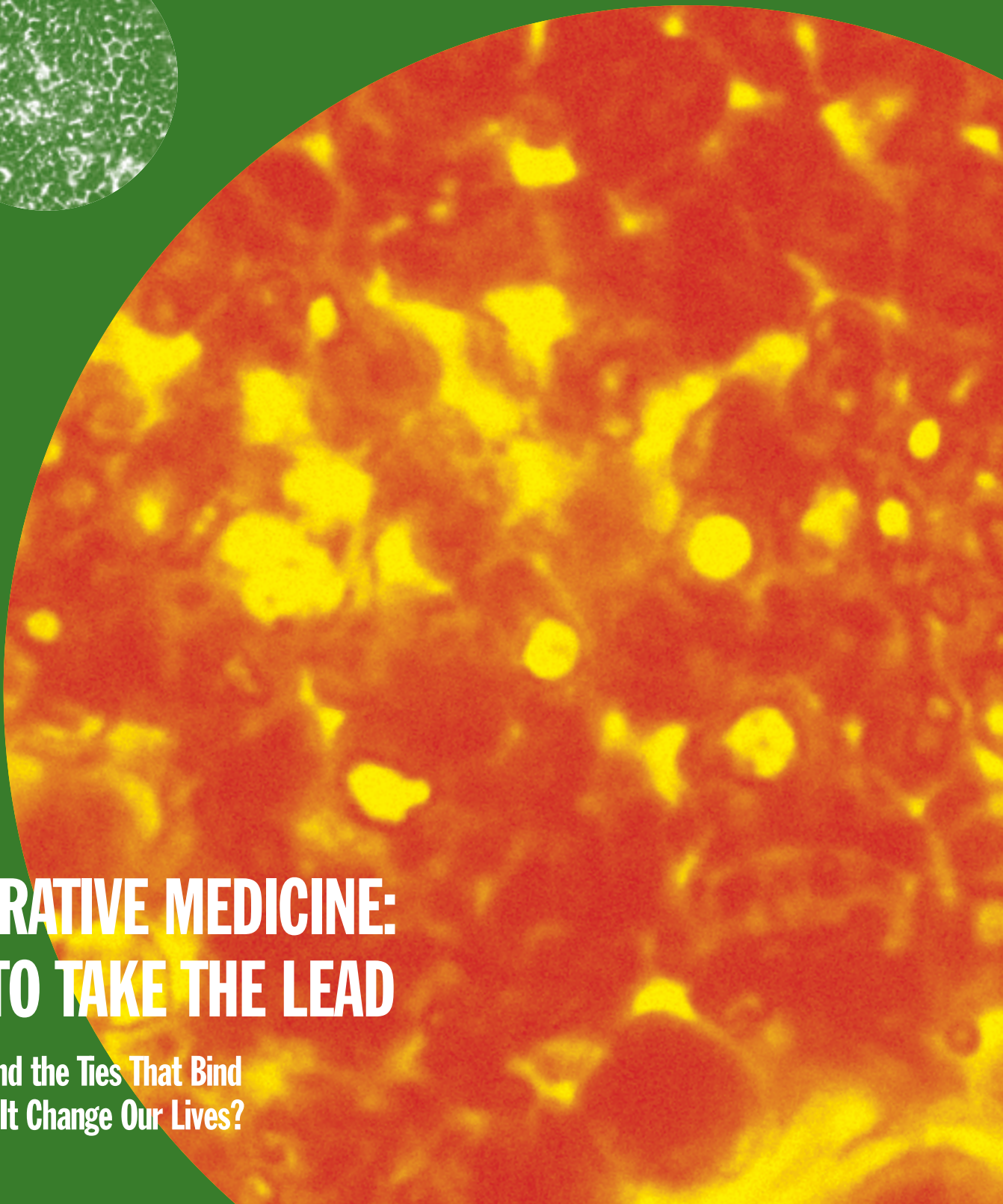
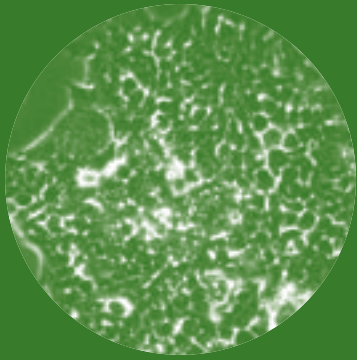


PENN Medicine

SPRING 2009



REGENERATIVE MEDICINE: READY TO TAKE THE LEAD

Financial Aid and the Ties That Bind
Med Tech: Will It Change Our Lives?

The Past Is Present

Like almost everyone who heard about the 21st Century Endowed Scholars Fund in January 1993, I had no idea who the donors were. The \$10 million gift was extremely generous. Starting with six students in the Class of 1996, it would cover the full four-year tuition at Penn's School of Medicine for six students in each class. The initial gift would support the first 25 students selected as Endowed Scholars. Not even the six recipients of the scholarships, who attended the press conference at which the gift was announced, had been told who their benefactors were. The anonymity was part of the agreement.

Reporters from national, local, and campus publications had flocked to the John Morgan Building. I was there representing the University's biweekly tabloid for employees, *The Compass*. The founding editor of *Penn Medicine*, Marshall Ledger, Ph.D., was among those in the room, but he appeared to know no more than the rest of us. All we knew was that the donors were an alumnus of the School of Medicine and his wife – in the words of William N. Kelley, M.D., then dean of the school, “a humble couple who feel very strongly about medical education.”

As Kelley and Fredric Burg, M.D., then the school's vice dean for education, explained, the program was established so that the students would have the freedom to pursue the medical careers of their choice without being constrained by financial concerns.

The identities of the donors were kept secret until May 1996, when the first Scholars were set to graduate. They were – and are – Walter Gamble, M.D. '57, and his wife, Anne. Part of the story

is the warmth they have shown former and present recipients of the scholarship program and the example the Gambles have set for them.

All these years later, it seemed like a good idea to take a look at the 21st Century Endowed Scholars Program. In this issue, you can read about what the original recipients are now doing, as well as some recent and current Scholars. The debt that graduating medical students are carrying is greater than ever. So is the need for financial aid.

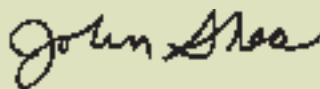
I first learned about Roy Vagelos, M.D., while working at *The Pennsylvania Gazette* and covering a speech Vagelos gave at a Baccalaureate Ceremony. The event takes place before the University's Commencement. The purpose seems to be to inspire the graduating students, and that day Vagelos performed his role very well. He has a B.A. degree from Penn (1950) and an M.D. degree from Columbia, but he was speaking primarily as CEO and chairman of Merck & Co., the pharmaceutical giant. He spoke not about the daily ins and outs of running a major corporation but about one of the extraordinary decisions the company made in the 1980s. Merck provided a drug to fight river blindness, a parasitic disease that affects millions of people in Africa and elsewhere – free of charge.

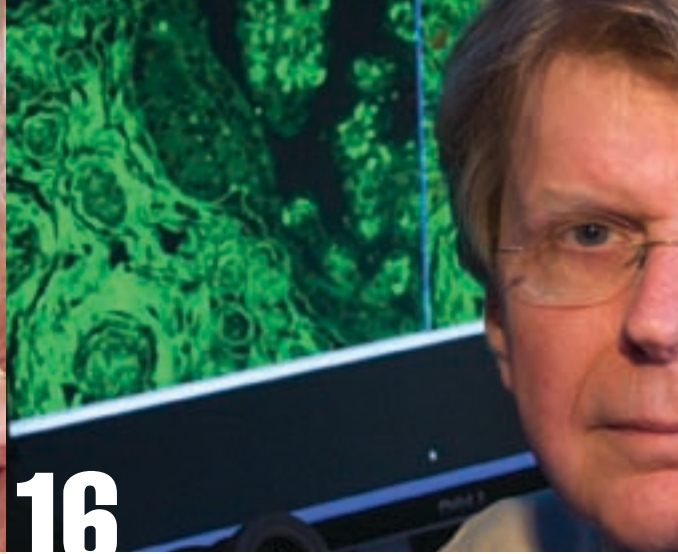
A few years later, in 1994, I was at the press conference called to announce the new chairman of the University's board of trustees. It turned out to be . . . Roy Vagelos, M.D. He was stepping into

another important role, one he fulfilled with distinction. As Judith Rodin, Ph.D., then president of the University, pointed out, Vagelos possessed an attractive combination of experience, in both medical research and private business. “He's been in the trenches *with us*,” she said. “He knows from the inside what universities are about” while also knowing the challenges that major corporations face. Vagelos and his wife, Diana, are also major donors, supporting both Penn and Barnard College.

An account of the recent public conversation Vagelos had with Arthur L. Caplan, Ph.D., director of Penn's Center for Bioethics, is in this issue. The stated topic was potential conflicts of interest in university-corporate alliances. But their talk ranged more widely than that.

In 1997 I ran an article on William Hanson, M.D. '83, then associate professor of anesthesiology and critical care, in *Penn Health Magazine*. We referred to him then as C. William Hanson III. Even back then, Hanson was keeping abreast of medical and technical innovations. What had caught his eye – and, as a result, ours – was the possibility of using a computerized “nose” to diagnose some illnesses. Hanson had heard about dogs that could smell the difference between the urine of people who did and did not have cancer. There were also dogs that could smell cancerous skin lesions. Hanson undertook to test a device that was widely used in the beverage, food, and perfume industries – but now he applied it to diagnose lung infections. His research was picked up around the country. It is not surprising that his interests and experiences led him to write *The Edge of Medicine: The Technology That Will Change Our Lives* (2008), featured in this issue. ■





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SCHOLARS AND DONORS *By Jon Caroulis, with John Shea*

For 17 years and counting, a scholarship program has spared some of Penn's most outstanding students a burden of debt and helped them find career paths. Their benefactors, Walter Gamble, M.D. '57, and his wife, Anne, say the program has enriched *their* lives as well.

GENERATING A HOME FOR REGENERATIVE MEDICINE *By Dawn Fallik*

Although embryonic stem cells have been the focus of scrutiny – and controversy – in recent years, many scientists continued to explore other ways to generate or reprogram cells for therapeutic use. Now with one of the pioneers in the field as its director, Penn's Institute for Regenerative Medicine seeks to establish itself as a leader among such programs.

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THE CHALLENGES OF PERSONALIZED MEDICINE

By Nan Myers

Still one of the most highly anticipated developments in the field, personalized medicine was the topic of a recent symposium in Philadelphia. Experts from Penn Medicine examined some of the challenges facing personalized medicine – among them, medical, technical, political, and economic.



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PEERING OVER THE EDGE OF MEDICINE

By John Shea

In his new book, William Hanson, M.D. '83, professor of anesthesiology and critical care at Penn, takes a look at some recent advances in medical technology and how they can improve patient care. These include proton therapy, robotic surgery, and telemedicine.



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CAN ACADEMIC MEDICINE AND INDUSTRY WORK TOGETHER? *SHOULD THEY?*

Roy Vagelos, M.D., has a special perspective on the relationship between academic medicine and industry: he has worked at the N.I.H., been chairman of a medical department at Washington University in St. Louis, and served as CEO of Merck & Co. Vagelos shared his views with Arthur L. Caplan, Ph.D., director of Penn's Center for Bioethics.



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A NEW ROLE FOR MESSENGER RNA: CELL REPROGRAMMER *By Karen Kreeger*

A team of scientists from three different schools at Penn has found a new way to change one type of cell into another. By flooding a neuron with a specific type of messenger RNA from a different cell type, they were able to reprogram the neuron.



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Another Stellar Showing

For the 12th year in a row, the University of Pennsylvania School of Medicine has been ranked among the top five research-oriented medical schools in the nation by *U.S. News & World Report* in its annual survey of graduate and professional schools. In addition, Penn Med was ranked 12th among medical schools with an orientation on primary care, a major leap from last year's ranking of 31st.

Penn also placed in the top 10 in the country in four specialty programs: pediatrics (2nd), women's health (6th), internal medicine (4th), and drug/alcohol abuse (6th). *U.S. News* ranked two of Penn Medicine's Ph.D. specialty programs among the top 10 in the nation: immunology and infectious disease (7th) and microbiology (8th).

In a memo, Arthur H. Rubenstein, M.B.,B.Ch., dean of the School of Medicine and executive vice president of the University of Pennsylvania for the Health System, wrote: "Our rankings in this competitive survey reflect the tireless dedication, commitment, and resourcefulness of our faculty, students, and staff in providing an exceptional educational experience for the next generation of physician/scientists while maintaining our ongoing commitment to superior patient care and pioneering research."

According to the *U.S. News* survey, the top five research-oriented medical schools, in rank order, are: Harvard University, Johns Hopkins University, University of Pennsylvania and Washington University in St. Louis, and the University of California at San Francisco. In determining rankings, the magazine weighs peer assessments, assessments by residency program directors, research activity, student selectivity, and other factors. This year, 126 medical schools and 20 schools of osteopathic medicine were considered.

Penn Medicine Loses a Leader

Bennett L. Johnson Jr., M.D., fondly known throughout the Penn Medicine campus as "Bernie," died on April 3. He was 76. Senior medical officer of HUP, he

was also senior associate dean for diversity and outreach and had served as senior associate dean for veterans' affairs. A fuller appreciation of his life and service to Penn will appear in the next issue of *Penn Medicine*.

