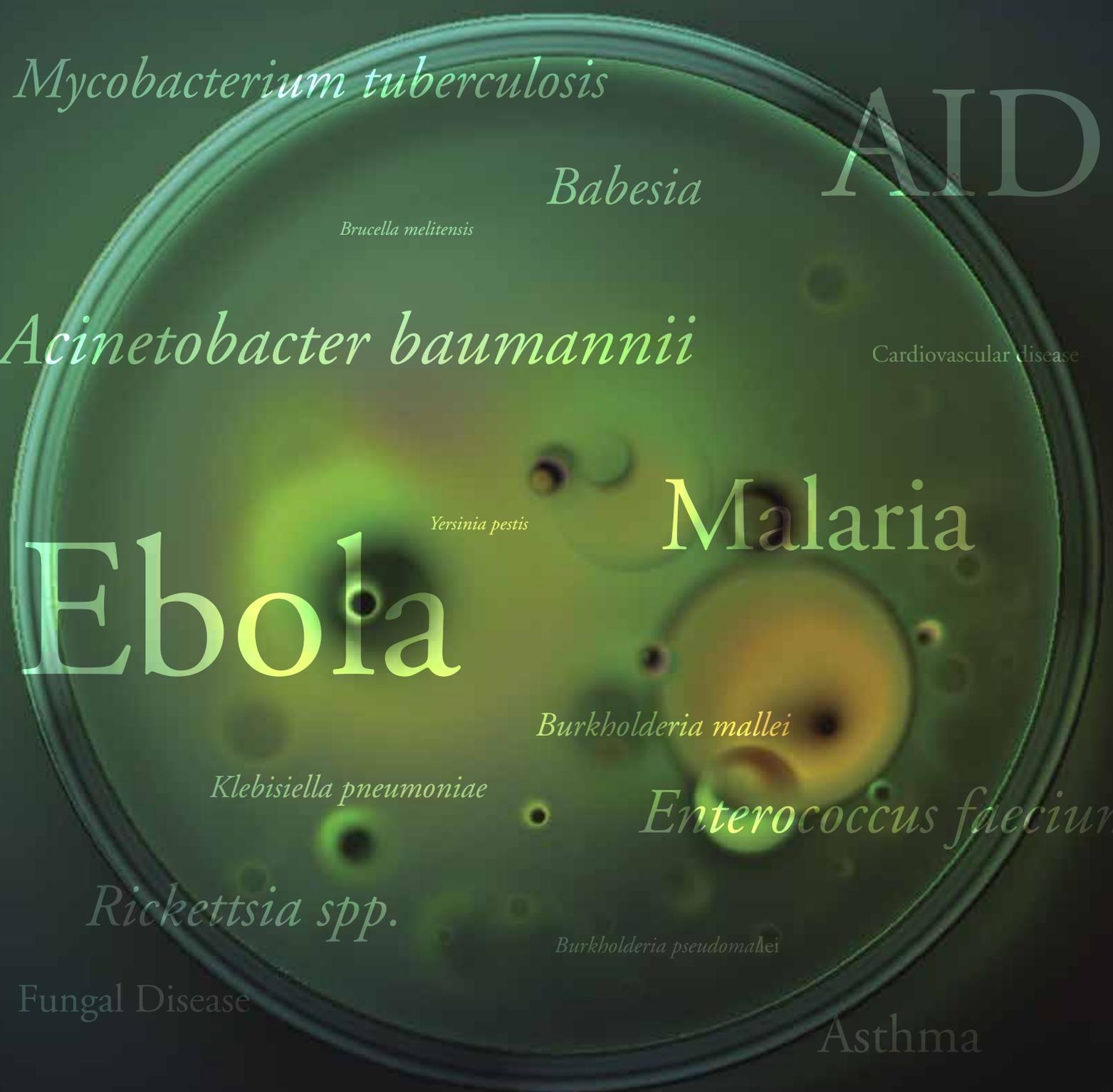
Bacillus anthracis

Sepsis

Staphylococcus aureus

Obesity

Pseudomonas aeruginosa





David Perlin



David Alland

“It’s time to join forces to tackle disease at the intersection of inflammation and infection,” says one of the directors of I3D, William C. Gause, PhD, senior associate dean of research. Born two years ago, the Institute has brought world-class scientists together to build upon the expertise at cutting-edge facilities like the Public Health Research Institute (PHRI), the Center for Immunity and Inflammation (CII) and the Center for Emerging and Re-Emerging Pathogens. “We are at the crossroads of discovery with unprecedented opportunity to develop new treatments for a wide range of deadly diseases,” according to Gause. “What if a simple diagnostic test could rapidly detect the world’s most contagious diseases? What if the body’s own immunological defenses could be harnessed to combat inflammation without compromising our resistance to disease?”

Inside the Antibiotic Labyrinth

Perhaps no one has seen more of this war upfront than David Perlin, PhD, executive director of PHRI. Last year, the National Institute of Allergy and Infectious Diseases (NIAID) and its Centers of Excellence for Translational Research (CETR) chose Perlin as the principal investigator and awarded him \$26 million to develop new antibiotics. Always straightforward, he says, “We have a worldwide crisis with major unmet needs. There aren’t sufficient drugs and too many are in the same chemical classes that make them resistant to just about everything. The pipeline for new antibiotics is running at a trickle. In fact, the medicine cabinet is empty in many cases.”

A combination of factors led the world into this war-with-no-weapons bind. Pharmaceutical companies once built their businesses on medications for acute conditions and have not made new antibiotic development a priority for decades because it’s not profitable enough. “When you get sick, you take an antibiotic for 10 to 12 days at most. That’s it,” Perlin explains. “Chronic conditions like high blood pressure or cardiac disease require drugs longterm, where the real money is.” Meanwhile, bacteria continue to develop resistance so the need for new antibiotics is ongoing. The Food and Drug Administration (FDA) also set the bar for drug approval too high requiring years of clinical trials not for safety but for efficacy, a rule that has finally been changed for antibiotic-resistant conditions. “Why would a company spend a billion dollars and 10 to 15 years on a drug that only affords them three to four years of U.S. patent protection?” Perlin asks.

“To jumpstart the drug discovery process,” Perlin has five projects with six core areas of expertise, in a new “Center to Develop Therapeutic Countermeasures to High-threat Bacterial Agents.” War-like words like “countermeasures” and “high-threat” are used on purpose, he explains, because “we want drugs that are novel and could potentially be used for strategic national purposes. It’s a battle against these pathogens.”

By choosing key players with deep experience at each point in the drug “discovery to market” process, including Cubist, an antibiotic

pharmaceutical company, he has put together a “group much like an academic-based pharma company. This could become the paradigm for how to do early phase drug discovery especially in areas of unmet needs.”

A significant component of this grant involves researchers from the Center for Emerging and Re-Emerging Pathogens run by David Alland, MD. Alland focuses on different aspects of *Mycobacterium tuberculosis* biology, epidemiology, and rapid diagnostics, and his group is looking at novel targets to develop new anti-TB drugs. He designed a test for TB endorsed by the World Health Organization in 2010 and is now working on one for Ebola after receiving \$640,000 from the NIH.

Other NJMS researchers have a variety of backgrounds. From medicinal chemistry (Joel Freundlich, PhD), pharmacokinetics (Veronique Dartois, PhD), structural refinement (Min Lu, PhD), *in vitro* screening (Nancy Connell, PhD), to the sophisticated animal infection modeling in Perlin’s own domain, “we can move compounds through rapidly,” Perlin explains. A separate board includes prominent pharmaceutical executives “to help us prioritize. Imagine if you are generating thousands of compounds. You need advice picking the ones the pharmaceutical world would deem appropriate to develop.” The aim is to license these discoveries out to companies. “Academic scientists are good at discovering small molecules but they don’t have the resources to do the compound refinement” or the ability to carry out small and large animal studies, as a prelude to human clinical trials.

“Dirty” Secrets and Crab Claw Enzymes

At the early end of discovery is Sean Brady, PhD, from Rockefeller University. “I’ve known Sean for years and he has really cool, innovative research,” Perlin explains. “He’s utilizing nature, bumping it up to go faster.” Actually, Brady is looking for drugs in dirt, sifting soil samples for uncultured, novel bacteria that could lead to antibiotics. “Genetic evidence hints there are many more bacteria out there,” Brady believes, with “vast chemical and biosynthetic potential.” His Laboratory of Genetically Encoded Small Molecules uses gene sequencing to synthesize “a rich, undiscovered source of useful natural products.” Historically speaking, he’s on the right track. Many current antibiotics, including tetracycline and vancomycin as well as cancer drugs and immune therapeutics, have roots right in nature.

What if the answer to the antibiotic crisis was hidden in plain sight? Besides leading the medicinal chemistry area, Freundlich is focused on learning from hundreds of thousands of molecules that have already been tested for antibacterial activity. The data resides in publicly accessible electronic archives, dormant for years until he and longtime collaborator, Sean Ekins, PhD, demonstrated how computational models can leverage this information to predict new antibacterial agents.

Then there is Richard Ebright, PhD, from Rutgers’s Waksman Institute of Microbiology, where the groundbreaking antibiotic

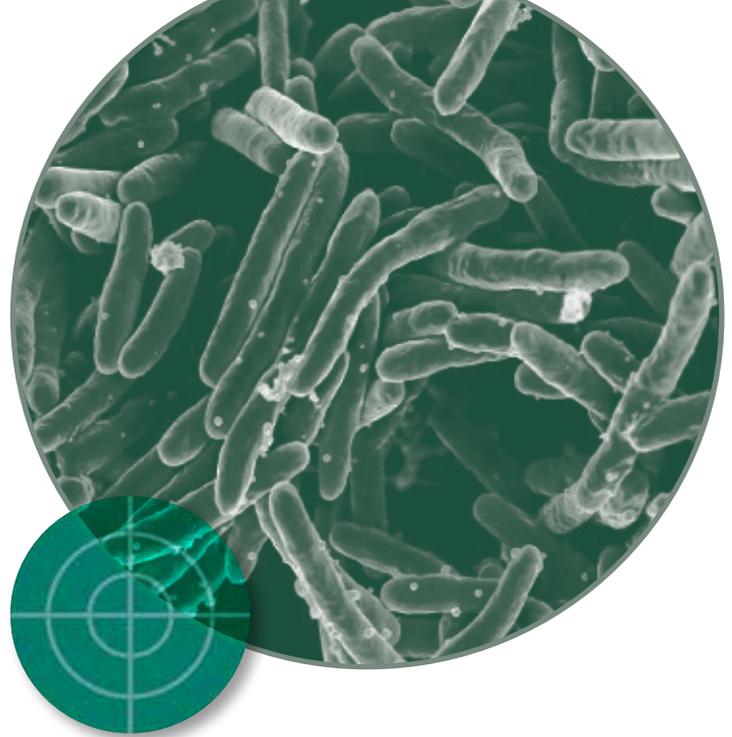
streptomycin was developed in 1943. He “is looking at a promising molecular target that can overcome existing antibiotic resistance,” Perlin explains. “He has the right kinds of molecules to jump the divide from preclinical to clinical.” Three compounds interfere with the action of bacterial RNA polymerase, an enzyme with a “shape reminiscent of a crab claw,” Ebright says. It uses a “pincer hinge” to stop bacteria from obtaining DNA genetic information.

