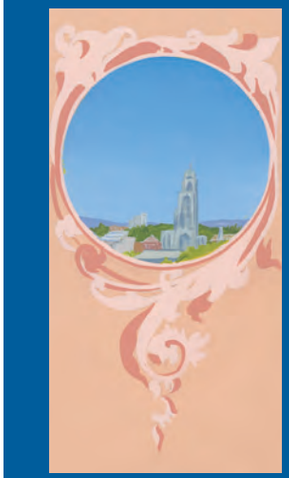

Devoted to noteworthy happenings

at the medical school

FROM LEFT: Kate Bennett (crew chief), Stacie Truszkowski, Anne-Marie Alderson, M. Patricia George, Ryanne Palermo, and Greta Daniels (crew chief/alternate).

UPMC

Pain Eds

According to the National Institutes of Health, approximately 100 million Americans suffer from chronic pain. The cost of treating pain is in the billions of dollars. The University of Pittsburgh School of Medicine established its multidisciplinary Pittsburgh Center for Pain Research in 2006; now it is one of 12 sites to receive the NIH award, Center of Excellence in Pain Education.

The center includes 20 faculty members from Pitt's Schools of Medicine, Nursing, Pharmacy, Dental Medicine, and Health and Rehabilitation Sciences. It will function as a clearinghouse for the development, evaluation, and distribution of pain management curricula for students across these schools. "With better education, I am hopeful that we will achieve better patient outcomes and spend a lot less" on health care in the process, says Debra Weiner, an MD, director of the center, and professor of medicine in the Division of Geriatric Medicine. *—Katie Martin*

OPENING HIV RESEARCH FLOODGATES

Four grants from the Bill and Melinda Gates Foundation—totaling almost $11.5 million—will help investigators in the School of Medicine and in Pitt's Graduate School of Public Health seek and develop new ways to stop HIV.

Pitt's Drug Discovery Institute and Pitt Public Health are teaming up to develop a new test to catch HIV earlier than is now possible. In addition, Ian McGowan, MD/PhD professor of medicine and of obstetrics, gynecology, and reproductive sciences, plans to find out whether monthly injections of rilpivirine, a long-acting anti-HIV drug, will prevent HIV infection. A group led by Sharon Achilles, MD/PhD assistant professor of obstetrics, gynecology, and reproductive sciences, is charged with investigating the notion that hormonal birth control causes changes in genital-tract immune cells, making them more susceptible to infection. And Lisa Cencia Rohan, PhD assistant professor of pharmaceutical sciences in the School of Pharmacy, will study the feasibility of using thin films inserted into the vagina to deliver contraceptives or anti-HIV drugs. *—Joe Miksch*

FOOTNOTE

"Four women on bikes. Nine days to cross America. Devoted to thousands who struggle to breathe." Team PHenomenal Hope—the "PH" is for pulmonary hypertension—will tackle the 2014 Race Across America, a tag-team, continuous bike ride from California to Maryland.

Led by Pitt assistant prof M. Patricia George (Fel '08) and sponsored by UPMC, the gang of four (shown above with their two crew chiefs) will race to raise money for the Pulmonary Hypertension Association.

Follow the team at teamphenomenalhope.org

UPMC

Jan Scheuermann
Cyborg Mom

In 1986, Andrew Schwartz, a PhD and Pitt professor of neurobiology, had an idea he was sure would work: translating signals in the brain, so a person's thought could move a very high-tech prosthetic limb. In December 2012, it worked very well. After months of training, Jan Scheuermann, a 53-year-old mother of two whose ability to move below the neck was stolen by spinocerebellar degeneration, fed herself a chocolate bar with a robotic arm. She bent the arm's wrist and rotated it, closed its hand, brought the treat to her mouth, and took a bite. Schwartz and a team of many others are working on the next step: using this brain-computer interface technology to generate sensation in the brain, allowing the arm's user to adjust grip strength. Below, Scheuermann (a Pitt grad—BA '83) recounts her relationship with Hector, the robotic arm, which is designed to resemble a human arm. ("I name things," she explains. "I had a big, old Dodge; it was so sturdy, I called it the Scheuermann tank!")