Honors & Awards

Penn's **Department of Dermatology** received an Astellas Award for scientific research that has improved public health in the field of dermatology, presented by the American Academy of Dermatology at its annual meeting. The department was recognized for its leadership in the development of a better understanding of acne, epidermal differentiation, hair follicles, and the microbial ecology of the skin, as well as advances in the diagnosis and/or treatment of leg ulcers, psoriasis, melanoma, bacterial infection, skin aging, HIV, and STD.

Wade Berrettini, M.D., Ph.D., the Karl E. Rickels Professor of Psychiatry, has received the Distinguished Investigator Award from NARSAD, the leading charity for research on mental-health disorders. The one-year grant will provide Berrettini with \$100,000 to advance his research on the genetic foundations of bipolar disorder. He is one of 16 scientists receiving the award, which is designed to support innovative research on psychiatric brain disorders by investigators who have established themselves as leaders in their fields. Berrettini will explore whether rare variants of a gene called ANK3 predispose people for bipolar disorder. His laboratory plans to sequence 700 gene samples from patients with bipolar disorder, derived from the National Institute of Mental Health Genetics Initiative, and to use novel sequencing technology to detect the

suspected variants. He plans to use the results to estimate the variants' frequency in bipolar disorder, which could lead to new research avenues as well as improved diagnosis and treatment.

David Casarett, M.D., associate professor of medicine in the division of geriatric medicine, will lead a major health-care initiative by the Department of Veterans Affairs. Casarett is also staff physician and director of the Palliative Care Service at the Philadelphia VA Medical Center. The Performance Reporting of Outcome Measures to Improve the Standard of care at End-of-life (PROMISE) Center will help the VA to identify best practices in palliative care and develop strategies for improving care at the end of life throughout its health-care system.

Wafik S. El-Deiry, M.D., Ph.D., professor of medicine, genetics, and pharmacology, was named an American Cancer Society Research Professor. His appointment is the first such appointment at Penn. The ACS Professorships are considered the most competitive and prestigious



El-Deiry

research grants that the Society awards. El-Deiry is also the co-leader of the Radiation Biology & Imaging Program at the Abramson Cancer Center and associate director for physician-scientist training in hematology/oncology. Some areas of El-Deiry's research have been the mechanism of action of the tumor suppressor p53 and the contribution of its downstream target genes to cellular growth control, as well as the development and application of non-invasive *in vivo* imaging technologies for cancer research.

Susan Ellenberg, Ph.D., professor of biostatistics and associate dean for clinical research in the School of Medicine, was elected to a three-year term on the board of trustees of the National Institute of Statistical Sciences. The institute's mission is to identify, catalyze, and foster high-impact, cross-disciplinary, and cross-sector research involving the statistical sciences.

Dwight L. Evans, M.D., the Ruth Meltzer Professor and Chairman of Psychiatry, is the recipient of the 2009 William C. Menninger Memorial Award for Distinguished Contributions to the Science of Mental Health. The award is presented by the American College of Physicians. Evans, who also has appointments in the departments of Medicine and Neuroscience, has investigated how stress and depression affect the human body, especially the endocrine and immune systems, as well as how morbidity affects brain and behavior. President of the American College of Psychiatrists, he recently completed a three-year term as president of the board of directors of the American Foundation for Suicide Prevention.

Nicholas K. Gonatas, M.D., professor of pathology and laboratory medicine, has received two awards from professional societies. The American Society for In-



Spoo! 2009! continued the Penn Med tradition of impressive learning, high spirits, musical talent, and rowdy satire. Here, medical students (from left to right) Heather Kiefer, Anh Truong, Brian Finkelman, and Yin Li perform the musical number "Little Marfan Annie," set to the tune of "It's the Hard-Knock Life!" from the musical *Annie*. In this spoof, Marfan syndrome is used to illustrate the importance of understanding genetic disorders as they relate to the delivery of patient care.

vestigative Pathology presented him with its Gold-Headed Cane Award, which honors long-term contributions to pathology, including meritorious research, outstanding teaching, general excellence in the field, and leadership in pathology. Gonatas has also been recognized by the American Association of Neuropathologists, which will present him with its Meritorious Award at its annual meeting in June. His research interests include intrinsic membrane proteins of the neuronal Golgi apparatus and the involvement of the organelle in the pathogenesis of motor neuron disease. Gonatas is a former vice chair of neuropathology.

Anne E. Kazak, Ph.D., professor of psychology in pediatrics at The Children's Hospital of Philadelphia, was named the recipient of the 2009 Cummings Prize. Presented by the American Psychological Foundation's board of trustees, the \$50,000 prize recognizes a psychologist whose career has expanded the role of the psychologist as a primary-care provider working side by side with primary-care physicians in organized

health-care systems. Kazak is director of CHOP's Department of Psychology as well as deputy director of its Behavioral Health Center and director of its Center for Pediatric Traumatic Stress.

Haig H. Kazazian Jr., M.D., the Seymour Gray Professor of Molecular Medicine in Genetics, received the Allan Award from the American Society of Human Genetics at its annual meeting in November. The Allan Award acknowledges substantial and far-reaching scientific contributions to human genetics, carried out over a lifetime of scientific inquiry and productivity. Kazazian was recognized for his contributions in understanding and deciphering mechanisms that cause mutations that lead to human disease. One such mechanism that he discovered is called a transposable element, or "jumping gene," which is a segment of DNA that can move around to different positions in the genome of a single cell and cause mutations. The award comes with a \$10,000 prize and an engraved medal. Kazazian is former chair of the Department of Genetics.

Mitchell A. Lazar, M.D., Ph.D., professor of medicine and director of the Institute for Diabetes, Obesity, and Metabolism, was honored by the American Society for Clinical Investigation, which presented him the 2009 Stanley J. Korsmeyer Award. He was recognized for his outstanding contributions to our understanding of the transcriptional regulation of metabolism. The society also noted that the trainees for whom Lazar served as mentor have gone on to successful careers in academia and industry. In addition to receiving a \$10,000 honorarium from the society, Lazar delivered the Korsmeyer Award Lecture.

Harvey L. Nisenbaum, M.D., associate professor of radiology at the School of Medicine and chair of the Department of Medical Imaging at Penn Presbyterian Medical Center, became the 28th President



Nisenbaum

of the American Institute of Ultrasound in Medicine at its annual meeting in New York City, in April. The multidisciplinary association consists of about 8,000 members, including physicians, sonographers, scientists, engineers, other health-care providers, and manufacturers of ultrasound equipment. It is dedicated to advancing the safe and effective use of ultrasound in medicine through professional and public

education, research, development of guidelines, and accreditation.

Peter C. Nowell, M.D. '52, the Gaylord P. and Mary Louise Harnwell Emeritus Professor of Pathology and Laboratory Medicine, was elected to the American Academy of Arts & Sciences. Known for his discovery of the "Philadelphia Chromosome," he was described by the Academy as a pathologist "who revolutionized our understanding of the genetic basis of cancer." Nowell has also received the 2009 Award for Outstanding Work in Science Related to Medicine, presented by the American College of Physicians. He shared that award with Elizabeth G. Nabel, M.D., director of the National Heart, Lung, and Blood Institute. In announcing the award, the College cited Nowell's work on the "Philadelphia Chromosome," by which he and the late David Hungerford identified the first genetic abnormality linked to cancer.

Theoklis Zaoutis, M.D., M.S.C.E., assistant professor in the departments of Biostatistics and Clinical Epidemiology and of Pediatrics, was selected to receive a Pediatric Investigator Award from the Society for Healthcare Epidemiology of America. The award recognizes the work of investigators in infection control and health-care epidemiology whose contributions in the field have been exemplary. Zaoutis is director of the Antimicrobial Stewardship Program at The Children's Hospital of Philadelphia, where he also serves as associate hospital epidemiologist.

A Scholarship to Ireland

Now in his first year of medical school at Penn, Jonathan Brestoff, an M.D.-Ph.D. student, will have an interesting change of scenery when he completes the spring term: he has been named a recipient of the George J. Mitchell Scholarship

and will spend the 2009-2010 academic year studying public health at Ireland's University College Cork.

The scholarship is named after the former U.S. Senate Majority Leader George Mitchell, who led peace negotiations in Northern Ireland in the late 1990s. It honors American students who excel in academics, leadership, and community service.



Brestoff

At Skidmore College, Brestoff majored in chemistry and exercise science. In 2008, Brestoff and his mentor, Thomas H. Reynolds IV, assistant professor of exercise science at Skidmore, discovered that the molecule manganese (III) tetrakis (4-benzoic acid) porphyrin – MnTBAP – induces weight-loss and a reduction in fat mass in lean and obese mice. This year they submitted an application to the U.S. Patent Office for the use of MnTBAP as an anti-obesity compound. In addition, Brestoff founded the Skidmore Nutrition Action Council, a student group that promoted healthy eating habits at the college and in the local community of Saratoga Springs, N.Y.

Brestoff is one of 12 Mitchell Scholarship recipients chosen by the U.S.-Ireland Alliance from a pool of more than 300 applicants.

Fellow Microbiologists

Two members of Penn's medical faculty were named fellows of the American Association for the Advancement of Science. The association recognizes individuals who have made scientifically or socially distinguished efforts to advance science or its applications.

The new Penn Medicine AAAS fellows are:

- * **Yvonne Paterson, Ph.D.**, professor of microbiology. She was honored for distinguished contributions to the field of cancer research, particularly for her pioneering work in immunotherapy, as well as for her institutional leadership as director of the office of Biomedical Postdoctoral Programs. Paterson also serves as associate dean for postdoctoral research training and director of biomedical postdoctoral programs.
- * **Susan R. Weiss, Ph.D.**, professor of microbiology. She was honored for distinguished contributions to the understanding of viral pathogenesis, specifically for elucidating the determinants of mouse corona virus tropism and virulence in the central nervous system and liver.

Paterson was also named a fellow of the American Academy of Microbiology, an honor bestowed in recognition of a record of scientific achievement and original contributions that have advanced microbiology. Three other members of Penn's Department of Microbiology were also named fellows of the academy: **Frederic D. Bushman, Ph.D.**, whose research focuses on understanding host-virus interactions, with the dual goal of understanding mechanisms and developing inhibitors; **Nigel W. Fraser, Ph.D.**, who has studied herpes simplex virus-1 latency in a mouse model system and is developing vector systems for use in gene therapy in the nervous system; and **Erle S. Robertson, Ph.D.**, whose laboratory investigates the fundamental mechanisms utilized by

Epstein-Barr virus and other gamma-herpesviruses to induce cell-mediated growth transformation.

Transitions & Appointments

Jeffrey A. Drebin, M.D., Ph.D., was named chairman of the Department of Surgery, effective February 1, 2009. He succeeds Larry Kaiser, M.D.

Drebin joined Penn's medical faculty in 2004, when he became chief of gastrointestinal surgery and vice chairman for



Drebin

research for the Department of Surgery. Since arriving at Penn, he has focused his clinical efforts on pancreatic and biliary surgery. Under his leadership, the gastrointestinal surgery division has grown to 15 faculty members across Penn's Health System and is one of the largest and most productive in the nation.

Drebin has made fundamental scientific contributions in cancer biology and novel approaches to cancer treatment. His work in developing the first monoclonal antibodies directed against the HER2/neu protein provided the scientific foundation for the evolution of targeted therapeutics of cancer. He and members of his team continue to explore new approaches to understanding and treating colon, liver, and pancreatic cancers. His research has been supported by grants from the National Institutes of Health, the Department of Defense, and the Bur-

roughs Wellcome Fund. He is co-inventor on two patents related to the use of monoclonal antibodies to prevent and treat cancer. In 2005, Drebin was appointed the William Maul Measey Chair in Surgical Research.

Drebin has held leadership positions with such organizations as the American College of Surgeons and the Society of Surgical Oncology. He has also served on study sections and scientific review groups for the National Cancer Institute, the Department of Defense, and other biomedical research groups. He was recently voted president-elect of the Society for Clinical Surgery.

Stuart L. Fine, M.D., has announced that he will step down as chair of the Department of Ophthalmology and director of the Scheie Eye Institute in June. By that time, he will have served in that position for 18 ½ years. He plans to continue as a professor of ophthalmology, concentrating on patient care, clinical research, and philanthropy. He is also eager to continue as a mentor for faculty, house staff, and students.

During Fine's tenure at Penn, the Department of Ophthalmology has witnessed enormous strides: patient visits have increased from 40,000 to 97,000 annually, clinical practice sites from 2 to 6, full-time faculty from 24 to more than 50, endowed chairs from 3 to 8, and research grants from \$1.5 million to \$18 million annually.

Among Fine's achievements is establishing specialized centers that have achieved international recognition. These include the Center for Hereditary Retinal Degenerations; the F. M. Kirby Center for Molecular Ophthalmology, the first center of its kind in the world devoted to studying molecular causes of inherited blinding retinal degenerations; and the Center for Preventive Ophthalmology and Biostatistics, which leads multi-center, randomized clinical trials that are supported by the National Institutes of Health.



Gathered around Walter and Anne Gamble are several current Scholars. From left to right, back row: Justin Pachuski, David Chacko, Adam Laytin, Beth Dolinsky, Debra Yeboa, and John Waters; middle row: Ehi Akhabue and Christina Palmer; and front row: Anna Weiss and Aura Obando.