Worms and Immunity

Asking big questions and digging deep for answers to immunity and inflammation come naturally for Gause, an intense, no-nonsense researcher whose lab interests have focused on how worms, helminths, trigger immune switches.

“Worms?”

Yes, this is metazoan parasite theory. “This research could be important in the development of vaccines against a variety of pathogens,” he explains. Helminths have coevolved with vertebrates for millions of years, shaping the activation and function of immune responses. To understand them in the lab is key to finding answers to many mysteries



David Alland designed a test for TB endorsed by the World Health Organization in 2010 and is now working on a diagnostic test for Ebola.

of immunity. When helminths and other metazoan parasites enter, exit, or migrate through their host, macrophages (disease-fighting, white blood cells) are activated in defense. Then, in a complex, type 2, trained immune response, the second time the host is exposed to the parasite—in the same way a vaccine works—the macrophage remembers just what to do. Lesson learned, the host survives, stronger than before, immunological memory bumped up. “If our own body’s macrophages can be effectively trained to fight invaders for which traditional vaccines are ineffective, they could destroy viral invaders like HIV or Ebola,” he explains. This differs from type 1, innate immunity where the body launches a vast array of defenses against infectious agents or invading pathogens, sending phagocytic cells like macrophages and neutrophils into battle, sometimes with unwanted side effects from toxic antimicrobial products.

Gause has found another piece to this immune puzzle through his worm work. The type 2 immune response triggered by helminths produces cytokines and factors that are different from the harmful inflammation of innate immunity that can lead to a variety of diseases and conditions including: cardiovascular disease, diabetes, implant failure, chronic wounds, inflammatory disease, and even obesity. In fact, this type 2 immunity has regulatory cells that block bad inflammation associated with type 1 immune response. It also can directly enhance wound healing and tissue repair. Harnessing components of the type 2 immune response to control harmful inflammation and enhance wound healing is an active area of study in the Gause laboratory.

Breakthrough Tests

In a perfect example of the kind of collaboration needed to win any war against pathogens, two researchers have been reaching across laboratory lines for a breakthrough test for Lyme disease. Victims are already applauding because up until now, the science helping them has been inadequate. The ticks and bacteria have been winning.

At the conference table on the third floor of PHRI, the air of excitement is palpable. Nikhat Parveen, PhD, is an associate professor in the Department of Microbiology, Biochemistry and Molecular Genetics who studies tick-borne pathogens, syphilis and multi-drug resistant bacteria like *Pseudomonas aeruginosa*. Salvatore A. E. Marras, PhD, an assistant professor in the same department, shares a PHRI lab on the other side of the building with Fred Kramer, PhD, and Sanjay Tyagi, PhD, the team that invented molecular beacons 20 years ago. Together, Parveen and Marras have designed a sensitive, multiplex test not only for *Borrelia burgdorferi*, the spiral-shaped bacteria transmitted by ticks that cause Lyme disease, but also for two other tick-transmitted pathogens that coinfect the critters and wreak havoc in humans: *Anaplasma phagocytophilum*, an intracellular bacterium, and *Babesia microti*, a parasite similar to what causes malaria. Both are dangerous and often undetected.



Salvatore Marras and
Nikhat Parveen



William C. Gause

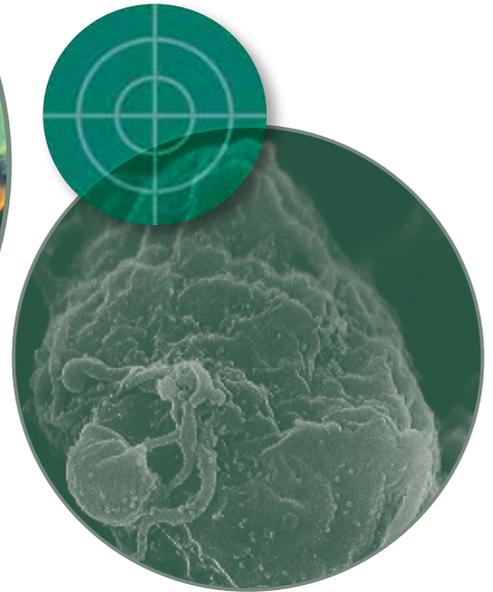
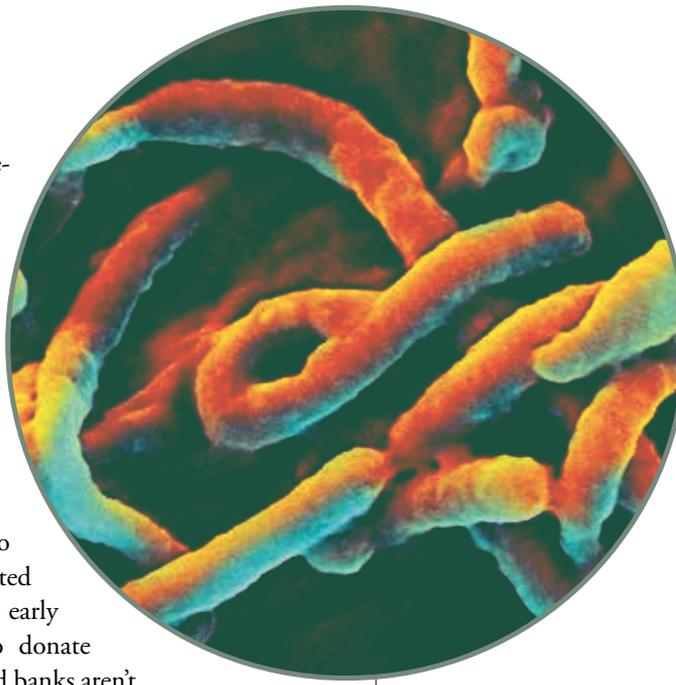
“All three pathogens use white-footed mice as a reservoir host and white-tailed deer populations to spread long distances. Babesia grows in red blood cells and the infection may remain asymptomatic. Anaplasma thrives in white blood cells. Both can lead to severe, fatal disease,” Parveen explains. “These two pathogens can also be transmitted by blood transfusions but it is difficult to check for them.” And, because infected patients don’t always feel sick in early stages, they have been allowed to donate blood, endangering the supply. Blood banks aren’t testing for Babesia and Anaplasma because efficient, cost-effective diagnostic assays haven’t been available.

Marras relishes teamwork. “This is so mutually beneficial. The introduction of molecular beacons has made it possible to detect RNA and DNA molecules in living cells and in clinical samples to quantify and detect multiple pathogens simultaneously.” Kramer and Tyagi describe the probes like this: “Imagine a magic reagent to which is added a droplet of body fluid from a patient. A glow appears in the tube and the color of the glow identifies the pathogen responsible for the patient’s illness.”

News of this test has already created excitement among patients. “You would not believe the overwhelming response to our first paper in 2009. We were still editing, but because the manuscript was online,” Parveen recalls, “I was getting calls from everywhere. These people are suffering and want answers so our assay is very timely.”

The Centers for Disease Control and Prevention (CDC) estimates that only one-tenth of Lyme disease cases are accurately diagnosed. Clinical manifestations are tricky and testing hasn’t been effective, unable to distinguish between active and underlying disease. And since antibodies against the pathogens persist in blood for a long time, it has even been difficult to confirm a cure. Patients are also susceptible to secondary infections that might explain some of the random symptoms reported in Lyme disease.

What’s next? They have applied for a patent and are speaking with a Massachusetts company that is ready to start developing the assay for field application, particularly for the blood bank samples. Parveen plans more human blood testing and is working with physicians like Kristine Gedroic, MD, a Harvard-trained specialist who has Lyme disease patients in her integrative medical practice in Morristown; Kathleen Casey, MD, of Jersey Shore University Medical Center; Melvin Weinstein, MD, Chief of Infectious Diseases, Allergy and Immunology, Robert Wood Johnson Medical School (RWJMS); and Tanaya Bhowmick, MD, RWJMS. Finding more patient samples from the northeastern U.S. and Europe where tick-borne diseases



“If our own body’s macrophages can be effectively trained to fight invaders for which traditional vaccines are ineffective, they could destroy viral invaders like HIV or Ebola,” explains William Gause.

are prevalent is on Parveen’s to-do list. She also wants to expand her technical expertise to develop assays for early detection of emerging multi-drug resistant Gram-negative bacteria in hospitalized patients and for efficient diagnosis of syphilis.

Parveen says, “Our test will be able to diagnose from early to chronic stages of Lyme as well as babesiosis and anaplasmosis in one assay. It is so sensitive and specific that any level of the pathogens present can be found.” Coinfections with these three pathogens have been increasing,” she adds. “There is a lot of tick-borne disease in Europe where Lyme originated hundreds of years ago though it was first diagnosed in the U.S. in Lyme, Connecticut. You see a lot of Lyme disease from Massachusetts to Maryland but not in Newark.”

