UNIVERSITY of MARYLAND
SCHOOL OF MEDICINE

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DEAN'S MESSAGE: What's On My Mind

What's on my mind this month is our **extraordinarily accomplished faculty and the recognition they are receiving on campus, nationally, and internationally, for their dedication to the advancement of science and medicine.** Our faculty members do not always get the recognition they deserve, so I would like to highlight several significant awards our faculty members have received in recent months.

Claire Fraser-Liggett, PhD, the director of the Institute for Genome Sciences (IGS), and a faculty member in the Departments of Medicine and Microbiology and Immunology, has received one of the highest honors in medicine. Dr. Fraser-Liggett has been named to the Institute of Medicine (IOM) of the National Academies for her outstanding professional achievement and commitment to service. Dr. Fraser-Liggett's research team has applied large-scale DNA sequencing and analysis to the study of the microbial world and how it impacts human health. This membership is recognition of Dr. Fraser-Liggett's impressive body of research and her overall contributions to science and biomedicine, which are many. It's also an affirmation of the growing recognition of the potential of genomics to improve human health. Since we launched the Institute for Genome Sciences at the School of Medicine, it has had a positive impact on countless peoples' lives worldwide.


Claire Fraser-Liggett, PhD


Elijah Saunders, MD


Scott Strome, MD


Gary Fiskum, PhD

In November, at the Association of American Medical Colleges Annual Meeting in Denver, Elijah Saunders, MD, received the 2011 Herbert W. Nickens Award. The Nickens Award honors individuals who have made outstanding contributions to promote justice in medical education and health care equality. For more than 50 years, Dr. Saunders has worked tirelessly to achieve medical equality and eradicate health disparities within minority communities. An international expert on hypertension in African-Americans, Dr. Saunders is consistently recognized for his patient education efforts to raise awareness of high blood pressure and for his exploration of new treatment options for African-Americans. I am pleased that Dr. Saunders has been recognized for his extraordinary efforts toward medical equality. Dr. Saunders has taught hundreds of medical students and to this day remains an energetic and powerful mentor and role model.

> IN ACADEMIC MEDICINE, RECOGNITION BY ONE'S PEERS IS ONE OF THE MOST MEANINGFUL ACKNOWLEDGEMENTS A FACULTY MEMBER CAN RECEIVE.

In addition to these important national awards, our faculty members are also being recognized by their peers on campus. Two School of Medicine faculty members have won founders week awards from the University of Maryland. **Scott Strome, MD, professor and chair, Department of Otorhinolaryngology-Head & Neck Surgery, is the recipient of the 2011 University of Maryland Entrepreneur of the Year Award, and Gary Fiskum, PhD, the Matjasko Professor for Research in Anesthesiology, is the recipient of the 2011 Researcher of the Year Award.**

These are but a fraction of the awards received by our faculty over the past year, many of whom were been nominated their colleagues at the department level, or through the Faculty Excellence Recognition and Awards Committee (FERAC). FERAC identifies our most outstanding faculty members and nominates them for membership in prestigious societies or for special distinguished awards.

In academic medicine, recognition by one's peers is one of the most meaningful acknowledgements a faculty member can receive. **I encourage you to actively nominate faculty members who deserve recognition for their outstanding contributions in teaching, research clinical care and community service.** Please visit the FERAC website to learn more: http://medschool.umaryland.edu/awards/

In the relentless pursuit of excellence, I am
Sincerely yours,

E. Albert Reece

E. Albert Reece, MD, PhD, MBA
Vice President for Medical Affairs, University of Maryland
John Z. and Akiko K. Bowers Distinguished Professor and Dean, University of Maryland School of Medicine

► BY CAELIE HAINES

STEPHEN REICH, MD, is First Recipient of the Frederick Henry Prince Distinguished Professorship in Neurology

An investiture ceremony was held on September 22, 2011, to award Stephen Reich, MD, the Frederick Henry Prince Distinguished Professorship in Neurology. This professorship was established through a generous gift from Diana Prince and her husband Frederick through the Frederick Henry Prince Memorial Fund, which honors Mr. Prince's great-grandfather and namesake. Mr. Prince, who has Parkinson's disease, is one of Dr. Reich's patients.

"Parkinson's disease has the potential to quite literally steal one's life away," said Dr. Reich. "Mr. Prince has faced the disease with a combination of courage, optimism and determination. While it has restricted his body, it has not daunted his spirit."