SCHOLARS and DONORS

Now in its 17th year, a scholarship program for some of Penn Med's most outstanding students has spared them a burden of debt, helped them find career paths, and created strong bonds with the remarkable Gambles.

When Walter Gamble, M.D. '57, and his wife, Anne, travel, they usually stay in motels. But when they come to Baltimore, Stephen and Andrea Berry insist they stay with *them*.

On a weekend last April, the Gambles and the Berrys cooked together, shared stories, and visited the historical sites around Baltimore. Using Photoshop, Walter was able to get both couples in the same photograph – which suggests that he's kept up with the technology since serving as one of the “chief photographers” for the 1957 *Scope*.

In addition to the sightseeing, Andrea Berry says one of the most enjoyable parts of the visit was sitting around the table, drinking coffee and telling stories.

“Walter would talk about the research he did as a pediatric cardiologist and some of the advances he developed,” she says.

This relationship began when Steve and Andrea were named Twenty-First Century Endowed Scholars, which meant they would receive full tuition in Penn's School of Medicine for all four years. In 1992, the Gambles gave \$10 million to start the scholarship program; the first recipients were six members of the Class of 1996. Steve, Class of 2002, and Andrea, Class of 2003, met in their first week of class and were married a few years later. The Gambles attended their wedding in California. As Andrea puts it, “It was really important for them to be there. They'd been an important part in our lives.”

What's striking about this relationship between the Gambles and Berrys is

By Jon Caroulis, with John Shea

that it's not unique – Walter and Anne Gamble have stayed in touch with many of the scholarship recipients since the program's inception.

“We've gotten lots of letters, e-mails, invitations to weddings, baby pictures,” says Anne. “We feel so blessed, it's enriched our lives. It's overwhelming.”

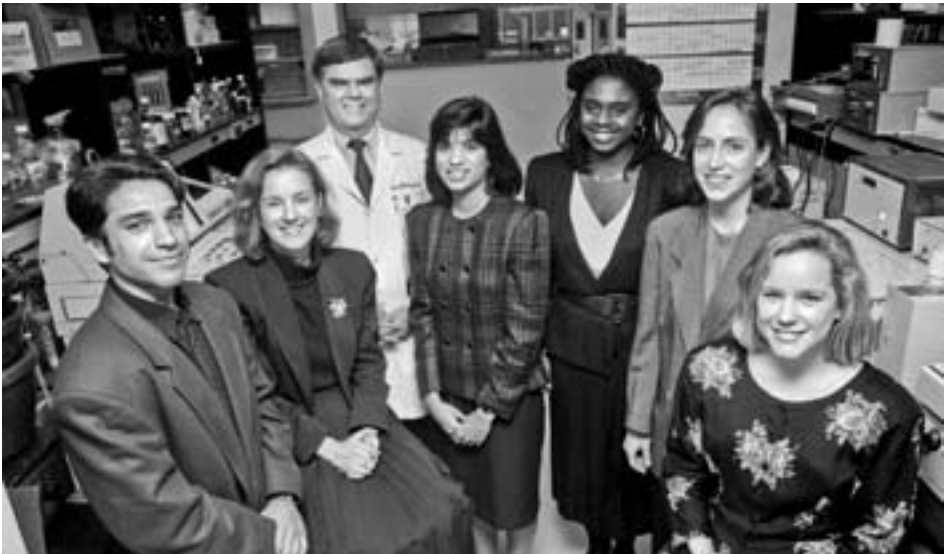
Another former Scholar who has kept in touch is Adil Esmail, M.D. '96, G.M.E. '02. One of the original six recipients, he is now a hand surgeon in Santa Monica, California. “It was really important for me that they be at my wedding,” says Esmail. “They were part of the family.” According to Anne Gamble, Esmail “left us no choice – we had to be there!”

A more recent graduate of the program the Gambles endowed is Julie Linton, M.D. '07. Now a second-year resident at The Children's Hospital of Philadelphia, she was delighted that the Gambles could attend her wedding in October 2007. “I feel incredibly fortunate to be connected to this inspirational, benevolent, and loving couple,” she says.

The Gambles also attend a number of dinners and luncheons for Scholars who are still in medical school, reports Vanessa Marinari, senior director of Alumni Development and Relations for Penn Medicine. “They give more than money – they give their *time*,” she says. “They've become a beacon for medical education.”

Anne Gamble chats with Lauren Marlowe, a current Scholar.





Tommy Leonard

The first six Scholars, shown here in 1993 with William N. Kelley, M.D., then the dean: from left, Adil L. Esmail, Diana Mallory (later Lanchoney), Rachana Srivastava, Katia Maggi Apollon, Tracey E. Cohen, and Karen M. La Face.

dissuades some students, particularly those from low-income families, from even applying to medical school. Economic diversity among medical students is socially just and is considered to enhance education and, eventually, patient care” (December 18, 2008). In addition, while conceding that the effect of debt on career choice is “complex,” he argues that “students and residents should be able to place more weight on their interests – which may lead them toward potentially lower-paying positions in primary care, public health, or research – than on making sufficient money so that repaying loans is not a burden.”

The Burden of Debt

In the first few classes of Scholars, you can find a pair who study infectious diseases; two who practice at public health clinics; one who works at a pharmaceutical company to help get medicines to those in poor countries; and one who works in ob/gyn.

Are these the career paths that Dr. Gamble envisioned when he created the program?

“Absolutely!” he says.

In an essay about the Twenty-First Century Endowed Scholars Program, Walter Gamble wrote that, in his day, medical students “never faced the kind of debts that are confronting them today. Who knows how that might compromise their choice of career? They sink into debt just to make it through undergraduate training, then compound that in medical school.”

The figures have risen sharply in the last 15 years, and tuition at medical schools has risen faster than inflation. In 1992, 81 percent of seniors graduating from medical school with debt owed a median of \$50,000; 21 percent had debt more than \$75,000. Last year, however, the Graduate Questionnaire of the Association of American Medical Colleges revealed that the

steep rise in debt was continuing: students reported an average debt load of more than \$140,000, and 17.7 percent of graduates carried educational loans of \$200,000 or more (*AAMC Reporter*, December 2008). When he was teaching at Harvard Medical School, Walter Gamble wrote that he saw medical students enter fields not because they wanted to practice that way, but because of monetary considerations: the specialties paid more, so the new doctors would be able to pay off their student loans more quickly.

In Gamble’s view, the heavy burden of debt not only affected what fields students selected but where they lived, and sometimes even whether to marry and start a family. One student reported that without the scholarship, he and his wife would not have had a child. Some recent statistics support Gamble’s view. In 2004, the AAMC reported that, among medical students who graduated in 2002, 32 percent indicated that their level of debt influenced their choice of specialty.

In a recent “Perspective” in *The New England Journal of Medicine*, Robert Steinbrook, M.D., one of its national correspondents, notes some of the possible effects of high debt. As he puts it, “The prospect of debt of \$200,000 or more

Setting Up the Program

In December 1990, Lori Farquhar, then an alumni development officer for the University of Pennsylvania School of Medicine, met with Walter Gamble at the Children’s Hospital in Boston. Gamble mentioned that he wanted to make a contribution to the medical school, so a meeting was set up between the Gambles and William N. Kelley, M.D., then dean of the School of Medicine and CEO of the University of Pennsylvania Medical Center.

At that meeting on April 26, 1991, the Gambles first broached the idea of creating a scholarship for students. But there were two conditions: first, the gift was to be kept anonymous; second, the school would commit to work toward making tuition free for all students.

As Walter Gamble wrote, Kelley was enthusiastic: “Let’s do it! This is a fabulous idea!” he said. And that was before the Gambles had indicated the scope of their planned contribution.

In his column in the Spring 1996 issue of *Penn Medicine*, Kelley described the Gambles as “visionaries . . . two of the most extraordinary individuals I have ever had the honor of meeting.”

As recounted in that issue, Walter Gamble’s family were the Gambles of

Proctor and Gamble. When Walter was one year old, his father, Clarence Gamble, M.D., established a trust for Walter's children, based on the Procter and Gamble stock. Over the years, the trust had done well, and Walter and Anne wanted to draw upon it for a good cause.

At first, as the Gambles requested, their identity was not revealed. The initial group of Scholars graduated in 1996, and only at graduation did they meet their benefactors. When Karen M. La Face, M.D. '96, met the Gambles, she says, it was "tearful" for her. As she puts it, "They are just the kindest, most humble people."

Her words are echoed by Diana Mal-lory Lanchoney, M.D. '97, G.M.E. '00, another of the first class of Scholars: "They are most gracious people." Looking back, she feels they have had a greater impact on her than she knew at first. "I think it's always been something that has gone far beyond finances," she explains. They are models because of their commitment "to us and to medicine."

Esmail, who came to the United States from Tanzania when he was 12, said he planned to attend Penn's medical school whether or not he received the scholarship. Being at Penn, he says, "felt right," and the scholarship was "icing on the cake. But their gift is extraordinary, and I want fellow Scholars to set up a scholar-



Adil Esmail, M.D., shown in his California office, is an orthopaedic surgeon specializing in hands.

ship to give back as well. They gave because they wanted to make a difference. They taught us the value of giving."

Part of the reason the Gambles went public at the 1996 Commencement was their hope of inspiring others to create similar scholarships. As Walter Gamble said at the time, "Maybe, eventually – probably not in our lifetime – the whole class will be tuition-free." Although that goal is still far away, the Twenty-First Century Endowed Scholars Program has attracted other contributions, among them gifts from the Class of 1946 and the Class of 1971. Also in 1996, the Gambles established the Gamble Challenge to alumni donors at the \$25,000 level. That challenge was met through the generosity of 58 alumni, 14 of whom pledged \$50,000 or more. Four years later, the Gambles contributed an ad-

ditional \$15 million to provide supplemental support to the Scholars program. Today the School of Medicine selects 10 scholars a year, all based on merit.

Citing the number of Scholars who have chosen careers in public health, family medicine, and research, Walter Gamble says, "This is a selling point to get others to contribute to the program."

Many Paths to Penn

The paths the Scholars took to Penn's School of Medicine – from the first group on – are as varied as their careers after graduation. Maggi Apollon, M.D. '96, the daughter of a physician, knew early on that she wanted to be a doctor. (She was voted best clinician by her class.) Adil Esmail also knew from an early age that he wanted a career in medicine.

Karen La Face, the N.C.A.A. diver of the year as a college senior and a gold medalist at the Pan-American Games, was accepted to Penn's medical school, but put off attending until her diving career ended. (She finished by placing ninth on the three-meter spring board at the Barcelona Olympics.) Diana Lanchoney, after graduating from Tufts University with a dual major in German and economics, worked at Chase Manhattan Bank. "It wasn't until after I graduated that I began to appreciate the revolutionary advances in science," she says. So she enrolled in a Penn post-baccalaureate program to help her apply for medical school.



Walter Gamble listens to Oladapo Michael Babatunde, a current Scholar.

Tracey E. Cohen, M.D. '96, worked in the laboratory of a Nobel Prize winner before she applied to medical school. Steve Berry spent a year in Africa as a volunteer helping to treat people with HIV.

Among the more recent Scholars, Andrea Edlow, M.D. '07, didn't think about medicine until she accompanied an aunt, an internist, on a trip to Mexico to treat a diabetic patient. Julie Linton spent nine months on a Fulbright grant in Panama before starting at Penn Med. "This experience," she says, "unleashed a lifelong passion for global health."

Before coming to Penn, Alexi Wright, M.D. '03, worked for National Public Radio and the New York Academy of Sciences. With a strong interest in writing, she says, "When I applied to medical school, my dream was to become the next Oliver Sacks. That, or a physician scientist – or both!"

One of the more extraordinary routes to Penn is that of David Fajgenbaum, a Gamble Scholar in his first year at Penn. Even before finishing his undergraduate years at Georgetown University, where he also played football, he established an organization dedicated to supporting college students who are coping with the death of a loved one. National Students of AMF Support Network is now a non-profit group with 26 chapters on college campuses. "We have about 20 volunteers, like myself, who are working for the organization, including four Penn Med students," he says.

Asked when he decided he wanted to become a doctor, Fajgenbaum says, "My dad is an orthopaedic surgeon, and I always wanted to be like dad. But two weeks before I began my freshman year at Georgetown, my mom was diagnosed with a grade IV glioblastoma and my whole world was thrown upside down. Through watching what her doctors could do for her and wanting revenge against cancer, which took my mom 15

months later, I decided again to go to med school to become a doctor, but this time to become a surgical oncologist."

The organization he started has moved far beyond revenge. Fajgenbaum points out that between 35 and 48 percent of college students have lost a loved one within the last two years. For establishing AMF, Fajgenbaum received a 2007 BRICK Award. His story was also told last year in *Reader's Digest*, whose foundation made a \$100,000 grant to the National Hospice Foundation in his honor.



Walter Gamble and Sasha Waring, a current Scholar.

But Fajgenbaum was not quite ready for medical school. Before starting at Penn, he earned an M.P.H. degree at Oxford on a scholarship, completing his work in one-third the usual time. He admits it was "extremely difficult." But, as he explains, "I have become increasingly interested in public health, both through my expansion of National Students of AMF and from the idea that a day's work can have an impact on more people."