What you do see in Newark, however, are world-class scientists advancing the war against infection, inflammation, and immune disorders. ●

Visit the I3D Website: <http://research.njms.rutgers.edu/i3d/index.php>



THE GOOD DOCTORS

With the new financial imperatives of our medical system and the ever-growing role of technology in all aspects of health care, many of us fear that the doctor-patient relationship will suffer. According to a 2013 survey by *Consumer Reports*, most patients put a premium on empathy, compassion, and humaneness—often valuing them even more than the doctor’s skills in a given specialty. You can rest assured those qualities will not disappear from medical practice any time soon. Medical students—at least those at NJMS—are still choosing the profession for all of the “right” reasons. **By Eve Jacobs**

Christina Sarris, a fourth-year medical student and future neurosurgeon, will not enter this profession with stars in her eyes. Raised in upstate New York with three younger siblings, she has a mother who is a nurse and a neurosurgeon-father. She knows the unrelenting demands of this specialty—long hours in the operating room, very sick patients, and a particularly challenging residency that is often not welcoming to women.

But she also recognizes this profession’s particular satisfactions. Despite great advances in the field, the brain is still a mysterious organ, and fixing it surgically when it goes wrong takes consummate skill achieved through years and years of study. Sarris is ready.

She decided to become a doctor while still in high school, and matriculated into a seven-year program offered collaboratively by The College of New Jersey and NJMS—allowing her to shorten this part of her studies by one year. “It was a hard choice but financially a good choice,” explains Sarris, who turned down a spot at the University of Pennsylvania. “I struggled with the decision, but looking back, I wouldn’t change anything and felt more than prepared to enter medical school.”

Sarris majored in biology, excelling in neurobiology and immunology courses, but was hit with a major setback midway through college—her father was diagnosed with Parkinson’s disease at the age of 52 and gave up his livelihood and life in the operating room. “He didn’t have a tremor at the time,” she remembers, “but his movements slowed down. He was out of work for almost a year.”

Sarris herself went through some indecision and emotional upheaval—by the end of her third year of medical school, she was leaning towards specializing in internal medicine. However, watching her father rebuilding his work-life had a big impact on her. “He studied for his neuro-critical care boards, passed them, and became a



neurointensivist,” she says. (This is a non-surgical specialty dealing with life-threatening diseases of the nervous system—including strokes, ruptured aneurysms, brain and spinal cord injury from trauma, seizures, swelling and infections of the brain, and brain tumors.)

“He’s happy again,” she says. “Seeing how much he wanted to get back to his work made me want to do that, too. He says he’ll never retire.”

Sarris was also strongly swayed by the encouragement, warmth and support of faculty in the NJMS Department of Neurological Surgery. “This is the reason why women do or don’t go into neurosurgery,” she says. “People here made neurosurgery welcoming.”

She had Krystal Tomei, MD, who recently completed a neurosurgery residency at NJMS, as a model. “She took me under her wing,” says

Sarris. But the male neurosurgeons were just as encouraging, she says, including department chair and neurosurgeon Charles Prestigiacomo, MD, and neurosurgeons Chirag Gandhi, MD, Robert Heary, MD, and Antonios Mammis, MD, who completed a residency and fellowship in the department and is doing “intriguing work implanting neurostimulators for Parkinson’s disease.”

Sarris has been invited to 42 residency interviews—an almost unheard-of number in a highly competitive field. (There are 102 neurosurgery residency training programs in the U.S. offering 206 positions yearly.) She is thinking about specializing in the spine, and also likes pediatrics, which would add an additional year to the seven-year training time. Her goal is to combine all her “likes” and establish a career in academic medicine, where she can mentor future doctors—in much the same way that she has been mentored.

When time allows, she likes to cook her Greek specialties, enjoy the outdoors, and spend time with her family and her boyfriend, who is also a medical student. They met as tour guides in their first year at NJMS.

“I’m trying to get in the mindset that undertaking a long residency doesn’t mean I’m delaying life,” Sarris says. “I figure that I’ll be working 80 hours per week. That’s just what you have to do in neurosurgery.” That won’t leave much time for anything else, but Sarris is passionate about her choice.

Fourth-year student Eric Burnett can’t remember a time when he was not fascinated by science. He was raised by a single mother who held a variety of jobs—including nursing assistant and Lamaze instructor—and who actively fostered his science-studies, he says. His success in high school anatomy and physiology classes led him to Rutgers, New Brunswick, where he majored in biology and Spanish. But despite good grades, an academic focus on science, and decent MCAT scores, he did not get into medical school on his first try.

“I was ready to call it quits,” he says, “but my mom would not stand for it.”

So he applied and was accepted into a Master’s program at Rutgers Graduate School of Biomedical Sciences in Newark. “I loved it,” he remembers. An additional bonus—he met and conversed with George Heinrich, MD, associate dean for admissions at NJMS. [See related story on page 37.] “Dr. Heinrich encouraged me to apply for early decision.”

Burnett heard he was accepted in August 2010. He—like all those accepted at NJMS—received a personal call from Heinrich. The memory still makes him smile.

Unfortunately, Burnett’s first close-up experiences with the health care system—shortly after hearing about his acceptance—were not happy ones. His mother, whom he describes as “self-employed with no health insurance” was diagnosed with lung cancer that was already far advanced. He took care of her from December 2010 to May 2011. “She died just two months before my White Coat ceremony,” he says.



“Unfortunately,” he states, “I saw the other side of medicine first. The doctors looked down on my mother, thinking she did not take care of herself.”

Grieving and homeless (he and his brother had to leave their rental home), Burnett pushed forward “because it was my mother’s dream for me to become a doctor. She said, ‘You will be a doctor no matter what.’ It was so hard.”

James Hill, PhD, associate dean of student affairs, suggested Burnett apply to the school’s FIRST program, which offers selected students a stipend and six weeks of basic science courses in the summer before they begin medical school. For many nontraditional students, it alleviates some of the intense pressures of first-semester classes. Burnett could have lived in Rutgers student housing, but chose instead to remain with his brother. “I didn’t want to leave him,” he says.

At a particularly vulnerable time for him emotionally, the first-year medical student started to put down new roots and began to thrive. During year 1, he volunteered his time in the school’s student-run health clinic for patients with no insurance. He loved the early “clinical exposure”—time spent with patients rather than solely learning from books. “That started first week, first year. It was awe-inspiring,” he says. “The third- and fourth-year students were so good technically and also so good at interacting with patients.”

By his own third year, he was feeling much more confident and capable. And by his fourth medical school year, Burnett was ready to play a starring role in the Student Family Health Care Center.

In addition, the CALM (Collaborative Approach to Learning Medicine) program taught him valuable teaching and mentoring skills. Upperclassmen work closely with students to help them develop these skills. As coordinator for the second-year pathology review course, Burnett wrestled to transform it and make it more reflective of the United States Medical Licensing Examination (USMLE) Step 1, more often referred to as “The Boards.”

“Attendance at the course is voluntary and it has gone up. That’s a good sign,” he comments. Mentoring “a lot of students” has also become central to his commitment to medicine and to the school.

“I send the students emails and serve on panels on how to study,” he says. “I’m a guy they can go to when they need help or advice.”

Internal medicine will be his specialty—the variety and complexity intrigues him. “You act like a detective, taking disjointed information and making a cohesive whole. And I like the wide exposure to many different people and I like dealing with families,” he says.

He also loves the academic teaching, which he hopes to continue. “So much of medicine is about teaching,” he says. “There are so many opportunities to be a teacher and a mentor.”

Looking ahead five years, Burnett hopes to be in a fellowship in infectious diseases. One of his many interests is LGBT health care and risk reduction for HIV.

In his personal life, he has achieved his mother’s dream for him—which has become his dream, too. In May 2015, he will officially become an MD. He also has a long-term boyfriend whom he met just three months before his mother died. And his younger brother—who deferred enrollment at New Jersey Institute of Technology (NJIT) at the time of his mother’s death—just graduated from the school and accepted his first job as an IT analyst for Toys “R” Us. Life is good.

“The people here foster an ideal community to learn and practice medicine,” he says. “Everyone is so supportive.”

Fourth-year medical student Behrooz Vaziri moved to Millburn from Iran in 2004 and started tenth grade in a highly competitive high school speaking almost no English. That did not seem to stand in his way.

His brother was 20 years old when Vaziri’s father brought him to the U.S., seeking a second opinion on his older son’s medical condition. In Iran, he had been diagnosed with a rare eye condition and the prognosis was dire. Happily, doctors in this country were able to give a more definitive diagnosis with a positive long-term outlook. When his father returned to Tehran, it was with a determination to immigrate to the United States, where he felt the boys would have more and better educational opportunities.

“It was tough leaving family and friends,” says Vaziri. But in the summer prior to his first day at Millburn High, he learned enough English to excel in his coursework—with only an Oxford dictionary in-hand during tests.

Although his original career goal was engineering, the misdiagnosis of his brother’s condition and Vaziri’s subsequent realization of “how much you can help someone by making a correct diagnosis” led him in a new direction. He volunteered at Saint Barnabas Medical Center in Livingston, took a lot of science courses, and was accepted into NJIT’s honors college—majoring in biomedical engineering.

Vaziri took medically related courses in addition to his engineering requirements, became interested in radiology, and turned his sights

to medical school. In his junior and senior undergraduate years, he helped develop several biomedical devices, including an “eye-tracking” communications system “for those unable to communicate except through eye movements.” With this experience and a 4.0 grade average, he was an excellent candidate for medical school.

NJMS was a perfect fit for Vaziri—close to his family and providing “an early hands-on experience” taking care of patients. “And I had started thinking about going into radiology. Medical imaging is where medical diagnosis and technology meet,” he says. “I was excited.”

With Roger Howell, PhD, from the Division of Radiation Research at the NJMS Cancer Center, he invented and patented software that measures the biological response of cells to radiation from radio-pharmaceuticals and keeps track of all of the radiation that cells are getting. “Will the cell survive or die?” he says. “This information is useful to radiation oncologists and for research purposes.” The invention is now used worldwide.



“I was able to see the research end of radiology,” he says. And he liked what he saw. As Vaziri looks forward to starting a radiology residency program, he says: “My parents came here to give me and my brother a chance at having a great higher education. It was certainly hard for my parents, who gave up so much.”

Vaziri has also lived up to his parents’ dream. He will earn his MD in May and in five years, he hopes to be a practicing radiologist who does bioinformatics research in radiology and teaches at a medical school. “I love teaching,” he says.