Dr. Reich could not be more grateful for the confidence the Princes have shown in him by establishing this professorship, but he was quick to point out that he will not be the only one to benefit from it. "It's important to think of this not as a reward for a job well done, but as support for a job needing to be done," said Dr. Reich. "All of us who are involved in Parkinson's disease and related disorders are reminded daily of the deficiencies of our understanding of these disorders and the limitations of our therapies. It is only through the support of gifts such as this one from the Princes that we can make much-needed progress."


Diana and Frederick Prince pose with Stephen Reich, MD, at his investiture ceremony.

Speakers at the ceremony included Dr. Reich's colleagues, National Public Radio Host Diane Rehm, who credited Dr. Reich with saving her career, and Diana Prince, who shared her story of having a spouse with Parkinson's. Mrs. Prince illuminated her hopes that this gift from her family will go a long way in helping the research Dr. Reich and others are doing in pursuit of a cure, or at least better treatment options.

This investiture ceremony continued the tradition of honoring faculty members who receive endowed professorships with a special medal to uniquely recognize their accomplishment. The front of the medal features the image of a founder and first dean, Dr. John Beale Davidge and the historic Davidge Hall. The back of the medal lists the four tenets of the School of Medicine's mission: education, research, patient care and service, as well as the official name of the endowed professorship.

► BY KAREN ROBINSON

New Pathway Discovery Critical to Cardiac Arrhythmia

Paul Welling, MD

RESEARCH SCIENTISTS in the Department of Physiology have uncovered a previously unknown molecular pathway that is critical to understanding cardiac arrhythmia and other heart muscle problems. Understanding the basic science of heart and muscle function could open the door to new treatments. The study, published recently in the journal *Cell*, examined the electrical impulses that coordinate contraction in heart and skeletal muscles, controlling heart rate, for example. Unraveling how the body regulates these impulses is key to understanding serious health conditions such as paralysis, muscle relaxation and heart arrhythmia.

Researchers in the *Cell* study examined ion channels—membrane proteins that allow the electrical charges to flow into and out of the cell. The number and location of channels on the cell's surface are critical to the heart's rhythm. The School of Medicine scientists found a new, previously unknown intracellular trafficking pathway that controls the number and location of the ion channels on the cell surface, affecting the passage of electrical charges and controlling the beat of the heart and other muscle activity.

Ion channels are proteins that form pores at the cell's surface. The pores open with careful regulation, allowing the passage of ions like potassium, sodium or chloride. These ions carry distinct electrical charges, and their regulated passage into and out of the cell stimulate and coordinate contractions such as the heart's rhythm.

"This study illuminates a new pathway for therapeutic intervention," said Paul Welling, MD, professor, Department of Physiology. "Drugs that interfere with or augment this signal may be used to control the number and location of ion channels in such a way to fight arrhythmia and other muscle disorders, potentially saving lives."

Until recently, scientists have focused on the regulatory mechanisms that control the way that these ion channels open and close and how that action affects muscle contraction and heart rate. Years of research have shown that it is not simply the action of these ion channels that affects heart arrhythmia. Scientists have found that the location and number of channels on the cell's surface are just as important to the heart's rhythm. The study in *Cell* describes a new intracellular trafficking pathway that controls the number and location of these ion channels on the cell surface.

"Previously, we were unsure how the ion channels get out to the surface of the cell," said Dr. Welling. "We found a new mechanism that operates like a molecular zip code, ensuring that the appropriate numbers of ion channels are sent to the correct cellular location, the cell surface. It also functions as a type of proofreading mechanism, making sure that only correctly made ion channels make it to the cell surface."

Dr. Welling and his colleagues examined the molecular pathology of the genetic condition Andersen-Tawil Syndrome, characterized by uncoordinated muscle contractions, paralysis and disruptions in the normal heart rhythm. The syndrome is caused by mutations in the gene known as KCNJ2, which encodes a potassium channel in the heart and skeletal muscle known as Kir2.1.

The scientists examined how mutations in the potassium channel affect its passage through a key intracellular sorting station called the Golgi apparatus. The Golgi apparatus modifies, sorts and packages molecules for the cell's use. Dr. Welling's lab found that the Golgi apparatus selects the Kir2.1 channel to travel to the surface of the cell in an unusual, signal-dependent manner. The signal determines where the Golgi apparatus sends the potassium channel and how many it sends and verifies that the channels are of quality. In patients with Andersen-Tawil Syndrome, the signal is faulty and fails to properly regulate the ion channels and their path to the cell surface.