A new set of challenges faces him at Penn, but, as he says, "I was so happy to get into such a great university for medical school and to receive such a generous gift from the Gambles."

Choosing Fields, Developing Careers

From the start, the Gambles intended for the Scholars to pursue whatever field was closest to their hearts, and the paths they have taken since graduation are varied.

After completing an internship in internal medicine at HUP, Lanchoney became interested in health-care economics and preventative medicine. Now at Merck & Co., she works to see how the pharmaceutical company "can most effectively partner with international organizations and groups to accelerate the availability of life-saving vaccines to the world's poorest countries," she explains. "It's a new position and it's a dream position for me, the culmination of a lot of ideas and experience. My first laboratory job was in vaccines and infectious disease, and through my training, a theme became apparent: 'How you can take innovative science and bring it where it's really needed most?'"

"I'm helping serve people who are definitely underserved and am very fortunate to have this opportunity," she says. "I'm where I should be."

In her ob/gyn practice, says Apollon, "The most satisfying part of the work is my relationship with patients, which I didn't think would be the case. I can deal with quality-of-life issues. I talk to 15-year-olds and tell them not to fear the changes they're experiencing."

"It's more challenging to deal with adolescents," she adds.

Steve Berry was working in the kitchen of a restaurant when he learned he had been accepted into Penn's medical school. Not long before, he had spent a year in Africa with the Peace Corps. While working at a clinic there, he saw at first hand the devastation caused by the AIDS epidemic. One case he recalls vividly was a young man in a village who had been accepted to a college on a scholarship. But he had the virus, Berry

recounts, “and he never came back.”

After medical school, Berry trained in internal medicine at HUP. In 2004, he won the Maurice Attie Senior Resident Teaching Award. He was drawn to research dealing with infectious diseases. Now a fellow at the Johns Hopkins School of Medicine in Baltimore, he’s working on evaluating a drug treatment for HIV-related anemia that has shown promise but has considerable side effects.



Nicholas Stein and Aura Obando, both current Scholars, with Anne Gamble.

In October, Berry presented an analysis of the Johns Hopkins HIV Clinical Cohort at the joint annual meeting of the Interscience Conference on Antimicrobial Agents and Chemotherapy and the Infectious Diseases Society of America. He reported that patients starting HAART (highly active anti-retroviral therapy) are likely to be at risk of serious illness for nearly two months after starting treatment; in addition, the risk does not decrease to near-normal levels until 90 days after starting treatment. The findings suggest that physicians treating patients with HIV “should keep particularly close watch over signs and symptoms of illness and of infectious disease” during that

period. Earlier this year, Berry presented another look at the HAART patients, speaking at the 16th Conference on Retroviruses and Opportunistic Infections. This time, Berry and his team categorized the reasons for the hospitalization of patients in their first year after starting HAART. The top category turned out to be “non-AIDS-defining” infections, such as pneumonia and bacterial endocarditis.

Berry plans a career as a medical-school faculty member who conducts research. It’s not one of the higher-paying areas of medicine, he says, adding that he probably would have gone into a private practice if not for the freedom of choice the Gamble scholarship provided him.

Andrea Berry is a fellow in pediatric infectious diseases at the University of Maryland, working in the Center for Vaccine Development. As she explains, traditional vaccine design has not yet been successful in creating a

vaccine for malaria, one of the deadliest diseases in young children in developing countries. Her approach is to examine the interaction between malaria proteins and the immune system in order to design a more sophisticated and more effective malaria vaccine.

“I was drawn to pediatrics because I enjoy working with children,” she says. “They are honest, tenacious, and inspiring. I also enjoy working with parents and families, which is vital for pediatricians if we are to consider all aspects of a child’s health. Most kids don’t get sick, but many common illnesses in children are infectious diseases, including influenza and respiratory viruses, ear infections, and many

causes of diarrhea, including rotavirus.”

Because of successful vaccines, she continues, “there are many diseases that I have never seen, including small pox and measles. So I’m excited to be in a field where I might place one of the diseases that is common today on the ‘never seen’ list for the next generation of pediatricians.”

Before she applied to medical school, Tracey Cohen worked in the laboratory of Eric R. Kandel, M.D., a neuroscientist at Columbia University who later shared the 2000 Nobel Prize in Physiology or Medicine. “I still have the letter telling me I was accepted as a Scholar,” Cohen says.

She grew up in a coal-mining town in Southwestern Pennsylvania where there were few doctors and health care was poor. But before she was 25 she was working in Kandel’s laboratory and having her research studies published. Her mentor wanted her to pursue a Ph.D. degree in neurobiology, but her roots proved stronger: instead, she wanted to be a doctor and provide care for underserved populations. As it turned out, she found such as group, in a Rhode Island community with a large Hispanic population.

Cohen worked at a community health clinic, eventually became its director, and within a few years added two more clinics to the area. Along the way, she acquired a working knowledge of Spanish.

Her husband, a carpenter, built them a house with his own hands, and they had two sons 17 months apart. Running three clinics, caring for the children, and driving a good distance to work began to take its toll, so she found another job with community health care a few minutes’ drive from where she lives. Cohen is another Scholar the Gambles have visited.

Recently, Cohen became an associate director of the Neighborhood Health Plan of Rhode Island, rated by *U.S. News & World Report* and the National Committee for Quality Assurance as the top plan in the state for treating Medicaid patients.

From Family Medicine to Oncology

Karen La Face spent the first eight years of her medical career working at a clinic that dealt primarily with veterans. “They really are a disparate group of people,” she says. “They range in age from 33 to 95.” And so was the range of maladies she’s treated: post-traumatic stress, depression, and alcoholism.

Now in a family practice, she focuses on preventative medicine with a holistic approach. Like many other Scholars, La Face says that her choice of field is directly related to the scholarship.

When applying to medical school, she explains, “I didn’t realize the kind of debt you can rack up.” Today, she has three small children and, following maternity leave, she has resumed work on a part-time basis. “Who knows, if I had to pay off debt, maybe that would not be an option.”

Her experience with the Gambles, she continues, has “inspired me to be more generous and charitable. I want to give back to Penn.”

According to Andrea Edlow, she is on the career path she wanted because of the Twenty-First Century Endowed Scholars Program. Like her husband, Brian Edlow, M.D. ’07, who was also a Gamble Scholar, she is a fellow at Brigham and Women’s Hospital in Boston. “I have always loved and felt passionate about women’s health, and I was able to choose a career in ob-gyn without worrying about what specialty would allow me to make the most money to pay back my medical school loans.”

Edlow shares authorship of several articles published in the *American Journal of Obstetrics and Gynecology*, including “Can Placental Pathology Explain Second-Trimester Pregnancy Loss and Subsequent Pregnancy Outcomes?” (October 2008). She has also served as the Massachusetts Junior Fellow Chair for the American College of Obstetricians and Gynecologists.

Esmail was interested in a career in orthopaedic surgery, and he credits Pedro K. Beredjikian, M.D., G.M.E. ’97, then an orthopaedic surgeon at Penn, with getting him interested in hand surgery. Esmail trained to be a vascular surgeon and has done operations ranging from treating carpal tunnel syndrome to attaching severed fingers. Asked what he finds satisfying about his work, he simply says, “Any successful surgery is fulfilling.” In particular, he adds, “our hands are so important to us, and to be able to give a person back their dexterity is wonderful.”

Alexi Wright, who is now a hematology/oncology fellow at the Dana-Farber



Alexi Wright, M.D. '03, now at the Dana-Farber Cancer Institute.

Cancer Institute, reports that she chose to go to Penn for her medical education because of the “flexibility” that the Gamble scholarship offered. Since graduating, she has been a prolific writer, in many cases sharing the byline with her partner, Ingrid Katz, M.D., a fellow in infectious disease at Beth Israel Deaconess Medical Center in Boston. In 2004, having gone through the process themselves only a year earlier, they reported in *The New York Times* on “the Match.”

That same year, in the online magazine *Slate*, they took turns describing a

week in the lives of interns, touching on the pressures, pleasures, and sometimes pains. Wright touches on all of them in her first entry: Waking at 4:43 a.m., she gets up and cracks open “my first Diet Coke of the morning. I’ve never been one for coffee, but caffeine is key, so I drink about a gallon of Diet Coke a day.” At the hospital, she learns one of her patients, a 21-year-old man with leukemia, had died during the night: “Nearly every member of our team has broken down in tears while taking care of him.” Later in the week, Wright shares her developing insights on education and training:

“Education happens at every level. As interns, we learn from the nurses, each other, the residents, the fellows, and our attendings. The formal teaching usually comes from the coaches, but a lot of key learning happens at night when we’re alone with the residents on call. That’s when we learn how to perform procedures, manage critically ill patients from minute to minute, and interact with patients and their families. It sometimes feels like a strange sleepover party when we’re all up together, taking care of patients and wandering the halls late at night.” And as she puts it later, “Internship is all about learning how to develop a sixth sense that helps us determine what’s wrong with a patient.”

In *The New England Journal*, Wright and Katz have written a number of “Perspectives” on contentious topics. For example, in “Tobacco Tightrope – Balancing Disease Prevention and Economic Development in China” (April 12, 2007), they point out that the United States was one of the nations slow to ratify the WHO Framework Convention on Tobacco Control and that its objections “were often closely aligned with the interests of the tobacco industry.”

More recently, Wright was the first author of a study published in *The Journal of the American Medical Association* (October 8, 2008) on the benefits of end-



Julia Linton, M.D. '07, a resident at Children's Hospital of Philadelphia.

of-life discussions between physicians and terminally ill patients. Some physicians have been reluctant to have such talks, feeling it would be more upsetting to their patients. But according to the study, patients who had such discussions were less likely to experience emotional distress, received less aggressive medical care in their final week of life, and had a better quality of life near death than patients who did not have comparable discussions. The benefits seemed to apply as well to the family members, who were less likely to be depressed six months after the patient had died.

Despite her knack for the printed – and on-line – word, Wright notes that “my current passion/obsession is research, so writing is on hold for now.”

A Growing Interest in Global Health

Like several of the Gamble Scholars, Julie Linton has taken her skills and enthusiasm to other countries. “I first traveled to Consuelo, a community in the Dominican Republic, in June of 2006,

and I have since returned several times,” she says. “Because of the Gambles, global health became a sustainable part of my career path.” While pursuing a career in primary-care pediatrics, she also hopes to be engaged in teaching at an academic institution, “with particular interests in global and immigrant health, health disparities, and preventative care – including healthy lifestyle and prevention of obesity.”

Linton has been part of the leadership team of the Alliance for International Medicine. In its newsletter, she wrote about her experiences in Consuelo: “Providing care in a severely resource-limited setting forces me to remain mindful of our privilege in the United States and to appreciate the capacity to find joy in simplicity and genuine human connection.”

Julian Harris isn't sure where his medical education will take him in the long run. He completed both his M.D. and M.B.A. degrees at Penn in 2008 and has begun a residency in internal medicine at Brigham and Women's Hospital.

Although he had long thought about being a doctor, as he grew older, he says,

“I became more interested in social issues of medicine, such as health policy.” Harris, whose M.B.A. degree is in health-care management, has been to Africa and Latin America several times. On one visit, he helped prepare a study on health-care reform for the Government of Egypt. He has also worked on an assessment of the clinical care and support programs in Uganda. In addition, he has conducted research in the Dominican Republic, studying how HIV patients were adhering to anti-retroviral medicines.

Harris's interests include politics. In addition to serving as co-president of Penn for Obama last year, he was a member of Doctors for Obama '08 and attended Barack Obama's inauguration in January.

Harris was one of five authors of “Barack Obama's Plan for a Healthy American,” published in Fall 2008 in *Context*, which describes itself as “the Journal of Health Students Taking Action Together.” After noting that the nation's health-care system “is in disarray, with more than 45 million U.S. residents uninsured and continually rising health costs,” the lengthy article proceeds to argue that Obama's plan “would dramatically improve access to health-insurance coverage and the quality of health care, reduce health-care costs, revamp the health-care delivery infrastructure, and focus on important population health priorities.”

For the short term, says Harris, he will be involved with patient care, but he sees that the future could be a combination of activities, including research. What he is sure of is that meeting the Gambles “has been the best part of the scholarship. I hope to get to know them more in Boston.”

Other Scholars have echoed this theme. As Alexi Wright puts it, speaking for her partner as well, the Gambles “are two of the most inspiring people we know.” And Karen La Face sums it up: “They've shown us how to live and enjoy life, but also how to do good.” ♥

The Challenges of *Personalized*

FOR PERSONALIZED MEDICINE TO BE REALIZED, “WE HAVE TO COLLECT ENORMOUS AMOUNTS OF INFORMATION. AT THE PRESENT TIME, WE ARE BETTER AT COLLECTING THE INFORMATION THAN TRULY UNDERSTANDING IT.”

What is the reality of personalized medicine? It turns out that it depends on whom one asks.

“It is not a particularly straightforward issue,” explained Garrett FitzGerald, M.D., director of Penn’s Institute for Translational Medicine and Therapeutics and chair of the Department of Pharmacology. He was speaking at a recent symposium presented by the Penn Genome Frontiers Institute (PGFI) and the Franklin Institute, the venerable Philadelphia institution dedicated to public science and technology education.