But highest among the high points of medical school for Vaziri have been his four years of volunteering in the student-run health clinic. “There are many immigrants there and I can relate to them,” he says. “It’s so gratifying to help people with few resources. I always feel happy when I leave the clinic.” ●

To learn about scholarship opportunities, email: njmsalum@njms.rutgers.edu

A CLEAR AND PRESENT DANGER

BY EVE JACOBS

The retina is a delicate structure at the back of the eye that is critical to vision. Damage to this light-sensing tissue can impede the exquisitely orchestrated flow of light and image from lens to brain that we call sight. Some changes to the retina so severely impair eyesight that they are life-changing, for sure.

For Robert Wigder that life-changing news came like a one-two punch between the eyes. First, in June 2006, he was diagnosed with dry age-related macular degeneration (AMD)—requiring his eye condition to be monitored biannually. Then in July 2007, he was diagnosed with the wet form of AMD, also known as choroidal neovascularization. The difference between the two remains a huge mystery to most people—but, in fact, they are quite different in terms of symptoms, progression and treatment. For Marco Zarbin, MD, PhD, the details of the macula and its range of damaging changes are crystal clear. But a drive to understand how to halt those changes and then reverse them—ultimately restoring lost sight—is the impetus that drives his arduous research forward year by year.

Zarbin is chair of the Institute of Ophthalmology and Visual Science (IOVS) at NJMS, where he oversees all aspects of the Institute's life, including exceptionally busy clinical practices, a highly regarded residency program in ophthalmology (the only one based in the state), outreach to underserved members of the Newark community and its environs that has changed the eye-care picture for many local residents, and research—both lab-based and clinical trials—that helps develop new and better therapies. Zarbin himself has earned a far-reaching reputation as an expert in diagnosing and treating retinal disease, as well as actively pursuing research in AMD.

First, a short explanation is in order. AMD is a degenerative disease that tends to affect those older than 60 and involves the macula (the small central portion of the retina) that supports fine vision, which is needed to read, recognize faces, and drive. The dry form of the disease is diagnosed when yellow deposits, called drusen, form under the macula. As the deposits, which are thought to be abnormal accumulations of cellular debris, grow in size and multiply, they can cause vision to dim or be distorted. As the disease advances, the light-sensitive layer of cells (called photoreceptors) in the macula can die, as can cells called retinal pigment epithelium (RPE) that partner with photoreceptors to

support vision. As a result of photoreceptor and RPE death, patients can develop blind spots in the center of their vision, and eventually lose central vision. This advanced form of dry AMD is called geographic atrophy. The dry form is much more common than the wet AMD. “Dry macular degeneration sometimes leads to the wet form,” Zarbin states.

“How the dry form of AMD progresses to the wet form is not known exactly, nor is it understood why some patients never progress to geographic atrophy, why some patients with early AMD never progress to the wet form of the disease, or why some patients develop both geographic atrophy and choroidal neovascularization,” he continues.

Only about 10 percent of those with AMD develop the more damaging wet form of the disease in which abnormal blood vessels grow under the macula and leak blood and fluid into the retina. Blind spots, loss of central vision, and distortions, such as straight lines appearing wavy, can result from dysfunction and death of the light-sensitive retinal cells. The wet form is treatable with drugs (and other therapies) that often halt its progression but do not cure or reverse the disease. As a result, patients with wet AMD still can lose central vision despite treatment.

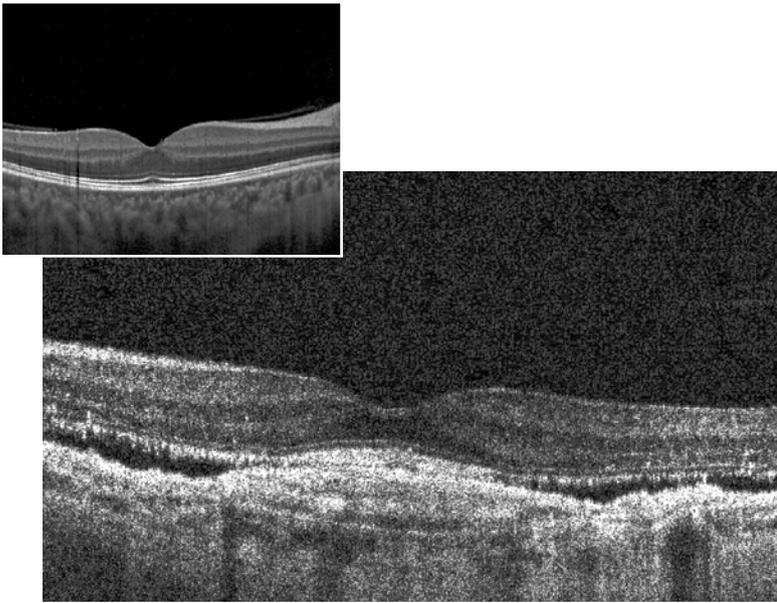
For Wigder, the bad news of his diagnosis with the wet form of AMD was followed by the good news that a drug called ranibizumab—which received FDA approval in 2006—would likely slow down the disease's progression. It is a form of a colorectal cancer drug called bevacizumab that inhibits a protein (vascular endothelial growth factor) known to stimulate the growth of new abnormal blood vessels. For Wigder, the thought of a monthly injection into the eye was horrific, but the potential loss of vision was even more frightening. He needed a lot of hand-holding to get through the first treatments, he admits, but that's exactly what he got at IOVS.

Wigder is not by nature a fearful man. In 1959, he founded Wigder Chevrolet in Livingston, and he has built his business from the ground up. He now employs more than 50 people and is still an active and vital part of the enterprise.

That is germane to this story for two reasons. First and foremost, he's not ready to give up his professional life, and he very much needs his vision to stay actively involved. Secondly, he has a deep appreciation

(l to r)
Marco Zarbin and Bernard Szirth





The “healthy retina” image (top) and the dry AMD image (bottom) were captured with OCT (optical coherence tomography) equipment. In the top image, there is a depression in the center. This is normal and represents the macula/fovea often referred to as the area with 20/20 vision.

In the bottom image, the area of the macula/fovea is disturbed and elevated, resulting in poor central vision, or blurred vision.

for what it takes to run a business well and to satisfy the expectations of clients. He views the Eye Institute as a multi-faceted business and gives Zarbin high marks on all facets: providing the highest quality product and service; running a “first-class” operation requiring the orchestration of many employees; and the “hand-holding” quality of understanding clients’ needs and responding to each patient in a personal fashion.

Despite losing some vision to AMD, Wigder still drives his car, goes to work every day, and engages in all of his usual activities. Reading—both on a traditional page and on a computer screen—are more problematic. However, the Low Vision Center at IOVS has outfitted him with the newest technology and equipment, which allows him to get by. And, of course, there are times, however few, when he leans more than he might like to on his wife—who drives him to and from his monthly eye treatments. (He has also had two cataract surgeries at IOVS.)

AMD affects about 1.75 million people in the U.S., with about 200,000 new cases diagnosed each year. With the aging of the population, that number is expected to rise precipitously over the next 20 years. And despite new drug therapies and sophisticated low-vision aids, macular degeneration is still the major reason for seriously damaged eyesight and blindness in those 65 and older in this country.

That’s where IOVS is reaching out farthest—with several of its many arms. With one of its newest pieces of diagnostic equipment, Bernard Szirth, PhD, director of Telemedicine and Applied Visual Science at IOVS, is heading up an effort in Newark and its surrounding communities to diagnose eye disease early and save sight. With optical coherence tomography (OCT) equipment in hand (the Eye Institute is equipped with a mobile, hand-held version of this device, a rarity in

ophthalmology practices), Szirth is able to take scans of the rear portion of the eye very quickly and in any location.

He can “see” into the eyes of hundreds of people in a single day and refer those with incipient eye disease, or those with more advanced disease not yet diagnosed, for appropriate care. OCT is particularly effective in picking up AMD, glaucoma (a disease that affects the optic nerve, which connects the retina to the brain), and diabetic retinopathy (retinal damage that is sometimes caused by chronic diabetes).

The hand-held OCT machine provides cross-sectional images of the retina, the retinal nerve fiber layer (RNFL) and the optic nerve head. “This is like taking an MRI of the eye, but it just uses light, no radiation,” he explains. “We see so much more than just looking into the eye with an ophthalmoscope.”

Zarbin explains that this equipment makes it possible to screen 19 patients an hour for a whole spectrum of problems—without ever dilating the eye. Because the equipment is light-weight and transportable, Szirth says, “We can go where people gather—community centers, churches, soup kitchens, homeless shelters, and programs for the elderly, for example. We can also comfortably screen children and wheelchair-bound patients.”

“Last month we screened 300 people in one very long day,” he states. The “we” he speaks of are medical students, who not only learn about how to diagnose eye disease, but also learn how to best serve the local community and its health care needs.

And, of course, not to be overlooked is the research that is woven into every aspect of what goes on at the Institute. Research pursuits range from clinical trials exploring new therapies for retinal diseases, many conducted by Neelakshi Bhagat, MD, MPH—a graduate of the residency program here who completed a fellowship in California and then returned to IOVS as a faculty member—to the more esoteric work that is done in Zarbin’s lab, where he and laboratory director Ilene Sugino diligently work out the obstacles to transplanting new RPE cells to replace those that are damaged as a therapy for the advanced dry form of AMD. “These RPE cells can come from embryonic stem cells,” says Zarbin. However, the process of keeping the cells alive is fraught with complex challenges. Zarbin and Sugino are making some headway in identifying the molecular components for a biochemical mixture that would aid RPE cell survival in the eyes of AMD patients.

Zarbin says the rate of moving research forward is highly dependent on funding: “With the right amount of funding, our work could be done in a year,” he predicts. However, with current research dollars limited, those results are likely three to five years down the road.

For Wigder, who has helped support that research every year since his diagnosis, the importance of helping to underwrite the development of new therapies is not in question. “The costs associated with translating therapies from the laboratory to the clinic are enormous,” he observes. “I won’t likely benefit from this research, but I know it will make a huge difference for many others in the future.” ●

Contact IOVS at Zarbin@rutgers.edu or 973-972-2038; or make a gift through the Rutgers University Foundation at: njms.rutgers.edu/makeagift

A Rutgers infectious diseases expert discusses the myths and realities of the measles outbreak and the vaccine gap that has abetted the current epidemic.