Scientists found a new, previously unknown intracellular trafficking pathway that controls the number and location of the ion channels on the cell surface, affecting the passage of electrical charges and controlling the beat of the heart and other muscle activity.

"Elucidating the mechanisms behind this rare disease provides insight into more prevalent forms of arrhythmia such as heart failure," said Dr. Welling. "There is great interest in understanding the mechanisms by which cardiac ion channels are regulated. This new pathway may be an excellent target for therapeutic intervention for both Andersen-Tawil syndrome and the far more common condition, like arrhythmias associated with heart failure."

The study has implications beyond the science of the heart, he added. The class of ion channels the researchers examined includes about 12 other ion channels that control various body processes from cognition to the salt balance in the kidneys. The next step for his lab, Dr. Welling said, is to study this pathway in relation to the kidneys. It is possible the same pathway affects the entire class of channels and helps regulate all the body processes associated with them.

► BILL SEILER

Public Health Crisis Linked to Mortgage Default and Foreclosure

Dawn E. Alley, PhD

DEPARTMENT OF EPIDEMIOLOGY & Public Health faculty warn of a looming health crisis in the wake of rising mortgage delinquencies and home foreclosures. Their study, released in the *American Journal of Public Health*, is the first long-term survey of the impact the current housing crisis is having on older Americans. The study focused on adults over 50 and found high rates of depression among those behind in their mortgage payments and a higher likelihood of making unhealthy financial tradeoffs regarding food and needed prescription medications.

"More than a quarter of people in mortgage default or foreclosure are over 50," said the study's principal investigator, Dawn E. Alley, PhD, assistant professor, Department of Epidemiology & Public Health. "For an older person with chronic conditions like diabetes or hypertension, the types of health problems we saw are short term consequences of falling behind on a mortgage that could have long-run implications for that person's health."

The study was prompted in part by the rapid rise in foreclosure rates that began in 2007 following a dramatic increase in subprime lending. By 2009, 2.21 percent of all homes in the United States, a total of more than 2.8 million properties, were in some stage of foreclosure. Previous research had shown that home ownership is associated with better health while financial strain is associated with worse health and higher death rates.

The researchers examined data from the Health and Retirement Study, a nationally representative panel study of Americans older than age 50. In 2008, 2,474 participants were asked if they had fallen more than two months behind on mortgage payments since 2006. The survey included questions designed to measure psychological impairment, general health status and access to important health-relevant resources. In predicting these health outcomes, researchers controlled for demographic factors, health behaviors, chronic diseases, sources of debt and annual household income.

Among participants who were mortgage delinquent, 22 percent developed elevated depressive symptoms over the two-year period compared to only three percent of non-delinquent respondents. Twenty-eight percent of mortgage-delinquent participants reported food insecurity compared to four percent in the non-delinquent group. In addition, the delinquent group reported much higher levels of cost-related medication non-adherence (32 percent compared to five percent).

The study also found that lower-income and minority homeowners were at higher risk for mortgage default. "Our results suggest that the housing crisis may be making health disparities worse," said Dr. Alley, "because these groups had poorer health, lower incomes and higher levels of debt even before the current mortgage crisis." The researchers noted that it will likely take decades for African American and Hispanic communities to recover the wealth lost during the housing crisis and that minority communities are disproportionately affected by declining home values and lost tax revenue.

The study began just as mortgage delinquencies and subsequent home foreclosures began to rise in the United States, driven mainly by increases in mortgage payments

[continued]

► BY BILL SEILER

First U.S. Patient Receives Specially Processed Donor Lungs

Lung Transplant

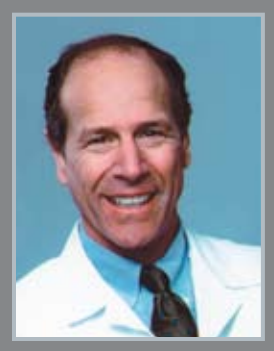
Faculty from the Department of Surgery have transplanted the first lungs treated in the United States with an experimental repair process before transplantation. The procedure is part of a five-center national clinical research trial to evaluate the efficacy of repairing, before transplant, lungs that might otherwise have been passed over as unsuitable for organ donation. The results of this study, if successful, could significantly expand the number of transplantable lungs available to patients awaiting transplants.