“Open Society and Genomics-Enabled Personalized Medicine” was moderated by Gina Kolata, science writer for *The New York Times*. The session included talks by leading researchers and bioethicists.

The promise of personalized medicine became clearer in 2001 when the International Human Genome Project completed a blueprint of the human genome. Researchers began to realize the possibilities based upon the new knowledge that could enable novel approaches toward managing and curing human disease. It was as if a new era in medicine was being born.

Not so fast: that seemed to be the consensus of the speakers at the symposium. Although they acknowledged the great promise of personalized medicine as en-

abled by genomics – the study of how an organism’s complete genome is regulated – there are still some obstacles and some significant questions to address. As FitzGerald put it, “The challenges of personalization are medical and technical, social and political, economic and regulatory.”

Tom Curran, Ph.D., a professor of pathology and laboratory medicine at Penn who serves as an associate director of PGFI, began the symposium by discussing some of the successes of gene therapy.

“As human beings, we have a lot in common,” he said. “Our DNA differs in only 10 million base pairs out of three billion, so we are actually 99.7 percent identical.”

By interpreting the information contained in DNA, he continued, “we can learn about nature and the origins of

disease. Not only can we predict disease and identify carriers, we can try to match specific treatments to specific patients based on the complement of genes. We can also uncover the causes of diseases and hopefully can offer new treatments to our patients.”

Curran, who is also the deputy scientific director of The Childrens Hospital of Philadelphia, described how investigators are using genomics to try to understand cancer. Recently, scientists at CHOP discovered a mutation in a single gene that exists in about 25 percent of patients with neuroblastoma, a neuroendocrine tumor that is the most common extracranial solid cancer in childhood. “It turns out that this mutation was not a new discovery,” said Curran. “It had previously been found in patients with adult leukemia. To treat these adult patients, a drug was developed. Now, one year later, we are beginning clinical trials to learn if this drug is also effective against neuroblastoma.”

Getty Images/Steven Hunt

Medicine

By Nan Myers

Scientists are also using gene therapy to “cure” sickle cell disease, he said. “Sickle cell is a terrible disease that causes great pain. It is a genetic disorder that forms a mutation in hemoglobin. It binds oxygen in a slightly different way than normal to form a cell in the patient’s blood that looks like a sickle rather than being round.”

“There is a cure for sickle cell disease,” Curran asserted. “It is bone marrow transplant. If there were a perfect match for every patient, we would cure the disease. Since we can’t, scientists at CHOP are pioneering a new approach to transplantation, called tolerance.” In this process, they transplant the mother’s blood, which does not have the disorder, directly into the fetus *in utero*, before the immune system in the fetus is developed. “The hope is that we can trick the fetus into believing that the mom’s blood is the baby’s blood – and have a baby born without sickle cell disease.”

Each speaker at the symposium emphasized that the study of genomics and personalized medicine is extremely expensive and takes both significant amounts of time and very specialized research. “There is a lot being promised,” noted Pamela Sankar, Ph.D., assistant professor of bioethics in Penn’s Center for Bioethics. And as Curran pointed out, “We have to collect enormous amounts of information. At the present time, we are better at collecting the information than truly understanding it.”

The mission, according to FitzGerald, is to learn “how the revolution in genomics may refine the way we use the drugs we have today and help us to refine the use of drugs that are discovered tomorrow.” He went on to explain an addi-

tional complication in the coming era of personalized medicine.

“Most of us are subject to the determination of two professions, medicine and law,” which, he said, think differently about the same type of evidence. “Medicine uses large-scale clinical trials in a large number of people to determine if drugs work safely or if they work at all. Law looks at things in a much more personal fashion; it is much more interested in knowing whether the drug caused *your* heart attack or *your* stroke. In a sense, the law is already at the personalized stage of medicine.”

In the current health-care environment, FitzGerald continued, “Drugs are effective; they are also dangerous. Take Celebrex,

THE HUMAN GENOME IS IMPORTANT, OF COURSE. “BUT HOW DO THESE MULTIPLE CLUSTERS OF MULTIPLE GENES INTERACT WITH THE ENVIRONMENT THAT ONE IS EXPOSED TO – WITH DIET, EXERCISE, AND SMOKING, FOR EXAMPLE?”

for example. Packages carry an FDA-mandated ‘black box warning’ for cardiovascular and gastrointestinal risk. Yet we know this risk only pertains to two percent of the people. But how do we know which people are in that two percent?”

Sankar elaborated on this challenge. “The future of personalized medicine is pharmacogenetics,” she said. “This is the concept of choosing a drug just based on a person’s genetics. The hope is that in the future they will do a genetic analysis of you and on the basis of the results, get sufficient information to decide if you should get a specific medicine and how that medicine should be dosed or whether, instead, there are certain preventive measures you are recommended to take.”

On the other hand, the challenges of personalized medicine have not slowed the movement. “The market has already

spoken,” said FitzGerald. “There are people out there who are ready to sell information to you on your personal genome. Look at those companies who offer genome mapping services, who offer to let you see your genes in a whole new light. Spend, swab, send – within days, you can unlock your susceptibility to certain diseases and so much more.”

According to Sankar, “People have an incredible optimism for personalized medicine.” But, she argued, the reality today is very different. It is a very complicated process, both creating a test and getting the test to the point where it can actually be used in a clinical setting. Sankar also raised concerns about interpreting test results, citing a recent study that looked at a colon cancer test and how well the physicians could use the information. The study showed that more than 30 percent of the physicians could not interpret the results correctly. “So the question is: If the physician who sees the test results can’t really explain them to a patient, what is the likelihood that a patient can understand the choices?”

How significant are genomes in determining a person’s health? FitzGerald suggested that they are only one factor, and the panel concurred. “We’ve taken our eye off the total problem to focus on only part of the problem,” said FitzGerald. Instead, humans can never really get away from “the environmental influence. All of the aberrant genes we find can contribute to what we know as a heart attack or stroke. But how do these multiple clusters of multiple genes interact with the environment that one is exposed to – with diet, exercise, and smoking, for example?”

These are the kinds of questions that will have to be answered before the promise of personalized medicine can become a reality. ▀

Materials related to the symposium can be accessed at <http://published.genomics.upenn.edu/2009/franklin>



John Gearhart, Ph.D., director of the IRM, left, discusses institutional matters with Ed Morrisey, Ph.D., scientific director.

By Dawn Fallik

Generating a Home for *Regenerative* Medicine

The Institute for Regenerative Medicine is not only about stem cells. It's not only about scientists or clinicians or engineers or veterinarians. The ultimate purpose of the enterprise, according to its director, John D. Gearhart, Ph.D., is to enhance collaboration across schools and disciplines, from medical school down to high school.

The goal, he says, is to spread the excitement about regenerative medicine – the excitement of possibility.

Now, with a new president in the White House, that possibility seems closer to reality. In March, President Obama lifted certain limits on stem cell research. And for Gearhart, that's just the spark to push the institute forward and help it become a national leader in the field of stem cell research.

"It's been a tough 10 years to be in research in general, but it's been really tough to live through an era of science being bashed and ignored and ideology

trumping science," says Gearhart. "Now the new president is surrounding himself with scientists, and there's some money in the stimulus package [for this area]. They know it's a good investment."

Last summer, Gearhart came to Penn as the eighth Penn Integrates Knowledge University Professor. Like all PIK professors, he has appointments in two of the University's school – in his case, the School of Medicine (Cell and Developmental Biology) and the School of Veterinary Medicine (Animal Biology). He was also named the James Effron University Professor. The official announcement cited not only Gearhart's pioneering research in stem cells but also his commitment to educating the general public and policy makers about the importance

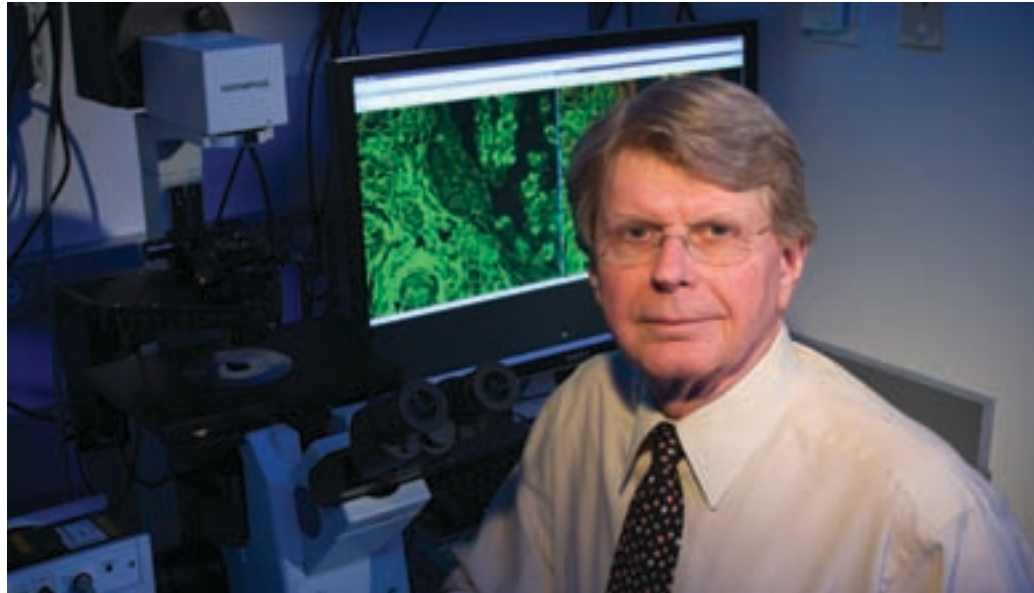


Photographs by Addison Geary

of stem cell research. At Johns Hopkins School of Medicine, Gearhart led a team of researchers that first identified and isolated human embryonic stem cells. His research has focused on the role genes play in forming human tissue and embryos, particularly in connection to causing birth defects and mental retardation. Before joining Penn, he was the C. Michael Armstrong Professor of Medicine at Johns Hopkins, director of developmental genetics in its Department of Gynecology and Obstetrics, and director of the Stem Cell Program at the Institute for Cell Engineering.

Penn's Institute for Regenerative Medicine was established in 2007. As Amy Gutmann, Ph.D., Penn's president, stated at the time, "The discovery of the remarkable properties of adult stem cells is transforming our understanding of basic biology, as well as disease processes." The institute, she said, "will foster new and significant campus-wide research collaborations to explore the frontiers of stem cell biology and pave the way toward the discovery of life-saving therapies." The following spring, the institute shared \$3.9 million from tobacco settlement funds – the result of a Congressional agreement in which the cigarette and smokeless tobacco companies would pay \$368.5 billion to federal, state, and local governments over 25 years. The Commonwealth of Pennsylvania then used that money for various health research projects across the state, including the IRM. In particular, the institute's share supports new approaches for regenerating insulin-producing islet cells to treat diabetes. It also supports outreach programs for minority students in Philadelphia and for faculty at Haverford College, Lincoln University, and Thomas Jefferson University.

Before Gearhart arrived, two of Penn's most prominent biomedical scientists were sharing the director's position. Jonathan A. Epstein, M.D., the William



A pioneering scientist, Gearhart also has been an effective advocate for the importance of stem cell research.

Wikoff Smith Professor of Cardiovascular Research and chair of the Department of Cell and Developmental Biology in the School of Medicine, specializes in exploring the molecular mechanisms of cardiovascular development. Ralph L. Brinster, V.M.D., Ph.D., the Richard King Mellon Professor of Reproductive Physiology in the School of Veterinary Medicine, is widely known for his work in manipulating the cellular and genetic composition of early mouse embryos.

Starting the institute, says Brinster, was a challenge because so many schools, administrators, and faculty members across campus were involved. On the other hand, getting the faculty and administration excited about the research was not.

"The faculty voted nine years ago that regenerative medicine was *the* most important area to develop," he says. "It's such a critical area, and the University has so many investigators with such a big stake in stem cells that I can't see that it won't thrive here."

So far, more than 70 faculty members have joined the collaborative effort, from researchers at the medical school trying to induce heart cells to regenerate, to engineers focused on tissue engineering, to

veterinary scientists studying germ cells.

Members say belonging to the institute not only allows increased options for research funding but also a place and a way to connect with other people across campus who have similar interests. The University's schools of Medicine, Veterinary Medicine, Dental Medicine, Engineering and Applied Science, and Arts and Sciences committed to hiring a total of at least 15 new faculty members who would be associated with the institute. The new faculty would be housed in specific departments, but the IRM would help provide funds for recruitment.

Christopher Chen, Ph.D., M.D., is the Skirkanich Professor of Innovation and Bioengineering at the engineering school, which has 10 members in the IRM.

"Across the campus, we're all working on bits and pieces of the regenerative medicine puzzle," he says. "It's the basic research of trying to understand what these cells are and how they might contribute to the physiology of the disease." The next step, he continues, is "translational . . . how to *use* those cells."

"Having an institute gives us a sort of coffee shop where we can all meet and learn about what others are doing," says

Chen. “We spend so much time focusing on our own work, we don’t always know that other people are working on similar problems.” The institute “helps to provide a home base where people rally around certain types of problems. We choose what problem we’re going to work on, and then we get together to write grants and get money to do the research.”

At present, people in the engineering school are working on new kinds of biomaterials – synthetics that would allow stem cells to be embedded in the body. Then, as Chen explains, those materials could be programmed with specific properties, from how fast they degrade to how they work with different organs.