Measles Outbreak: What You Need to Know

Measles, a highly contagious respiratory infection that causes serious complications in about 3 of 10 people, has been grabbing headlines since the start of an outbreak last December at Disneyland in California. From January 1 to February 20, 2015, 154 people from 17 states and Washington, D.C. were reported to have measles, including one case in New Jersey. Most of these cases (77 percent) are part of a large, ongoing multi-state outbreak linked to Disneyland. Measured against the approximately 600 cases reported in 2014, this year is on track to set a record for a disease that was declared eradicated in the United States in 2000. While concern surrounding the outbreak has focused on children and the anti-vaccine movement, more than 60 percent of the cases reported are among adults—a statistic that led the CDC to urge adults to be vaccinated. This has many wondering: Am I protected? Pediatric infectious disease specialist and NJMS alumnus **Glenn Fennelly, MD'87, MPH**, chair of the Department of Pediatrics at Rutgers New Jersey Medical School, explains the myths and facts about measles and the measles vaccine and how to protect yourself and others.

Q: How does an outbreak like this occur after measles was considered eradicated in the United States?

A: The majority of people who are going to get measles are unvaccinated. Since measles continues to be common in other parts of the world, travelers can bring it back to the United States where it can spread in communities with pockets of unvaccinated people.

Q: How contagious is measles compared to other diseases?

A: Measles virus is highly contagious. If you are nonimmune and have contact with an infected person, there is a 90 percent probability that you will contract measles. Also, the virus can remain active and contagious for up to two hours on surfaces or in an airspace where an infected person coughed or sneezed.

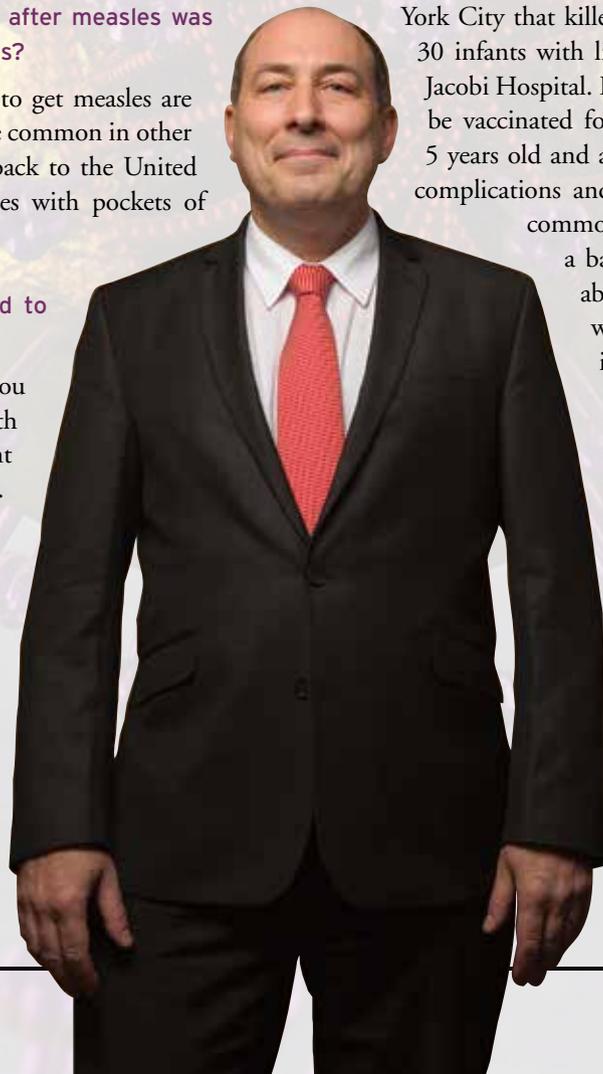
Q: Who is most at risk, and what are the complications of contracting measles?

A: Children younger than one year old who are too young to receive the vaccine are most vulnerable to contracting measles and can suffer severe complications. During a major epidemic in 1991 in New

York City that killed five children, we hospitalized more than 30 infants with life-threatening complications of measles at Jacobi Hospital. Four of the five children who died could not be vaccinated for medical reasons. Children younger than 5 years old and adults over age 20 have the highest rates of complications and death. Bacterial pneumonia is the most common complication. Often occurring against a background of malnutrition, it accounts for about 60 percent of all deaths due to measles worldwide. Other complications include ear infections, diarrhea, lung infections and acute encephalitis, or swelling of the brain, which can be very debilitating or fatal. Measles can be deceiving since its initial symptoms appear to be like those of a cold or flu, such as high fever, cough, runny nose and watery eyes; however, two to three days later, white spots appear in the mouth, followed by a red, spotty rash.

Q: Could something like the Disneyland outbreak occur at a public venue in New Jersey?

A: Absolutely. It can occur anywhere that nonimmune adults and children

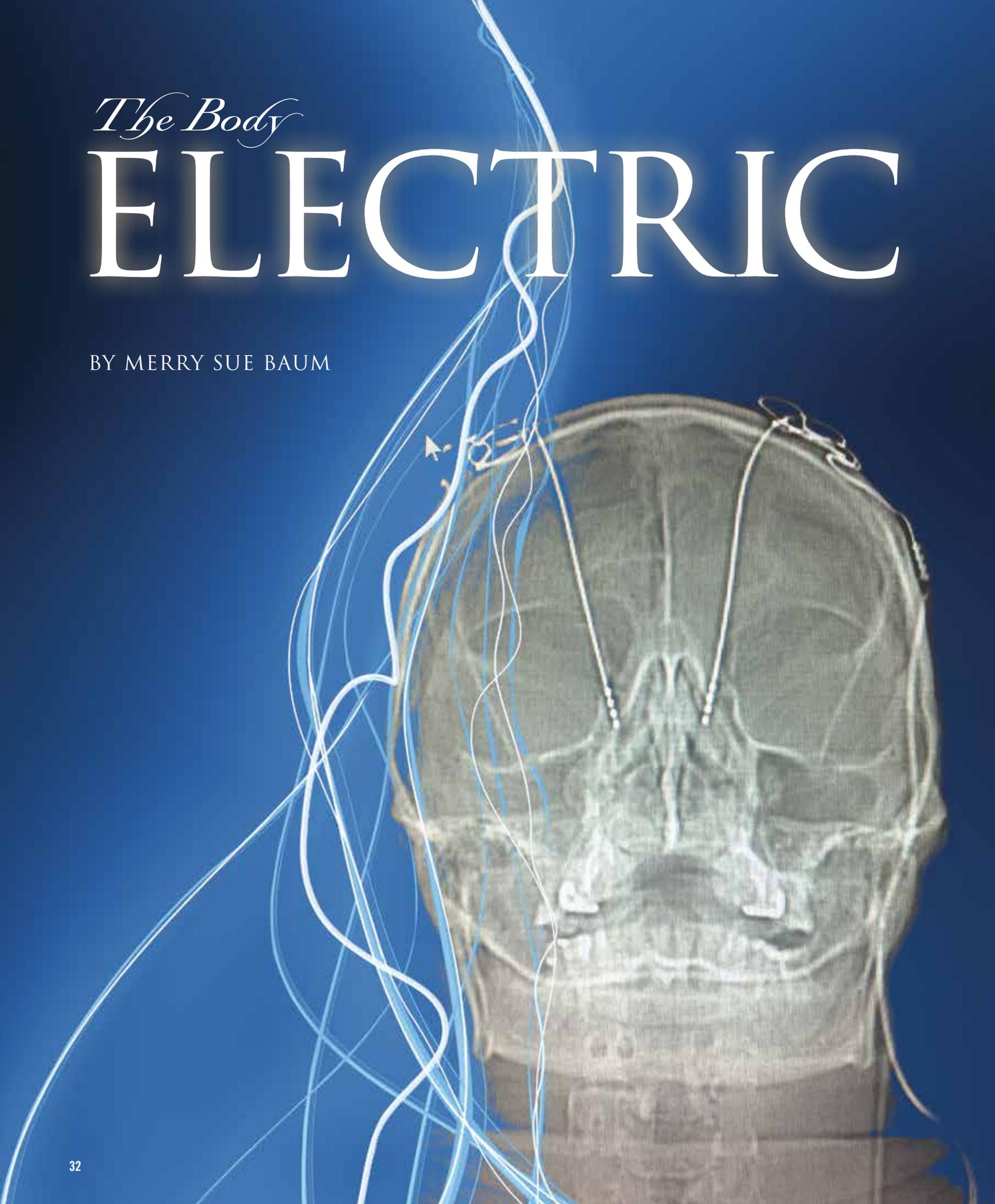


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The Body

ELECTRIC

BY MERRY SUE BAUM



The human nervous system is a wonder of electrical engineering. With its network of 100 billion neurons, the brain serves as command central. From there millions of messages are processed and delivered at lightning speed to the entire infrastructure of the body. Every heartbeat and breath, every action and reaction, and every notion and emotion are the work of this magnificent structure.

With a system that scientists say is the most complex one known on earth, it is not surprising that sometimes things go wrong. Pain signals going awry is one of them. Pain is the body's way of signaling that something is wrong and needs attention. It's necessary for our survival. But when it has no apparent cause and won't let up, it can destroy a life.