Currently, only 15–20 percent of donor lungs are transplantable; most do not meet transplant criteria. The research focuses on an external perfusion technique using a fluid called STEEN Solution™ .

More than 1,700 people are on the lung transplant waiting list in the U.S., including nearly 30 in Maryland, according to the United Network for Organ Sharing.

"We are excited about the prospect of what this ex vivo, out-of-the-body perfusion technique could mean for our many transplant candidates who often spend years waiting for lungs to become available," said the principal investigator, Bartley P. Griffith, MD, professor, Department of Surgery. "This research is part of our ongoing goal to develop innovative procedures and rapidly improve our patients' quality of life."

Lungs in this clinical trial are recovered using current donor lung retrieval techniques. Once brought to the study transplant center, the lungs are reassessed by the transplant team. The lungs are then physiologically assessed during ex vivo perfusion with STEEN Solution™ over a period of three to four hours. During this time, the transplant team evaluates abnormalities inside the lungs, oxygenation levels and overall health of the lungs. At the end of the process, the transplant team determines if the lungs meet the high standards necessary for transplantation.



Bartley P. Griffith, MD

"Studies from other sites outside the U.S. have demonstrated that the results after transplantation using this ex vivo technique were at least as good as lungs that had not required perfusion," said Dr. Griffith. "These findings, plus the expertise from within our own center, give me great confidence in the future use of this ex vivo perfusion technique as an option to potentially increase our pool of transplantable lungs and reduce long wait times for our transplant candidates."

STEEN Solution™ is a product of Xvivo Perfusion, part of the Vitrolife Group, Goteborg, Sweden.

► BY CAELIE HAINES

Engineering a Future for Physical Therapy

We don't think much about how much effort goes into walking and other deliberate limb movements, until suddenly we are not able to do them any longer. Patients with stroke, spinal cord injury, or amputated limbs, however, don't have the luxury of being so blissfully unaware of these actions. New advances in engineering and technology research may soon help to change all that.

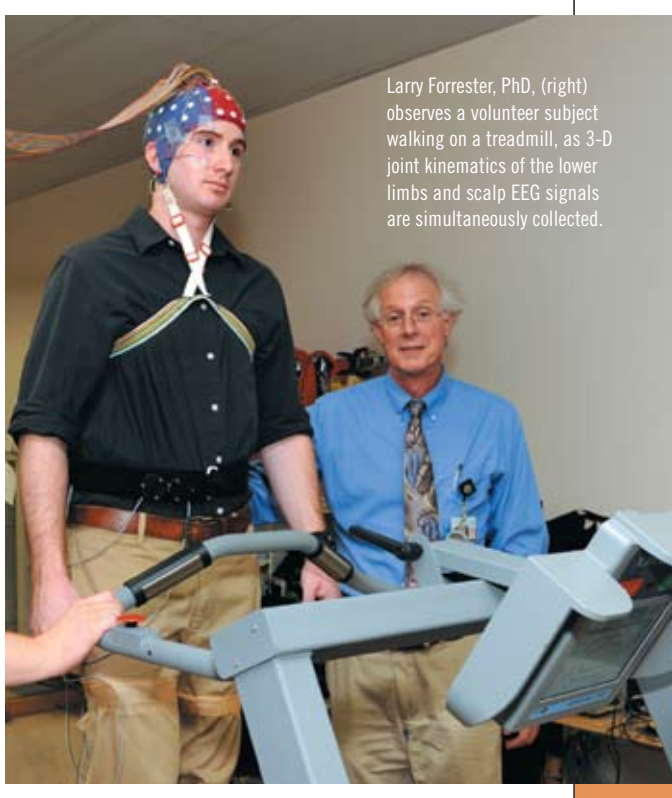
Larry Forrester, PhD, associate professor, Department of Physical Therapy & Rehabilitation Science, and José 'Pepe' Contreras-Vidal, PhD, associate professor of kinesiology at the University of Maryland at College Park, recently published an article in the *Journal of Neurophysiology* on their groundbreaking research sponsored by the joint UMB-UMCP SEED program. The study reports on the use of non-invasive electroencephalography (EEG) to "decode" brain signals for walking. Researchers hope this approach will one day enable non-invasive, robotic-assisted devices to follow the brain's commands and spur movement in paralyzed limbs. Using a sensor-lined "brain cap" that can measure EEG, "we record the brain waves as the person is walking on the treadmill," Dr. Forrester explained. "At the same time, we record the leg movements with a motion analysis system. These are synchronized in processing, after the experiments are done, and the goal is to analyze the EEG, and identify the brain signals that predict the movements of the legs."