For his part, Gearhart is studying how one type of stem cell evolves into another of the 203 cell types. In his laboratory, he is also focused on taking an adult skin cell and reprogramming it into a stem cell.

“The beauty of this is that you can take the skin cells from a living patient and convert them to stem cells, and then from that stem cell you could grow whatever the patient would need, like a heart cell,” he explains. “That way, you would get around ethical issues [involving embryonic research]. But more importantly, you would get around immune issues, because that cell is from that patient.”

Gearhart’s research now focuses on developing heart cells and nerve cells, particularly dopaminergic neurons that are involved in Parkinson’s disease and motor neurons involved in such diseases as amyotrophic lateral sclerosis (ALS).

Ed Morrisey, Ph.D., is the scientific director for the IRM as well as an associate professor of Medicine and of Cell and Developmental Biology. He found that collaborating between the schools entailed a learning curve for the institute’s administrators.

“The benefit is that Penn is a big place, and what was remarkable was that when you start looking at the vet school and the

engineering school and the med school, there are a lot of people doing stem cell research already,” he points out. “But even within an institution like Penn, each school has its own culture.” The role of the IRM, he says, is to learn what the individual schools want to get out of their involvement in various projects – and then find a way to contribute resources.

In the past year, IRM members received several large grants, including one from the National Institutes of Health to study skin stem cells; a large Myogenesis Research Center award from the American Heart Association to fund research on heart stem cells; and a smaller NIH exploratory grant to fund preliminary work on cardiovascular stem cell biology



Paul Estes meets with Morrisey and Gearhart.

that is expected to lead to a larger consortium grant application later this year.

Researchers say they’re excited about developing new projects across schools. Last year, the institute put out a call for pilot projects, looking for those on which the different schools could work together. That’s how the tissue engineering collaboration developed.

Epstein, a specialist in cardiovascular medicine and a developmental biologist, is part of one of the projects – focusing on the development, regeneration, and renewal of heart muscle. He is studying the connection between certain gene development and congenital heart disease, examining regeneration in particular. The liver, he notes, regenerates fairly quickly.

At this point, it is not clear whether heart muscle tissue regenerates at all unless helped by medicine.

One approach in this project is to grow cardiac tissue in a dish and then use it as a kind of patch in a patient who has had a heart attack or other cardiac problem. The cells are grown in two ways. One development occurs in a matrix-like gel that forms around the cells and gives them substance; then the cells produce the connective tissue that forms into a graft. The other method involves Dacron, a synthetic material, that also gives the cells substance and a structure in which to expand.

How the stem cell grafts will work best is not settled, says Epstein. Some groups are experimenting with injecting the cells directly into the heart. Others are making a “biopatch” that is sewn onto the heart in a surgical procedure. Currently, the lab studies use either adult stem cells taken from surgical procedures or mouse models.

The Institute for Regenerative Medicine put Epstein’s team in touch with a group from the engineering school that could help grow the patch and determine which kind would be best for the heart.

As Epstein explains, “The institute allows for easier collaborations with people who have similar interests but might be studying very different topics, because the methods and mechanism are probably shared among different tissues. People studying brains may not talk to people studying hearts very often.”

One challenge in developing the institute was simply addressing the controversial portion of the program: human embryonic stem cells. In Brinster’s view, because the use of the embryonic cells raised religious and political concerns – fully covered in the media – it was difficult to address other kinds of stem cells and their uses. For example, researchers are finding ways to change skin cells into stem cells, and many people who have objections to

embryonic research do not have the same objections to using skin cells.

“It sort of put a cloud over the whole field,” says Brinster.

Steven Fluharty, Ph.D., the University’s vice provost for research and a professor in the Department of Neuroscience, serves as chair of the oversight committee for all the participating schools. According to Fluharty, the University had to work with the Commonwealth of Pennsylvania to address how the research at the IRM would proceed given the state’s restrictive laws about human embryonic stem cell research.

“We didn’t want people to just think about human embryonic stem cells,” he says. “Are they powerful tools for research? Absolutely. But by no means are they the only avenue by which advances can be made.”

Fluharty notes that new lines available for research will be very useful. Although the state’s laws are more restrictive than the federal laws, researchers are hoping that the state will follow the president’s lead.

Meanwhile, scientists are working with mouse embryos and skin cells, researching the stem cells – those very cells at the start of life, the ones that become liver, tissue, bone, heart – and hoping that they will help unlock various medical mysteries and help promote healing.

The University is creating a committee to oversee research involving embryonic stem cell use, says Gearhart. Although most research uses mouse cells or adult cells, some research does use the 13 embryonic stem cell lines approved by the federal government. That research, Gearhart points out, is not funded by state monies, only by federal or private funds.

If President Obama validates other stem cell lines, those would also be eligible for research, but Gearhart emphasizes that no cell lines will be generated at Penn.

The highly publicized controversies surrounding stem cell research meant

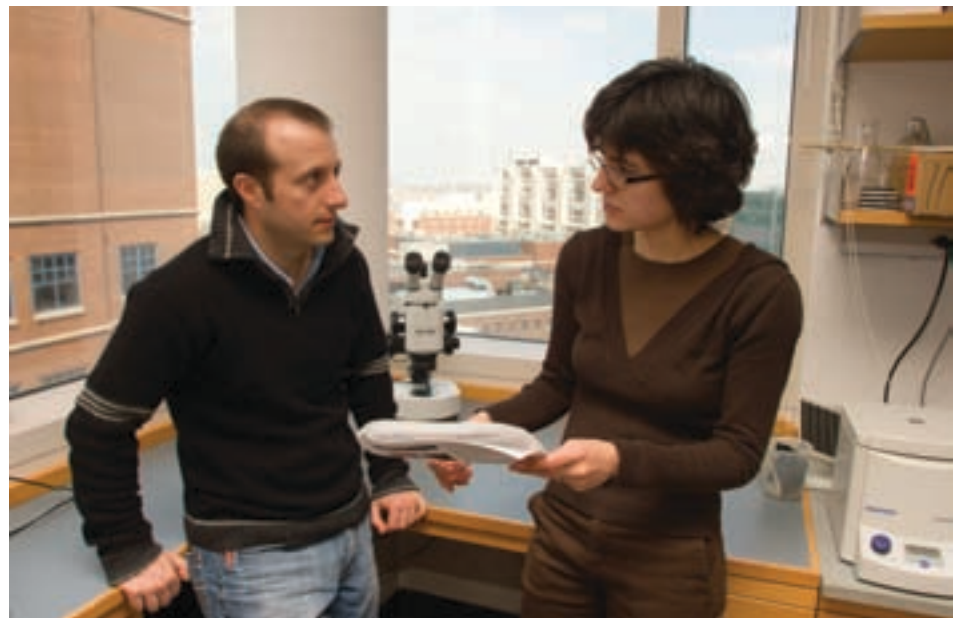
that whoever took over as director of the IRM had to be comfortable as a lightning rod, a public speaker, and a scientist. Epstein knew Gearhart from his pioneering work in the field, but says he was also impressed by Gearhart’s strong advocacy efforts. Gearhart has testified frequently before Congress and taught politicians, the press, and the general public about the meaning of stem cell research and its pros and cons.

“He was a very natural fit because he could address many of these issues and

“I felt very strongly that we should be doing more than just research in this field,” he says. His years of experience in stem cell biology and regenerative medicine told him “that it was more about education and outreach quality if we were going to make the field really robust.”

The interest Penn showed in both research and public policy attracted him.

“The field was so dynamic and so full of potential, Penn recognized that they had to get into this field and commit to this kind of institute.” The IRM, in his



Paul Estes, B.S., a graduate student in Gearhart’s lab, confers with Filipa Pinto, Ph.D., a research specialist.

contribute across many different levels,” says Epstein.

Gearhart, too, felt he was a natural fit for the position at Penn. He grew up in a Pennsylvania coal mining town and became a ward of the state – at Philadelphia’s Girard College – when his father died. He went to Pennsylvania State University, then to graduate school at Cornell University. Gearhart returned to Philadelphia as a fellow at Fox Chase Cancer Center.

As director of the Institute for Cell Engineering at Johns Hopkins, Gearhart brought millions of dollars into the field. But, he said, there was something missing.

view, was a clear statement of purpose and direction.

Although he’s been at the institute for less than a year, Gearhart already has a list of goals to accomplish.

To no one’s surprise, he wants to facilitate regenerative medicine research by identifying targets and pairing investigators from across schools with similar interests.

The second goal is to provide funding that will support those projects. Although the money from the tobacco settlement is used for a variety of projects, the institute can also apply for NIH grants and other federal funds. At pres-

ent, says Morrisey, there is money available, and the institute is actively pursuing large grants as well as supporting smaller pilot projects within the school.

The third goal is to create a mechanism for training students and for teaching, both within the University and through public outreach. Gearhart is taking a role in this himself, as requested by President Gutmann, by teaching an undergraduate course on developing technologies for non-science majors.

“It’s easy for us to teach graduate students or medical students,” he says. “Teaching on a different level is more of a challenge.”

Gearhart has plenty of experience on those levels. In Maryland, he helped pass a law to fund stem cell research by traveling around the state, talking to garden clubs, business groups, synagogues, and anyone else who would listen. Part of the reason people listened was that he’d had media training in how to explain a complicated topic like regenerative medicine in language non-scientists could understand.

It’s a lesson other investigators could use, he says. He often found himself as *the* voice for stem cell research – just because he was comfortable talking to the press.

There is one more priority: school outreach. An important part of the IRM is Project BioEYES, a science discovery program throughout the City of Philadelphia, from pre-kindergarten all the way through high school. Jamie Shuda, Ed.D., is director of the Thomas Jefferson University Outreach Program and oversees the Life Science Outreach for Penn’s School of Arts and Sciences.

Although the program already existed at Jefferson at the middle-school level, the new presence of the IRM allowed it to expand and create lessons focusing on everything from regeneration to antibiotic resistance. So far, more than 14,000 students have taken part in the program.

“When we teach regeneration,” says Shuda, “we use zebrafish, and students

love to cut off the fin and see how it grows back. Or we use fluorescent lights to look at how they digest fats.”

There are several instructors in the program, but the hope is that teachers will be able to lead the classes themselves, with a little support from the BioEYES staff. Each lesson is adaptable to a school’s particular needs.

Shuda also works with Bridge to ReBio, another outreach program funded by the IRM. Through that program, four high-



Newly arrived as associate director is Kenneth S. Zaret, Ph.D.

school students work with undergraduate and graduate student mentors on a project. This was the first year of the grant, and 40 local high-school students participated.

“The idea was to sort of scaffold it up so that we could expose high-school students and undergrads to what real research looks like,” says Shuda.

The class work has sparked research. One student is studying the effect of statin drugs on digestion, another few are studying cancer cells. The graduate students use their own research as a jumping-off point for further study.

For the scientists who go to the schools as part of the BioEYES program, it’s an instant reminder of why they do what they do.

One of the lessons uses zebrafish to model human disease, and the students perform the experiments. As Epstein puts it, “When you regularly work with fish that glow in the dark, you start to take it for granted. But then you go to a school and a kid looks at and thinks it’s so cool.”

If the program is successful, these students will remember those lessons – and remember why science is cool, even when it’s not cool to love science. The goal is for them to stick with science, through college and graduate school or medical school. At the other end, the IRM plans to be there with money to support the recruiting of new faculty in the field of regenerative medicine.

For Gearhart, it’s as if he has been handed the keys to a Ferrari that is revved up and ready to go. His lab is busy, researchers are working together, recruiting – both for faculty and for new IRM members – is going well, and the zebrafish are luring young minds into the lab. In April, the institute added an associate director: Kenneth S. Zaret, Ph.D., who had held the W. W. Smith Chair in Cancer Biology and led the Cell and Developmental Biology Program at Fox Chase Cancer Center.

It’s go time.

“It’s easy to dream and plan,” Gearhart says. “But to be able to put things into effect? That’s divine. And that’s right where we are now.”

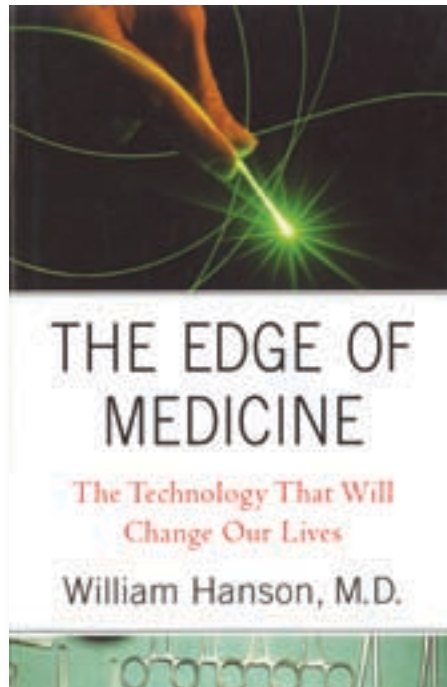
“I look forward to having an entity where we can find new areas of research, enhance ongoing areas of research, and decide where our niche is in the institution.” He wants to identify Penn’s strengths and make them even stronger, in order to create a more significant impact. And then? “And then we would be the real leaders in those programs.” ▀

Peering Over the Edge of

In a recent book, William Hanson takes a look at where

William Hanson, M.D. '83, professor of anesthesiology and critical care at the School of Medicine and director of surgical intensive care at the Hospital of the University of Pennsylvania, seems well suited to comment on where medicine is heading. As he writes in his recently published book, *The Edge of Medicine: The Technology That Will Change Our Lives* (Palgrave Macmillan, 2008), he was an early convert to the usefulness of computers in the health-care setting. On the other hand, the computers in use before Hanson entered medical school were much different from the sleek and speedy computers that are powering today's technology. "In the late 1970s and early 1980s, I worked at the same medical center that I do now, in an office that was then called Data Processing – the hospital division that managed patients' bills and accounts payable. There was exactly one computer in the entire hospital – in the basement – and it dined exclusively on IBM punchcards. . . . I was the hospital's only data analyst. . . ."