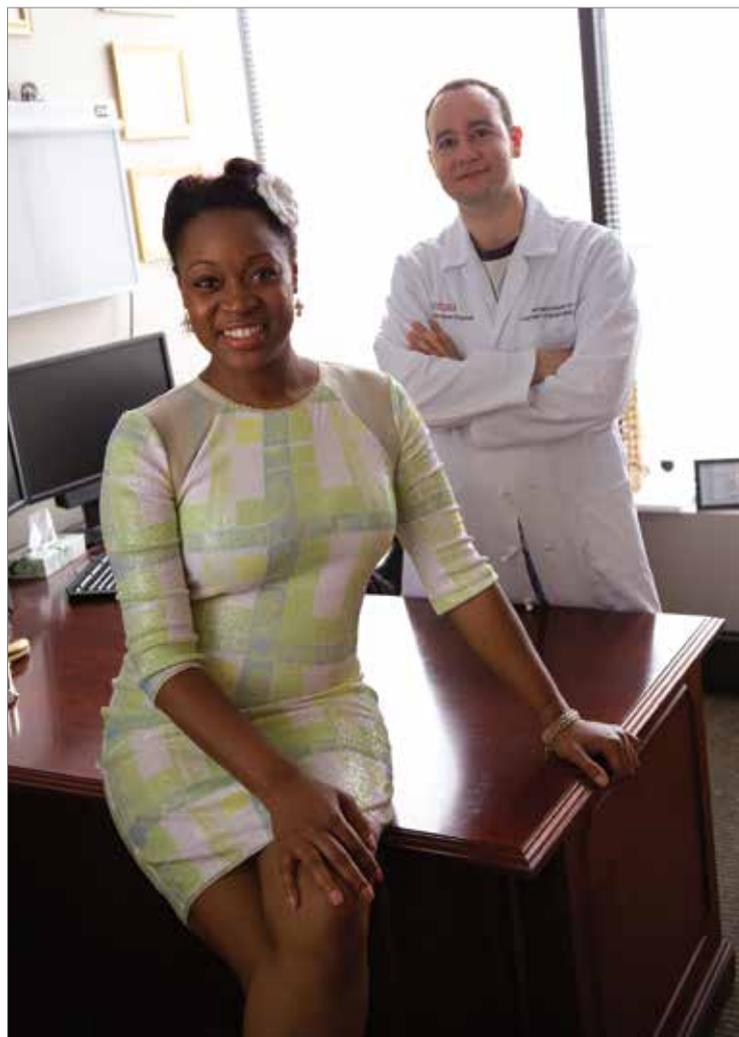
That's exactly what happened to Sequoia Lawson. She was an active, vibrant 22-year-old when she lightly tapped her right arm on a counter. She thought nothing of it until a few hours later when her entire arm was black and blue, her hand was ice cold, and she was in excruciating pain. At the emergency room later that day, the doctors recommended she find a neurologist, gave her pain medication and sent her home. But the pain didn't stop; it lasted nearly 10 years.

Lawson was suffering from complex regional pain syndrome, or CRPS, a rare, chronic condition of the extremities. It usually occurs after some type of trauma—a fracture or sprain—and sometimes occurs after a cast is removed. A trivial injury like Lawson's can also be the culprit, and it sometimes happens for no discernible reason at all. The triggers may be different, but the symptoms are always the same: dramatic changes in the color and temperature of the skin over the affected limb, intense burning pain, skin sensitivity, sweating, and swelling. Often the pain spreads to other parts of the body, as well.

Experts don't know what causes CRPS and there is no cure. There are treatments, and Lawson tried them all. She saw acclaimed neurologists and surgeons across the country, and three of them performed surgery. After each procedure, however, her arm became increasingly paralyzed and "the pain came back with a vengeance." She tried nerve blocking injections, which worked for a few weeks and then stopped. She tried massage therapy, hydrotherapy, relaxation therapy and physical therapy, all with minimal results. At one point she begged a physician to amputate her arm. "I experienced the depths of hell," she says. "The pain never let up; I couldn't sleep, I couldn't do anything. I took antidepressants, anti-anxiety medication, muscle relaxants and nerve relaxants. I gained a lot of weight and stopped going out. I thought my life was over."

As luck would have it, Lawson heard that Antonios Mammis, MD, assistant professor of neurological surgery at Rutgers New Jersey Medical School and director of functional/restorative neurosurgery at University Hospital, specializes in pain management using nerve stimulation. He is one of only a few physicians in the New York Metropolitan area trained to implant both surgical and percutaneous spinal cord stimulators for pain management. Lawson made an appointment and came to see Mammis from California, where she was living at the time.

He explained to Lawson that before the implant is performed, she



Patient Sequoia Lawson with neurosurgeon Antonios Mammis

would go through a trial to determine if, in fact, the treatment would work. The device was taped to her back and thin insulated wires known as leads were fed just under her skin through the area outside the spinal cord but inside the vertebral canal. A stimulator delivered mild electrical impulses that replaced the pain with a soothing massage-like sensation. She wore it for five days. "It worked. Something finally worked," she recalls. "I was even able to sleep. I was so happy I cried. I was ecstatic." Lawson then had the permanent neurostimulator implanted and got ongoing relief.

Mammis explains how the stimulator works. "Think about hitting your thumb with a hammer," he explains. "You instinctively rub your thumb, and it feels better. By activating one type of nerve fiber by rubbing, you shut down the pain transmission fibers." He adds that the treatment can be life-changing for people like Lawson, who suffer with pain for years.

While the cause of CRPS is unknown, there are neurological disorders that scientists know are caused by "faulty circuitry" in the brain. One of these is Parkinson's disease, which is characterized by

tremors, rigidity, slowed movements or abnormal movements and/or tone. Another is essential tremor, which usually involves trembling of the hands, head and voice in people 40 or older. And dystonia, a disorder that is characterized by involuntary repetitive twisting and sustained muscle contractions, is usually seen in younger people.

When medication does not adequately control the symptoms of these disorders, or when patients cannot tolerate the side effects, life becomes difficult. Simple tasks like getting a drink of water become a major undertaking. Eventually patients may be unable to care for themselves even though the disease does not affect the mind.

Mammis also specializes in a procedure for these patients known as deep brain stimulation or DBS. The minimally invasive procedure involves inserting a thin insulated wire, known as a microelectrode, through a tiny hole in the skull and then navigating it to a targeted area deep within the brain. It is then attached to a pacemaker-style battery, known as a neurostimulator, which sends electrical impulses that block the faulty nerve signals.

While the term “brain surgery” sounds frightening, DBS is a relatively safe procedure. Mammis explains that a week or two before the surgery, the patient has a magnetic resonance image (MRI) of the brain under general anesthesia, so he or she is perfectly still. On the day of the surgery, a frame is attached to the patient’s head to hold it still, and a CT scan with a special grid is then performed. Using all the data and special computer software, the physician calculates the exact trajectory and safe path the electrode will take to the affected area.

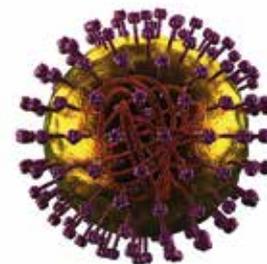
The brain itself does not feel pain, so the procedure causes very little discomfort. The patient gets a local anesthetic to numb the area where the frame is attached to the head, and light sedation is given when the hole is made in the skull. The sedation is then stopped, however, because the patient will need to speak to the doctor when the tip of the electrode is positioned. At that point the surgeon performs tests to confirm that the neurostimulation will be effective and to ensure that the electrode is in the correct spot. The patient may be asked to perform certain tasks, like counting to 10 or lifting an arm or a leg.

About a week later, a pulse generator is implanted under the patient’s skin near the collarbone. An extension wire from the electrode is passed just under the skin of the patient’s head, neck and shoulder and connected to the battery. The pulse generator does what its name implies: it sends electrical impulses to the brain, via the electrode. “You might say it is like a defibrillator for the brain,” says Mammis. About 10 days later, the patient returns for the first of three or four programming visits to have the pulse generator fine-tuned and his or her medication adjusted. Patients also learn to regulate the generator on their own.

“The results can be quite dramatic,” says Mammis. “We can usually cut down on medication and patients generally experience a significant improvement in their quality of life. This minimally invasive procedure that takes only a few hours gives people their lives back.”

In the future, Mammis hopes to be able to offer deep brain stimulation for major depression and also obsessive compulsive disorder. ●

Contact Dr. Mammis at mammisan@njms.rutgers.edu or 973-972-2323.



Measles Outbreak

Continued from page 31

encounter someone who has measles—often a traveler from another country or someone who was exposed through an outbreak like the one in Disneyland. Even though more than 95 percent of children in New Jersey are fully vaccinated, there certainly are pockets of vulnerability. According to data from The New Jersey Department of Health, the five New Jersey counties that have the highest proportion of children who have not been vaccinated due to religious exemption are Hunterdon, Monmouth, Sussex, Warren and Morris. In certain non-public schools, religious exemption contributes to non-vaccination rates exceeding 15 percent. A parent’s decision not to vaccinate a child against measles anywhere puts infants everywhere at risk for this killer disease. The current epidemic in the United States is a consequence of and will contribute to an ongoing global epidemic.

Q: Which are the common misconceptions about the vaccine that prevent people from giving it to their child?

A: The most prevalent misconception is that the measles-mumps-rubella vaccine causes autism. However, there is no causal relationship between measles vaccination and autism. Period. The 1998 research paper that led to this misconception was subsequently found to be fraudulent and was retracted by *The Lancet*, the British medical journal that originally published it. Pediatricians recommend that children receive the MMR vaccine, administered in a two-shot series, at 12 to 15 months and between ages 4 to 6.

Q: Which adults are vulnerable?

A: People born before 1957 likely were already exposed to measles and are immune. Adults born between 1957 and 1971 could be at risk for contracting measles. During this period many people either were not getting the vaccine or received only one dose of a less effective version than is available now. This is particularly true for people born between 1963 and 1967, who received a vaccine that contained inactivated measles that was not as effective. People vaccinated with that product or those who do not know their vaccination history should get at least one live measles vaccine. Those who work in a health care facility are required to get a second shot. Those who work with children or in public places—like Disneyland—should strongly consider getting a second shot. This is one way to prevent future outbreaks. However, because women who are pregnant or people with certain conditions, such as immunosuppression, should not receive the MMR vaccine, everyone should speak to their physicians first. ●

Contact Dr. Fennelly at fennelgl@njms.rutgers.edu or 973-972-5276.

— AS TOLD TO PATTI VERBANAS

Message from the Alumni Association President



PAUL J. P. BOLANOWSKI, MD'65
ALUMNI ASSOCIATION PRESIDENT

Dear fellow alumni,

As President of the Alumni Association, I am extremely proud that the Association has been a committed supporter of international study scholarships and community health programs for many years, and would like to share with you two examples.

Student Family Health Care Center

Celebrating almost 50 years of operation, the Student Family Health Care Center (SFHCC) is one of the nation's longest-standing student clinics at a medical school. Its beginnings date back to 1968, shortly following the Newark riots and the relocation of the medical school from Jersey City to Newark, when members of the senior class at NJMS were eager to identify a meaningful and effective way in which they could give back to the community. Over the course of several meetings, the idea to develop a

program that would provide free, comprehensive preventive health care to the families and residents of Newark was born.