Neither of these methods of analysis is invasive. "This is a first step toward just using brain activity to measure intention to step or walk or in any way use our legs," Dr. Forrester explained. "If you can get that intention from the EEG and use those signals to control a robotic device, it might enable them to walk or move independently."

Dr. Forrester knows this all sounds very futuristic. "There's a ways to go, obviously," he said. "But this latest paper using data from nondisabled subjects shows the proof of concept, that we can take this complicated activity and reliably forecast the movements intended by the brain from the associated EEG signals." In the future, Dr. Forrester predicts we will have lightweight, smart, robotic-powered prosthetics that would be strapped onto legs to help spinal cord injury patients to walk and have smart prosthetics controlled by brain waves. "By thinking, 'I want to stand up,' the machine stands you up, or 'I want to take a step,' and it makes you step."

In science fiction films, such amazing technology usually comes with negative consequences, with the machines replacing the humans who have created them. "This isn't about machines replacing physical therapists," Dr. Forrester insisted. "That's not it at all. In my view, it takes the trained therapist to understand how best to apply this kind of technology. Many years ago there weren't very many treadmills or dynamometers in clinics. Today, technology is available in those same places." It's possible that in the future the kind of devices that we are imagining right now could be readily available, stated Dr. Forrester. He explains it will be important for physical therapists to know how they work, what their benefits and limitations are, and to be able to engage with the scientists and engineers who are researching these devices to think about the best ways to implement this type of technology.

(This is an edited version of an article that first appeared in Proficio*, the magazine of the Department of Physical Therapy & Rehabilitation Science. It is reprinted with permission.)*



Larry Forrester, PhD, (right) observes a volunteer subject walking on a treadmill, as 3-D joint kinematics of the lower limbs and scalp EEG signals are simultaneously collected.

The study reports on the use of non-invasive electroencephalography (EEG) to "decode" brain signals for walking. Researchers hope this approach will one day enable non-invasive, robotic-assisted devices to follow the brain's commands and spur movement in paralyzed limbs.

related to adjustable rate loans. Dr. Alley said the health picture is much worse today because rising mortgage defaults are compounded by unemployment. "Recent data from the Centers for Disease Control and Prevention show that the number of Americans with depression has been increasing along with rising unemployment."

Dr. Alley added that mortgage counselors are seeing a rising tide of health issues. "We did a separate nationwide survey of mortgage counselors and found that almost 70 percent of them said many of the clients they worked with were depressed or hopeless. About a third of them said they had worked with someone in the last month who expressed intent for self harm or suicide. These are very serious and clearly ongoing issues."

This study was supported by the National Institutes of Health. It was conducted with support, resources and use of facilities from the Philadelphia Veterans Affairs Medical Center in conjunction with the Organized Research Center on Aging at the School of Medicine.

Class of 2015 Celebrates White Coat Ceremony

During Medical Family Day

Medical Family Day was held on November 3, 2011, at the Hilton at Camden Yards. This special event, which was sponsored by the Whiting-Turner Contracting Company, gives family members of first-year students a glimpse into what medical school is really like for students. A highlight of the day is the White Coat Ceremony, a tradition started at the School of Medicine in 1997. First-year students are formally presented with a white coat, long the symbol of physicians and scientists. The coats are put on by School of Medicine faculty to welcome their junior colleagues to the profession of medicine.

"Today you will be presented with the time-honored badge of the profession, the white coat," said Dean E. Albert Reece, MD, PhD, MBA. "It is a symbol of the confidence and professionalism to which I hope you will all aspire."

After receiving their coats, students recited an oath acknowledging their acceptance of the obligations of the medical profession. They also added their signatures to the school's honor registry, a leather-bound book signed by all University of Maryland medical students in their first year, in which they pledge to maintain integrity throughout their years in medicine.

PHOTO OF THE MONTH

34th Street, Hampden
Photo by: **Tom Jemski**, photographer, Office of Public Affairs

Call for Photos!

Send in photos of your favorite winter activity for the next Call for Photos. To participate, submit your photograph(s) to photos@som.umaryland.edu by January 1, 2012.

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