On the learning process

Well, the way I control Hector now is so easy. I wonder if I tried too hard at the beginning. Every time I tried to move, I was pushing the muscles in my arm that I would use to move my arm. I was doing that so hard and so concentrated. Now when I train, rather than pretend I'm moving my hand, I just look at the target where the arm is supposed to go and watch it go there. I don't think, "Up and to the right," I think, "There's the target," and go get it. Each new task I got, I knew I would learn. It didn't come real easy, but I didn't get frustrated. I knew it would come eventually.

On the potential of the arm

For people in my situation, who are completely unable to move below the neck, this can help them have a lot of independence and not need someone at home with them all the time. With a Hector mounted to their own [wheel]chair, they could go to the refrigerator, open it, get out some food, put it on their lap, close the fridge, go over to a table, and feed themselves whatever was on the plate. You can use Hector to help you call someone on the phone. You can turn TV channels with him. You know what else it just occurred to me that Hector can do? Turn the pages of a book! That'll be so great because there are some books you can't find on CD!

On the future

We just signed up to go for another four years. I'm allowed [medically] to keep the [electrodes] in my head for five years. As long as I'm enjoying it, and they have new things to learn, I'm game. I am the only one who can do this for right now. I'm so loving what we do every day we go in. And as long as we get occasional tasks where I can feed myself chocolate, I'm there. *—JM*

Faculty Snapshots

The study of tiny viruses can reap huge rewards. **Carolyn Coyne**, PhD associate professor of microbiology and molecular genetics, is one of 10 recipients of the 2012 Burroughs Wellcome Fund Award in the Pathogenesis of Infectious Diseases. Coyne's research proceeds on two fronts: what allows certain viruses to breach physical barriers in the body and how viruses evade the innate immune system. The five-year, $500,000 grant, which is targeted to high-achieving young investigators, is intended to provide the freedom and flexibility to pursue high-risk projects and new avenues of inquiry.

Coyne

The UPMC Rehabilitation Institute has received a five-year, $2.15 million grant and the mantle of Model System of Care for Traumatic Brain Injury (TBI); in this capacity it will collaborate with 15 other TBI model sites. Pitt's **Amy Wagner**, an MD and associate professor and vice chair of research in the Department of Physical Medicine and Rehabilitation, will serve as the center's director. The grant, administered by the U.S. Department of Education's National Institute on Disability and Rehabilitation Research, will help Pitt experts advance research and improve TBI patient outcomes.

Wagner

A porous, cell-free artery graft may be key to acheiving greater success in heart bypass surgery. Within three months of implantation, the graft—made of an elastic polymer—is completely degraded by the body and replaced with a new, 100-percent natural artery. **Yadong Wang**, a PhD professor of bioengineering and surgery, led the development of the graft. The results of his work, published in *Nature Medicine* in 2012, suggest that the porous nature of the material allows cells easy access to the support structure, where they replicate and remodel.

Wang

To see how the eye sees takes some doing. For more than 20 years, **Joel Schuman**, an MD, Pitt's Eye & Ear Foundation Professor, chair of its Department of Ophthalmology, and director of the UPMC Eye Center, has been a vital member of a multicenter, multidisciplinary team that invented and developed an imaging system called optical coherence tomography (OCT) that reveals vivid details of eye anatomy quickly and noninvasively. The five leaders of the long-term project (including Schuman) will share the António Champalimaud Vision Award—worth 1 million euros—from the Champalimaud Foundation in Lisbon. OCT has become the standard tool for early detection of diseases such as macular degeneration, diabetic retinopathy, and glaucoma. *—JM & KM*

Schuman

Infection Now; Asthma Later

Doctors had correlated frequent respiratory syncytial virus infection in childhood with asthma in adulthood. Now Pitt researchers believe they have strong evidence linking the two. The virus seems to harm regulatory T cells (Tregs), which are vital to the development of immune tolerance, says lead author Nandini Krishnamoorthy, a PhD and a postdoc in the lab of Prabir Ray. Ray and his wife, Anuradha Ray, are both PhD professors of medicine and immunology and senior authors on the *Nature Medicine* paper. The researchers posit that this damage to Tregs is not forgotten. It handicaps the ability of Tregs to modulate the body's system of protection against antigens like house dust mites and makes people more likely to develop asthma as they age. ***—JM & KM***

CATHERINE LAZURE

Another Kind of Asthma

Not all severe asthmas are the same, says Sally Wenzel, MD and Pitt professor of medicine. Her lab has uncovered a form of the disease—which is differentiated from other severe asthmas by its difficulty to treat and potential deadliness—that she calls "asthmatic granulomatosis." As the name suggests, this rare form of the disease is marked by small areas of focal inflammation in the lungs. Wenzel's study indicates that asthmatic granulomatosis has hallmarks of autoimmune disease and, therefore, responds better to immunosuppressants than to steroids, the go-to drug class for the treatment of severe asthma. Wenzel says, "If we better understand the underlying mechanisms that are causing [asthma] symptoms, we can offer better treatments." *—JM & KM*

YOU'RE IT!