Under the supervision of committed, volunteer faculty advisors, particularly Drs. Joseph Seebode and Ann Browder, along with support of the medical school and financial funding from a state grant, the doors to the Student Family Health Care Center opened in July of 1968. Organized to follow a team-centered approach to medicine, fourth-year student John Sorrentino, the first clinic coordinator, and his fellow medical students established a family medical practice.

While the clinic experienced a slow start during its first months, its reputation has since flourished. Over the years, students have participated at overwhelming rates, providing health care services to thousands of families. Recently, our medical students successfully launched the expansion of the SFHCC to include two new locations—the Fairmont Shelter and Apostle's House.

The altruism and dedication to community service of the founding members still resonate with the students today as they continue to carry out the vision of the Student Family Health Care Center: to provide medical students with the opportunity to broaden their exposure and knowledge of urban medical and socio-economic issues while providing quality medical services to the community; to serve as a model for the involvement of medical students in the delivery of quality health care, and to provide first- and second-year students with clinical experience under the guidance of third- and fourth-year medical students and faculty.

International Study Scholarship

The Alumni Association–NJMS has provided support for international student travel and study for more than 15 years. Beginning in the late 1990s, in collaboration with the

St. George Medical School, the Summer Externship to England was created. NJMS students between their first and second years were offered an exciting opportunity to gain clinical exposure and learn about another country's health care system. Throughout the four-week program in Aylesbury, England, students completed several mini-rotations at Stoke-Mandeville Hospital, and upon their return, wrote about their experiences.

In 2005, when the program in England came to an end, the Alumni Association had already begun its support of a separate International Study Scholarship program. Offered to first- and fourth-year medical students, these scholarships provide an opportunity for them to expand their knowledge of global health care issues, learn about medicine in different countries and pursue medical research endeavors. It is remarkable to learn from these students that a vast majority of them devote a significant portion of their time abroad to providing community service.

Each year, through the generosity of our donors, the Alumni Association has been able to help support an average of seven to ten medical students in their travels all over the world. This past summer, four first-year students travelled to Huancayo, Peru, where they worked in different departments of the hospitals shadowing physicians, learning medical Spanish, assisting at both a school and an orphanage for special needs and HIV-positive children, and teaching basic dental hygiene practices to elementary students. This spring four fourth-year participants will study in Costa Rica, South Africa and India; and we look forward to hearing about their experiences.

It brings me great pleasure to be President of the Alumni Association and to be able to help support the continuation of these two extremely valuable student programs. There is no doubt that the future of the medical profession is brighter than ever, as we continue to graduate students who not only excel in academics, but also demonstrate great dedication to the practice of medicine, as well as compassion and humanism. ●

LAWRENCE H. MARUM, MD'73, MPH

Oh The Places He Has Gone

BY MARYANN BRINLEY

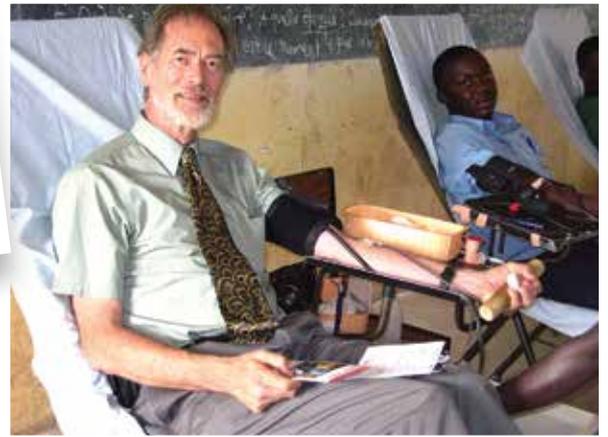
The countries that pepper Lawrence (Larry) Marum's CV read like a wish list in a travel magazine for adventure-seekers: Zambia, Kenya, Malawi, Uganda, Bangladesh. "International health has been my passion," he says. "I've spent more than 25 years living overseas and working there in public health though I also worked as a rural pediatrician in California." He has just completed six years as country director in Zambia for the Centers for Disease Control and Prevention (CDC) and he laughs when asked about his bucket list for retirement, "I don't have huge travel plans because we've had the privilege of living in so many parts of the world."

Born and raised in New York and northern New Jersey, he graduated in 1969 from Wheaton College in Illinois where he met his wife, Elizabeth, whose own work in international health has been spent running programs for the CDC, the World Health Organization, and USAID. Their careers have been lived in tandem. "It's wonderful being married to my best friend," he admits. "She even shared the medical school experience with me because we were married after my first year. She worked as a psychiatric social worker then." Elizabeth later earned her PhD at the University of California, Berkeley.

Marum recalls med school classes, labs, and lectures in the "metal Quonset huts across the street from Martland Hospital." He remembers Donald Louria, MD, "a most formative" teacher, and being on the same team with Jim Oleske, MD, in clinics. "Jim was ahead of me and was a great influence.



Lawrence Marum has spent more than 25 years living and working overseas. "International health has been my passion," he says.



We were going into homes for lead poisoning and taking care of patients with drug addictions. This experience really launched my thinking about health and medicine in a community sense, not just individual care." And, as a med student, he spent four months in Western Kenya, which whet his appetite for Africa. His international health career has had several areas of focus: training maternal and child health workers and starting immunization programs in Bangladesh, research and teaching on HIV in Uganda, developing malaria programs in Malawi, HIV surveillance and blood safety in Kenya and globally, and starting cervical cancer and maternal mortality programs in Zambia. He is currently working on the post-Ebola response planning for West Africa to build the capacity to prevent and contain the next epidemic. But HIV has been the major theme throughout his work in Africa.

Marum and his wife devoted their professional lives to HIV-AIDS because of two events. The first was a personal tragedy: "We were working in Bangladesh together and returned to Berkeley, California, for the birth of our first daughter who was born with a hypoplastic heart. She lived only a few days." Afterward, Elizabeth became the director of the hospice in Sonora where she persuaded her board to include AIDS patients. "This was in 1984," at the height of the epidemic and there was so much ignorance. "She ran one of the first hospices to care for these patients and began focusing on HIV-AIDS." Later, "As a pediatrician, I treated a young hemophiliac who had HIV," he explains.

"We were eager to return overseas," he

says. In 1990 with 6-year-old twins, Sonja and Paul, "I was hired by Case Western Reserve University to lead studies relating to mother-to-child HIV transmission in Uganda." Elizabeth was hired by the CDC to lead the U.S.-funded HIV programs in Uganda where she developed the first HIV testing and counseling program.

In Uganda, he recalls, "We saw a country devastated by the worst HIV epidemic in the world. But we also saw an opportunity to contribute and give hope." Now, almost 25 years later, "We have a situation in Africa where more than 7 million people are on anti-retroviral drugs and we can now talk about epidemic control. To see this happen in our lifetime is quite a transformation." His CDC work has also allowed him to watch countries build capacity to respond to health threats. "I am training people in epidemiology and surveillance so they can use data to make decisions."

Their twins are 30 now and in the U.S. with Paul finishing graduate work in public health and epidemiology. He wants to work in disaster response and complex humanitarian emergencies. Their daughter, Sonja, is in California where they hope to spend at least part of their someday retirement. "We have a parcel of a former sheep ranch with an orchard that we've been watching grow," he says. With a friend, they also own a house in Kenya "where we can stay in touch with colleagues. It's down the road from the district hospital we helped to strengthen so volunteering in the pediatric AIDS clinic is part of

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GEORGE F. HEINRICH, MD'72

Making a Good Call

BY TY BALDWIN

One of the most impressive actions that George F. Heinrich, MD'72 initiated as part of his job as associate dean for admissions at NJMS is personally calling every accepted student, wherever they are in the world, to let them know they've been admitted to medical school. He recalls that just this past year, a student was at an airport preparing to leave for another interview when he received the call. "That settles it," the student told him. "I'm canceling my flight."

It is that compassion for his students and passion for his position at NJMS that served as the basis for the Edward J. Ill Foundation to present Heinrich with the 2014 Edward J. Ill Physician's Award—given to a New Jersey physician recognized for distinguished service as a leader in the medical profession and in the community.

Heinrich, who is now an adjunct professor at NJMS, started working in the

Admissions Office in 1985 while he was a volunteer faculty member. He began by interviewing candidates and then serving on the Admissions Committee. In 1993, he assumed responsibility for the admissions function. "I feel very strongly about New Jersey Medical School and how privileged I was to be able to attend such a wonderful medical school," he says, adding that he saw admissions "as a way to help guide and select the next generation of physicians."

When working with medical students, Heinrich often tells students that "we care for people, we don't treat diseases." It's an approach to medicine that he traces to his childhood in Manhattan, where his father had his urology practice in one half of the family's apartment. "When I speak at the annual scholarship dinner, I usually tell the attendees that one of my most dramatic recollections of my parents was that my father made house calls, even though he was a specialist. And at the end of the month, when my mother and father did the billing, my father would not send a bill to those patients who could not afford to pay. That really stuck with me. That to my father it didn't matter what people had; he would provide care for them if they were in need, regardless of their ability to pay."

When he was 16, Heinrich lost his father to colon cancer. "His death had a profound effect on me. While I had already been considering a career in medicine, I became even more serious about a career that made a difference in people's lives."

After completing undergraduate work at Cornell, he matriculated at NJMS. "The school provided a real inner city exposure for clinical education and service. In retrospect, it exceeded my expectations. I couldn't have gotten a better education anyplace."

Heinrich says as a medical student he learned how important clinical experience was and how it helped to put all the pieces together when assessing a patient's status. He particularly remembers one patient who had had a stroke and was paralyzed on one side. "I took a good history and I listened to what this patient told me. In my naïve way,

I enthusiastically told my attending that I really wanted to work with her and suggested I could help participate in a medical plan that should include rehab and exercise therapies. He told me his opinion was that this patient would never walk again. I was devastated and disappointed in his response. But that night I told myself that this woman would walk out of the hospital. After outstanding medical care and attention by many, and with the help of crutches, she did walk out of the hospital. That case taught me the importance of listening to patients and trying to help them achieve the most they can within their physical and medical capabilities."