Hanson's interest in this new technology continued unabated through his medical education and training and beyond. In fact, he taught a class on computers in medicine at Princeton University for several years and is an associate faculty member in Princeton's Department of Computer Science. Back in 1997, Hanson published the first results of a study of an electronic "nose" in *Anesthesiology* and soon after presented his findings on its effectiveness at the annual meeting of the American Society of Anesthesiologists. Produced by a British company called AromaScan, the computerized nose analyzed aromas through its 32 semiconducting polymer sensors. Hanson and a colleague, Heather Steinberger, R.N., used



**THE NONROBOTIC
PARTIAL LARYNGECTOMY
"REQUIRES AN INCI-
SION THAT ESSENTIALLY
CUTS THE FACE IN HALF
TO GET AT THE CANCER.
THE ROBOTIC OPERA-
TION IS DONE THROUGH
THE MOUTH."**

the device to diagnose lung infections more quickly, non-invasively, and at a much lower cost than with the diagnostic techniques available at the time.

Still, part of the reason Hanson is well suited to write a generalist's book about the future of medicine is that he is also interested in medicine's past and aware of its merits. That past includes his father's career, from the early 1950s to the early 1990s. The senior Hanson – who also

taught and practiced at Penn, with Sylvan Eisman, M.D., as partner – makes appearances in *The Edge of Medicine* near its beginning and near the end. He serves as a kind of bookmark, representing some of the best care of an earlier time. Hanson the author writes about what he calls "the most sophisticated medical tool available at the time" for his father, back in the old days:

"My father's hands were large, warm, blunt-tipped, and always well manicured. He was an internist and used his hands as diagnostic tools. His fingers probed his patient's neck, abdomen, armpits, and groin – the soft underbelly, as it were – searching for enlarged nodes or organs. . . . When percussing, he used the middle finger of his dominant left hand to strike the last knuckle of the middle finger of his right over the patient's chest and stomach, acquiring information from the resulting sounds."

As Hanson writes later in that chapter, "My father never owned a cell phone, never had a computer in his home, wrote his patient notes in an almost-illegible hand in patient charts he kept in file cabinets in his office, and he made house calls." That's an effective summary of the way things were.

And the way things will never be again in medicine. We are left to wonder, for example, what the senior Dr. Hanson would have made of Tug, who makes a brief appearance in the chapter on robotics. Hanson describes Tug as "a cute little R2-D2 knock-off" now doing the job that would have been performed by a HUP pharmacy technician, who can be used instead for other, more demanding tasks. "Tug travels tirelessly from the basement pharmacy supply area to deliver drugs to patient floors all over the hospital."

Medicine

medicine is likely to go – and finds plenty to cheer about.

The use of more sophisticated robots to perform surgery is another of the remarkable advances that Hanson discusses. Hanson manages to paint the vivid differences between the older and newer forms of surgery while also evoking some names from Penn's past (Jonathan Rhoads, M.D., the legendary former chair of the Department of Surgery) and present (Gregory Weinstein, M.D., professor and vice chair of Otorhinolaryngology – Head and Neck Surgery). Watching an operation, Hanson describes himself as mesmerized as automaton hands worked busily with instruments and several flat-screen televisions around the room displayed what was happening in the back of the patient's throat. It was, we learn, a partial laryngectomy, in which the surgeon removes cancerous portions of the vocal cords.

"Looking around, I found the man behind the machine, the surgical Wizard of Oz, Dr. Gregory Weinstein, sitting in the corner of the operating room at a large, humped grey console, where he peered through a pair of goggles and rapidly manipulated both hands and feet, like a church organist playing a complicated fugue." Hanson points out that the robot-assisted procedure does much less damage to the patient. "The nonrobotic surgery requires an incision that essentially cuts the face in half to get at the cancer. The robotic operation is done through the mouth. All else being equal, which would you choose?"

In an earlier chapter, Hanson refers to an operation performed in 2001, in which a surgeon operating in New York successfully removed the gall bladder of a woman in France, using a remote-controlled laparoscopic device. Once again, reality has caught up with fiction: in *Remote Intrusion* (1996), Howard A.

Olgin, M.D. '65, a surgeon and novelist, wrote about a surgeon in Los Angeles who operates from afar on a V.I.P. patient in Japan (*Penn Medicine*, Fall 1998).

Part of Hanson's first chapter looks at one of the new technologies that has stirred excitement on the Penn Medicine campus – proton therapy. Again an interested onlooker, Hanson describes the materials that must come together for the

AS AN INTENSIVIST IS MAKING ROUNDS, WRITES WILLIAM HANSON, "SMART SOFTWARE IS WORKING AWAY IN THE BACKGROUND, CULLING THROUGH THE DATA STREAMS LOOKING FOR ANOMALIES OR WORRISOME TRENDS."

Roberts Proton Therapy Center, now under construction within a stone's throw of HUP's Ravdin Pavilion. (The center is scheduled to open in Summer 2010). As centerpiece, there is the cyclotron, weighing 220 tons, which will generate the proton beams. There are also the metal cages known as gantries, 35 feet tall and weighing 90 tons, as well as the 20,000-pound magnet that will guide the beams. The walls of the treatment rooms will be 18 feet thick, enough to contain "stray neutron radiation."

As Hanson told Terry Gross last fall on her *Fresh Air* show on National Public Radio, radiation treatments of the past were much less controlled: "There is damage to all the tissue surrounding the tumor." With the new technology,

"The proton beam approach is so precise that we can train a beam of protons on a tumor millimeters in size or even a millimeter in size that may be located in somebody's eyeball, kill that tumor, and leave sight intact."

At Penn, Hanson has championed a form of telemedicine known as Penn E-lert eICU. Launched at HUP in November 2005, it features real-time data, audio, and video monitoring of ICU patients from a central command center located at least four blocks away from the patient beds it monitors. As Hanson, the medical director, put it then, "One intensivist and two critical-care nurses will cover between 50 and 75 beds remotely." He expounds on the virtues of such a system in "Eye in the Sky," the second chapter of *The Edge of Medicine*, where he also ups the number of beds that can be covered effectively by the team to more than 100. The doctor at the monitor "is often the first to know about evolving patient problems because she's effectively in the crow's nest with a higher dimensional view of the landscape," which includes access to test results, vital signs, and so forth.

Abigail Zuger, reviewing *The Edge of Medicine* in *The New York Times*, called it "an enthusiastic travelogue, a guide to the universe of marvels coming soon to a hospital near you." She singled out the sections in which Hanson brings the "marvels" to life by describing patient cases. For his part, Hanson concedes that the book presents "an optimist's view" – in particular that medicine in the future "will be preventative rather than the rear-guard action it too often seems to be today." In the end, he hopes that health-care professionals will be able to "do a lot more, for a lot more of us, for a lot less." ♥

– John Shea



 **Can**
Academic Medicine
and Industry
Work Together?
Should They?



Earlier this year, Arthur L. Caplan, Ph.D., the Emanuel and Robert Hart Professor of Bioethics who serves as director of the University of Pennsylvania Center for Bioethics and chair of the Department of Medical Ethics, sat before a campus audience for a discussion with Roy Vagelos, M.D. The topic was “Conflicts of Interest in University-Industry Alliances: Can They Really Be Managed?” Their talk, however, ranged over several other timely – and occasionally controversial – matters.

Vagelos, who earned his undergraduate degree from Penn and his medical degree from Columbia University, was an especially appropriate choice of speaker. After 10 years at the National Institutes of Health, he became chair of the Department of Biological Chemistry at Washington University in St. Louis and founded its Division of Biology and Biomedical Sciences. In 1975, he left academic medicine

to join Merck, the pharmaceutical giant, as senior vice president for research and then, beginning in 1985, as CEO. He retired as CEO and chairman of the board in 1994. Now he serves as chairman of Regeneron Pharmaceuticals, Inc., and Theravance, Inc. An emeritus trustee of the University of Pennsylvania, Vagelos served as chair of its board from 1995 to 1999.

Arthur Caplan: When I talked to different people, the first question that kept coming up was to ask Dr. Vagelos why are drug prices so high. Does he think they are out of bounds or inappropriately high?

Roy Vagelos: This is a very common concern. When the Harris Poll was done several years ago on industry in general, it asked which companies and what industry had good reputations. The pharmaceutical industry traditionally has always been rated very high, because of the improvements



Arthur L. Caplan, Ph.D.



Roy Vagelos, Ph.D.

made in human health, extension of duration of life, etc. The polling in 2004 dropped the industry down to the very bottom, along with oil and cigarettes! And one of the reasons was the opinion that prices were too high. For the most part, I think drugs that deliver high value are a bargain.

I will give you an example. Many of you know that the statins were introduced for control of high blood cholesterol, in order to prevent coronary heart disease or to improve the problems of coronary atherosclerosis and coronary heart disease. They were introduced in 1987. The first one, Mevacor, was introduced by Merck, the first statin in the world. The second one, also from Merck, was Zocor. I'll tell you one brief story about the study that established that reducing high blood cholesterol was important. It was a study with Zocor done in 4,400 people over five years. All had high blood cholesterol and coronary heart disease. Half of them were put on Zocor and the other half were put on a placebo. At the end of five years, the code was broken and when they compared the people on the drug with those on the placebo, there was a reduction in mortality from *any* source, by *any* cause, of 30 percent; a reduction in death from heart attacks of about 43 percent; and a reduction in strokes by 30 percent.

So this one experiment revolutionized the treatment of heart disease. How do you price a drug like that? I say you price it depending on the value that is delivered for patients – do you prolong life, do you improve the quality of life, do you get people back to work? If you take the prices in 1987 and you bring them forward and increase the price every year according to consumer price index increases, you can get any one of the current branded statins for about \$1,200 a year.

However, there are some recent cancer drugs that have been introduced with astounding prices. An example is Avastin,

which was first studied for metastatic colorectal cancer in combination with other chemotherapy. A course of Avastin will give, on the average, an increase in life span of four months, and the price of that is \$50,000. There is a huge discrepancy between value delivered and price, and it's hitting people right in the pocketbook because, very often, the insurers will not cover that whole price. The co-payments and co-insurance on something like this can be as much as \$10,000. So people who want it are not getting the drug. We have a number of cancer drugs that are following this pattern, where the value is not related to the price, and that is causing anguish. The big problem is that such pricing could bring about government price controls. This could be devastating to a research industry that requires huge risk in the amount of investments it has to make to come up with a statin, a new antibiotic, a new drug for diabetes, etc. So we're better off having a more reasonable approach to pricing, and the industry is going to have to back off. I think the current pricing of some of these cancer drugs is not sustainable.

Caplan. Well, I can see you are going to be at a loss in response to my questions! In a similar vein, how do the pharmaceutical companies set their priorities – and I will tell you what motivates this question. People say they just heard about a drug that was approved for use as an eyelash extension. That does not seem to be on the Top Three list of public-health challenges that face the world. It may be something that is lucrative, but how does a company set priorities?

Vagelos. What we have seen over the last 50 years, of course, is the tremendous build-up of science. We understand so much more about disease and the mechanisms of actions of drugs that we can do a great deal; but in any particular company, you look at the science that you have, the



capability of *your* people, and then you try to match that with a disease that they can attack. Now, that eyelash extension I suspect was an outgrowth of something else – much as Viagra was discovered as an outgrowth. They were looking for a cardiovascular drug when they ended up with a drug for erectile dysfunction. Most companies are focused on diseases for which there are no adequate therapies. They look at the important diseases and they ask, “Can we bring our science to bear on *that*?” If you go across the spectrum of companies, they have different kinds of scientists, and they'll focus, looking at those important diseases that they can attack. Along the way, they may come up with something else, but they are always looking for better therapies for unmet important needs. For the most part, “me too” products are products where the research has failed – that is, failed in what they wanted to accomplish. You ask your research people, “Can you do something that will have fewer side effects, greater potency, greater specificity, whatever, something that will yield a *real* improvement over current therapy?” They'll work on it for five years and get discouraged, and they'll say, “This is as far as we can go. It's not very different from the one that we hoped to improve upon because it's just too hard to do.” Then the company has to decide, “Do we want to market it anyway” and the answer is “We have invested all these years, let's *do* it.” They then rely on



marketing and sales to recoup some of the research investments.

Caplan. That leads me to a question about marketing. As you know, there has been quite a bit of effort recently to cut back on certain types of sales practices – the lunches, the role in continuing medical education, some of the trinket distributions. We have taken steps here at Penn and others have tried to diminish, if you will, the market presence in the academic institution. Do you think this is useful, important? Was it erroneous to have these kinds of marketing practices in place? Does the reform amount to much of anything, and how bad was the problem to begin with?