It crosses all borders: political, geographical, and racial. As though aware of our attempts at surveillance and subsequent destruction, it changes its identity quickly and frequently.

For the past two years, this mutating stalker, influenza, was tracked at one of its favorite hunting grounds: schools. Seasonal flu spreads rapidly among children as they mass for education, and these kids take it home and spread it further.

Shanta Zimmer, an MD and associate professor of medicine at Pitt, and Derek Cummings, a PhD at Johns Hopkins University, are attempting to determine how the flu and other respiratory diseases are transmitted at school and leak again into the community. And children are helping in the research.

The project, SMART (Social Mixing and Respiratory Transmission) in Schools, includes students from the Canon-McMillan school district and Propel Charter Schools in the Pittsburgh area. Organizers gave more than 2,000 children devices to wear throughout the day that sensed and recorded their proximity to other children's devices. Diaries and videos helped flesh out how the children interacted. (Did any of the devices end up on a rooftop or in a toilet, we wondered? Apparently not. "The kids are really engaged in participating and using the equipment," notes Zimmer, "especially the younger ones.")

So far, it appears that, on average, a student interacts with more than 100 other kids per day. This number decreases with age, and kindergartners are much more physically interactive than their older counterparts. Researchers hope that these data will provide insight on how to prevent an epidemic.

SMART is also making kids smarter. Zimmer educates them on how the devices work, the ins and outs of vaccination, and the pathology of disease. *—Em Maier*

COURTESY RMQ SHANKS

BAD FILMS

Bacteria can be bad. Gangs of bacteria living on surfaces (such as lung tissue) as a "biofilm" can be even worse—up to 1,000 times more resistant to antibiotics than free-swimming bacteria. Pitt's Robert M.Q. Shanks, PhD associate professor of ophthalmology and of microbiology and molecular genetics, says biofilms (held together by a polysaccharide matrix) protect bacteria and help render them immune to most antibiotics. Shanks is looking for ways to make the bound bacteria (such as this *Serratia marcescens*) detach and become easier targets for drugs and our own immune systems. *—JM*

Name Dropping

Slated for a June 20 appearance in Pitt's Laureate Lecture Series, Rino Rappuoli, PhD and Global Head of Vaccines Research at Novartis Vaccines and Diagnostics, is expected to expound on the roles vaccines can play in this century. "Vaccines have been the most effective medical intervention ever developed," Rappuoli says. Childhood vaccination has saved lives, extended lifespans, and helped eradicate infectious diseases. In the future, he says, adult vaccines for HIV, cancer, and antibiotic-resistant bacteria will do likewise. "With new technology, genomics, and the application of systems biology, we've gone from this being impossible to being very possible," he says.

In his research career, Rappuoli developed a potent and nontoxic acellular pertussis (whooping cough) vaccine and, with colleagues, helped coin the term "cellular microbiology," reflecting his belief that cell biology and microbiology are inexorably entwined.

In addition to Rappuoli, a sparkling cast populates this year's Laureate Lecture roster:

Helen H. Hobbs, MD professor of internal medicine and of molecular genetics at Texas Southwestern Medical Center, spoke in February. Her work has provided insight into the genetics of cholesterol and fat metabolism and has helped identify new drug targets for atherosclerotic heart disease.

Susan Ferro-Novick, PhD professor of cellular and molecular medicine at the University of California, San Diego, visits September 26 to talk about how vesicles move and deliver cellular cargo.

The lecture series ends December 3 with a talk by the Salk Institute for Biological Studies' Vi and John Adler Professor for Research on Age-Related Neurodegenerative Disease, Fred H. Gage, a PhD. Gage's lab showed that, contrary to accepted dogma, humans are capable of growing new nerve cells throughout life. *—JM*