Last year Heinrich received a Golden Apple Award for Lifetime Achievement from the students at NJMS, which was especially meaningful to him. He explained that his work in admissions gives him the opportunity to get to know every student, to "build a rapport and let them know how much we care about each one of them." He is particularly proud of the fact that, unlike some medical schools that don't develop close relationships with their applicants, Heinrich will email, talk to, or meet all applicants or potential applicants who contact him. "I make sure there's enough time for anybody who would like to have the time," he says.

A few years ago, at a reception for entering students, a young man approached Heinrich to thank him for the acceptance phone call. Heinrich had spoken with the student on a Friday afternoon. His acceptance letter had gone out the following Monday. Over the intervening weekend the young man's grandfather had died. "He never would have known I was accepted to NJMS if you hadn't called," the student said. "My grandfather was so supportive of me and so proud when he learned I was accepted to medical school."

In addition to his medical school responsibilities, Heinrich is also passionate about his position as vice chair and CEO of both New Jersey Health Foundation (NJHF), which offers grants to support research and

Continued on page 39



NJMS students gather around four faculty participants in Career Nights 2015 (l to r, center of photo): Drs. James Oleske, Dorian Wilson, Dominga Padilla, and Paul Bolanowski

Career Nights 2015

Just because you made it into medical school doesn't mean you know what you want to do with the rest of your life. There are 120 medical and surgical specialties and subspecialties to choose from and many are unfamiliar to the majority of first and second-year medical students.

Factors that play into a career-decision are varied. A mentor or impassioned teacher can be a major influence, or a particularly positive experience in a specialty. Others may include: a newly recognized talent—in surgery, for instance; feeling a specialty is a “good fit”; quality of life considerations; and an assessment of personal strengths and weaknesses. An often-underrated factor is the “inside-view” from someone currently in practice.

And that is the premise of NJMS Career Night. Each year the Alumni Association of NJMS sponsors two such programs to introduce students to specialties and subspecialties that many will never encounter during medical school. This year's events were held on January 29 and February 10.

Almost 200 second-year students attended and more than 40 specialties were represented. January's line-up focused on

non-surgical areas and February's on surgical specialties. Every 20 minutes—for two hours—students rotated to different tables to chat with participating physicians. “This is very low-key. Doctors talk with students about their training, lifestyle, expenses setting up a practice, all kinds of things,” says Dianne Mink, director of the NJMS Office of Alumni Affairs. “Students are so hungry for real information.”

Some NJMS alumni who are now on the medical school faculty remember the value of career nights and readily volunteer their time. Other faculty members and some residents join them. Among the many who participated this year were: Drs. Patrick Foye'92, professor and interim chair, physical medicine and rehabilitation (PM&R); John Bach'76, professor, neurosciences; Paul Bolanowski'65, associate professor, surgery (thoracic); Susan H Morrison'81, pediatric allergy; Frank Padberg, professor, surgery (vascular); Dominga Padilla'00, associate director, Cultural Competency Programs; James Oleske'71, Francois-Xavier Bagnoud Professor of Pediatrics (pediatric allergy and immunology); Peter Carmel, professor,

neurosurgery; Wayne Berberian, associate professor, orthopaedic surgery; Dorian Wilson'82, assistant professor of surgery (liver transplant); Christine Gerula'96, associate professor, medicine (cardiology); Suqin Guo, assistant professor, ophthalmology; William Halperin, chair, preventive medicine and community health; Lisa Pompeo, associate professor, obstetrics, gynecology and women's health; Steven Dumbroff'89, anesthesiology; Ana Natale-Pereira'96, Barbara Nahas'81, and Antoinette Costa-Zaeh'82, internal medicine and geriatrics; and Kathleen Cuddihy'96, pediatrics.

Students and doctors enjoyed a light dinner while they made new connections that, for some, will open their eyes to never-before-considered possibilities. And the cycle of support continues. In another five to 10 years, some of these same students will participate in NJMS career nights to share an inside-view—one that may spark the passion of a future transplant surgeon or immunologist. ●

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Alumni Association of NJMS, 185 South Orange Avenue, MSB-B504, Newark, NJ 07103. Photos are welcome. You can also send your news via e-mail to: njmsalum@njms.rutgers.edu or fax us at 973-972-2251.

1960s

James P. Murphy, MD'66 has been working full time at Tamale Teaching Hospital, Tamale, Northern Region, Ghana, as an otolaryngology consultant since July 2007. He is also Senior Lecturer at the University for Development Studies, School of Medicine and Health Sciences, Tamale, Ghana.

Joseph DeGross, MD'67 reports that at 73, he continues to spend 6–8 hours a week in his office, noting that it is good for the brain. His children and three of his grandkids are all grown up. Semi-retirement life in East TN is lovely, but so is traveling to see kids and grandkids up north and down south. He hunts birds in the fall, and enjoys boating, fishing, golfing, writing, and enjoying life with Sandy. Life is good!! He hopes that all of his classmates are prospering and healthy.

James DeGerome, MD'68, FACP, RACG has re-released an updated version in soft cover of “The Cure for the American Healthcare Malady.” It is available on Amazon, subtitled: Socialized Medicine: The Apple in the Garden of Eden.

1970s

Cheryl Byt Montemurno, MD'72 writes that she retired as of June 13, 2014.

Alan E. Matook, MD'73, M.Sc. is currently Physician Advisor, Clinical Documentation Improvement at Hackensack University Medical Center Mountainside, Montclair, NJ.

David Brody, MD'74 retired from the practice of gastroenterology on March 31, 2014.

Alan Javel, MD'74 has continued to play softball—three games at a stretch while receiving chemotherapy, and has been in two different tournaments this year in Las Vegas and St. George, UT.

Kenneth P. Rubin, MD'75 is the current director of the Inflammatory Board Disease Center at Englewood Hospital and Medical Center, Englewood, NJ.

1980s

Joseph N. DeLuca, MD'84, PhD published two books last year, “Inspirational Sentiments to Become a Better Person—a Starter Manual,” and “Snippets—Memories to Enhance Healing, Health, and Wellness.” He is practicing in Altamonte Springs, FL, as both a primary care physician and clinical psychologist. The books are available through of barnesandnoble.com and amazon.com.

Capt. Lawrence Fox, MD'86, PhD is certified as “WatSan,” supervising donning and doffing of protective gear during care of Ebola patients at the NIH.

Diane H. Landauer, MD'86 writes that her son turned 16 and is a full-fledged driver!

1990s

Gene Tolomeo, MD'94 was selected by the 2014 New York State Society of Physician Assistants as the Physician of the Year.

2000s

Maria Gonzaga, MD'07 opened a new OB/GYN medical practice, Comprehensive Women's Care of Columbus, PC in Columbus, GA in June 2014.

Kate Twelker, MD'10 matched to NJMS for her trauma-surgical critical care fellowship next year and is excited to return home.

Adam Handler, MD'11 tells about his momentous year. He graduated from a pediatrics residency and joined his father in practice. “And throughout it all, I'm forever grateful for my medical school experience that helped get me to where I am today.”

IN MEMORIAM

Nicholas Willson, MD'63 passed away on July 31, 2014. Born and raised in Upper Montclair, after his completion of medical school, he was a Lieutenant Commander in the U.S. Navy as well as a medical officer in the Neurology Department at the Naval Aerospace Medical Institute in Florida. At the time of his retirement, he was the Director of the Central Reference Laboratory-Neurotoxicology Laboratory of the New York Psychiatric Institute.

Andre Guay, MD'68 passed away on December 16, 2014 in Portsmouth, NH. He served as Lieutenant Commander in the U.S. Navy and retired after 37 years of medical practice at the Lahey Clinic located in Burlington, MA. He is survived by his wife of 49 years, Barbara (Madore) Guay, and his children, Andrea Guay, Danielle Megliola and Stephanie Deihl, and their families.

*We wish to acknowledge **Joel S. Policzer, MD'76** whose name did not appear in the NJMS Honor Roll 2013–2014 as a generous contributor to the Founder's Club.*

Marum

Continued from page 36

my retirement vision.” The couple has also supported four orphaned Ugandan children. “One just graduated from Makerere University and they are all maturing and starting families so that has been very rewarding.”

Five years ago, Marum was diagnosed with pancreatic cancer. “Fortunately it was a neuroendocrine cancer, so it is slower growing,” he explains. He's healthy, working actively and playing tennis and squash, as well as skiing after “Whipple surgery and high-tech ablations. I'm very glad to be alive,” he says. This personal part of his journey—and the death of his daughter so many years ago—are “two very powerful influences on our lives, our priorities and our interests.” ●

To get in touch, email: LMarum@cdc.gov

Heinrich

Continued from page 37

health education in New Jersey and its affiliate, Foundation Venture Capital Group (FVCG), which provides very early stage investment funding for biotech start-ups. “Being involved in NJHF has allowed me to further explore and support the breakthrough research and outstanding educational programs at NJMS,” he says. “I feel I've been able to help the school's growth and development, and as a graduate that's very important to me.”

Heinrich, who celebrated his twenty-fifth wedding anniversary last June, makes a point of adding that the best thing he ever did was to marry his wife. “Life is respect and value and compromise,” he reflected “Having the support around me from her, and our two sons, has really given me the insight and the will to help others. Throughout the years, NJMS has come to play a very important part in our lives.” ●

To get in touch, email: heinrich@njms.rutgers.edu

ART SHOW SPRING 2015

The Cat's Meow

Art and medicine go hand-in-hand, as do talent and appreciation, at this year's Annual Exhibit and Awards of the National Arts Program.

Works of beauty and originality by more than 100 faculty and staff, and their family and

friends, line the walls and fill the showcases at NJMS. This is the

fourth such program hosted by NJMS

for Rutgers Biomedical and

Health Sciences. A special

thank you goes out to

Noreen Gomez—organiz-

er of the program—whose

love of the arts enriches us all.



Above: AND THE WINNERS ARE: Art show award recipients—of all ages and in all categories—proudly display their ribbons. **Left: Sculpture by Joseph Benevenia, MD, “the sculpting surgeon,” professor and chair, NJMS Department of Orthopaedics**

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