Vagelos. I think the problem was bad, and I think the reform is late in coming. The way I see it, the lunches, dinners, tickets, samples, support of continuing medical education, trinkets of all sorts, have evolved because the industry wants to get to the physicians who will prescribe drugs. They need access and they find that doctors are very busy, and so in order to get access, they will show up with lunch. That works, and the doctors don't seem to mind. In fact, the system has evolved because someone has asked and someone has responded positively – and it has escalated and gotten out of hand. Does it cause bias? Absolutely. I'm rather amused when people say there are psychological studies that have demonstrated

that giving gifts of any size causes people to want to do something for you.

Caplan. We wrote one of those!

Vagelos. And I say, well, do you think the companies would be giving away all these things if they *didn't* think they were getting something out of it? So it has evolved to a degree that is not very professional. Everything that the companies that I know are doing, in this regard, is within the law and they are within the codes. They're modest – this and that – but they're not very professional and they're not very effective. In one instance, when two companies were competing in the same mechanism of drug action, so that the drugs were not very different, one company would send *four* sales representatives per week to see the same doctor. Very often they will spend one or two hours waiting to see the doctor for one or two minutes. That is a most inefficient system, and I do not think it's very productive. I don't think they do the kind of science presentation that I would like to see because they're the wrong kinds of people. I have thought a fair amount about this, and I really congratulate Penn in taking a leadership position in restricting sales reps. That's something that I started before I left Merck, but my successor did not follow my lead.

But there's another way that I think could transmit information more efficiently. It's *terribly* important that the good scientific information about new drugs quickly reach doctors who are interested in that area: formal, scheduled meetings at medical centers, organized by the center. Let's say you have a new antibiotic. The company sends their M.D.'s, Ph.D.'s, Pharm.D.'s., that know everything about that drug, and they have an hour. They invite everyone in the medical center to attend and they explain everything, concentrating on the clinical research so that all relevant studies are discussed concerning efficacy and safety. That would be

done in front of the house staff and medical students, with the people in infectious disease asking questions such as "Why should I use your antibiotic vs. another antibiotic?" and "What kind of side effects?", etc. – an interchange to demonstrate to medical students that you just don't accept data. You *question* the data. I think that could be one of the more exciting meetings of the week at a medical school or at a hospital.

Caplan. Let me push on that a little. In the *British Medical Journal*, just this week, Marcia Angell, former editor of *The New England Journal* and a vociferous critic of industry relationships with academia, wrote: "I believe there should be no relationship between the drug industry and either prescribers or patients." She might say, I don't want these people in here with their vested interests presenting this information. What would you say to her?

Vagelos. I think her ideas and opinions are unreasonable. The great strides that we have made in medicines have been made because of the close relationship and interactions between the academic groups and the industry groups. I have been on both sides, and I know how important that is because every drug discovery and development that we worked on and that I worked on personally, I interacted with people in academia all the time. Their expertise is vital to getting the job done, and they have a terrific time doing it. Very often academic friends would come to Merck, while I was there, to spend the day in the laboratory, and at the end of the day, the Merck people would be very excited and the academic people said, "We learned a lot." So there was a terrific exchange. Now when the drugs are released by the F.D.A., you need to get that information out there. It is really important to have exposure of physicians and everybody who is going to be involved in handling those drugs with the people who *really* understand them.

Do all physicians immediately understand the impact of an important new drug, a new vaccine? The answer is no, but working together, we need to come up with a better system to teach physicians about new products. Another concern is the level of understanding of graduating medical students and residents and staff, whether they can examine clinical results and interpret them from the point of view of efficacy and safety. If we don't have courses to teach that effectively, we ought to introduce them because it would be very helpful if all people who prescribe drugs can actually interpret the data – they are not very difficult to interpret once you have been led through it once.

Caplan. Some in the room know that Penn is also taking a leadership role in starting to make sure that all of its faculty, at least in the School of Medicine, disclose their connections and ties to industry and probably put them up on the Web. Medical ethicists had some input into that, but it's really the leadership of the institution that has done it. If the connections are going to be there and if they are fruitful, is disclosure sufficient in this problem of conflict of interest?

Vagelos. I think disclosure isn't enough, but it is an incredibly important first step. There are moves that would have Congress make a law that companies report, on the Web, all payments to doctors and institutions and advocacy groups and foundations, etc. I think that would be one of *the* most important factors to change the way physicians function and work in academic medical centers. If a doctor were to know that everything that he's paid by a company is on the Web, I think you would see a reorientation of some lifestyles in academia and you would see a lot of people around here much more than otherwise! And so I think this reporting and the leadership taken by the University is great. To do it

in parallel, have companies report all the funds that are given to every physician and every institution, and then everybody could decide how much interaction they want to be involved in. I think it is terribly important. Is it enough to just list it? I think you must have – and you do – a conflict of interest committee that looks at these and asks are these *reasonable*?

Caplan. A lot of institutions and investigators these days feel kind of whipsawed because their political leaders invest in research and say, "Please produce products for us, please make this an economic engine." And at the same time, they say, "Don't have conflicts of interest." Can we get both politicians and the American people to understand that when you have these connections, you are going to have a certain irreducible tension?

Vagelos. I agree with that, and there is a difference in the two groups, in that companies have to be product driven because they can only exist and get support



from their boards and their stockholders if they produce new things and make money. And of course that is not what the university and the academic medical centers are about. But the ultimate goal of both

groups is improvement of human health, and a company is not going to succeed if it only extends eyelashes. The companies have the same objectives as an academic medical center – to improve health – and they will only succeed long term if they can do that repeatedly. The investment in biotechnology with everybody wanting to get into it could go too far. What used to be applied research is now translational research. That's because the N.I.H. got into it and put money into it, and so people are thinking that they, too, their medical center or their university, can also hit a home run and bring in \$100 million dollars a year on a patent that one of their faculty will deliver. People, I think, are pushing a little too hard towards translation. I fear that we might lose some of the important knowledge that we require for drug and vaccine discovery if we push everyone towards applied research, because we still need the fundamental knowledge upon which all the discoveries ultimately are dependent. So even though it is nice to have some drug discovery going on in the university, for the most part, it is very inefficient. Many of the efforts that I have seen at universities are micro-companies, and this is inappropriate as far as I am concerned. I think it is a bad decision by the N.I.H. to support that kind of research at the cost of true basic research.

Caplan. Has bioethics been *constructive* or *obstructive* in terms of research? Senator Grassley introduces an investigator who's committed some problem every week, and ethicists babble on about it in the media – I don't know why they do that, but some do! – and others sit around making more and more rules about informed consent and all kinds of bureaucratic committees, IRBs to keep a watch on what is going on. Worthwhile? In the way?

Vagelos. I think it's *crucial*, more than worthwhile. We have seen too many instances where we have *not* had informed

consent. We don't have careful review of experiments that are being done on humans. We have instances where people with financial connections to the drugs or vaccines that are being tested are involved in these studies, and they're biased. They are bound to be biased. With the emphasis on ethics and IRBs and conflict of interest committees that we will have, we hope to put an end to that. There is no possible excuse for some of the things that have gone on, and I think the focus that's been brought on by our ethicists is important.

Caplan. You all heard that! One of the problems that we struggle with here at Penn is trying to handle research that goes on in poor nations. I know that you led a program that tried to deal with river blindness, one of the great industry successes on the ethics frontier in helping people deal with a very devastating disease. But can we really bring off solutions to health problems in the poorest countries in the world when they just don't have the money to buy anything? Even with foundations like Gates getting behind it, it's still kind of a drop in the bucket. So how can the private-sector industries really deliver on what these impoverished nations need?

Vagelos. Obviously each company cannot possibly take on the impoverished world with every important drug that they produce. In the case that you mentioned, river blindness, Merck discovered and developed a drug, Ivermectin, that was rather magical because it could prevent blindness for 18 million people who are affected by the disease, onchocerciasis. It is transmitted by the black fly, and this drug would kill the parasite microfilariae and stop the disease. It was shown to be effective in thousands of patients who were part of a clinical study. We knew these were poor people who could not afford the drug at any price. I was involved in talking with the leaders of several coun-



tries and suggested that we could stop this disease at not too great a governmental expense. The suggestion I made to our State Department was a couple of million dollars to get started, and I also talked with the President's office back in 1987. They said, "This is very exciting, but we can't afford it." The U.S. Government said Ivermectin was not in the budget, and so they turned us down. Therefore there was the possibility that this drug would sit on the shelf and not reach the people who could benefit. In October 1987, Merck announced that it would contribute the drug free to anyone in the world who needed it, for as long as it was required. The company treated free 80 million patients in 2008, and the number has increased each year. Let me put it this way: I think all successful companies must respond in some way when they have developed a unique drug/vaccine that can improve the lives of many people – even if these people cannot afford it. They must set an example.

Caplan. Did the stockholders understand that?

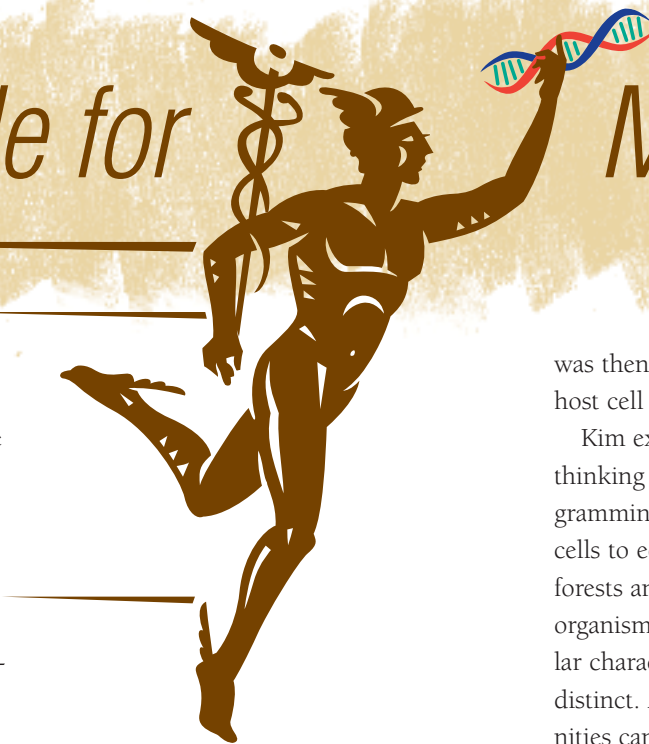
Vagelos. They did understand it, and it certainly had a positive influence on the people of Merck. It transformed that company. A different industry response later occurred when people noted that millions of people were infected with HIV in Africa and thousands were dying each year. In the late 1990s, when the first combination drugs were available that could con-

vert the 100% lethal disease to a chronic infection, all the companies which had developed these drugs initially refused to reduce their prices or do anything to introduce those drugs to the poor people in Africa. That was reversed in a few years for two reasons. First, there was tremendous anger among the American people. Second, a small generic company in India introduced combination drugs at very low prices in Africa and made a profit. That embarrassed the large companies, so each company then turned around and built wonderful programs in Africa. They could have done that at the start. That is what I think is important for the industry to do: when it has an important drug, make sure that it is made available someplace.

Caplan. Health reform is in the air. What's the most important thing or two that you think ought to happen to reform the current health-care system?

Vagelos. I think it's an embarrassment in our country that everyone does not have health insurance, and I think that is number one. There has to be a focus. You can't do it overnight. President Obama is starting with children. I think he just signed a bill so that 4 million additional children will have health care, but we have got to extend that and there are a number of mechanisms to do that. It's going to be expensive but it's got to be done. That is why reforming the whole system, getting some of the expensive inefficiencies out of it, and introducing health-care insurance to everyone is the number one important objective. Beyond that, I would say, let's talk about academia. For academia, we need to have continued support of research, and Obama understands that. Medical research is fundamental to the future improvement of health. He understands that – not only biomedical, but he wants to improve engineering and physical sciences research and training as well. ♥

A New Role for Messenger



One of the most highly publicized scientific quests of the last decade has been to find a way to transform one type of cell into another type. Most of the attention has focused on stem cells, as researchers tried to tweak cells at the gene and nucleus level to reprogram their identity. Stem cells can differentiate into all the specialized tissues and can replenish the specialized cells that have been lost because of injury, disease, or aging. Now, scientists from three schools of the University of Pennsylvania have found another way to change one cell type into another – by using messenger RNAs.

These molecules contain the chemical blueprint for how to make a protein. Simply by flooding one cell type, a nerve cell, with an abundance of a specific type of messenger RNA (mRNA) from another cell type, the investigators were able to change a neuron into an astrocyte-like cell. These star-shaped brain cells have several functions: they help to maintain the blood-brain barrier, regulate the chemical environment around cells, respond to injury, and release regulatory substances.

The Penn research team – headed by James Eberwine, Ph.D., the Elmer Holmes Bobst Professor of Pharmacology, Junhyong Kim, Ph.D., the Edmund J. and Louise W. Kahn Term Endowed Professor of Biology, and first author Jai-Yoon Sul, Ph.D., assistant professor of pharmacology – reported their findings in April in the *Proceedings of the National Academy of Sciences*. Their novel approach offers the possibility of a new type of cell-based therapy for neurodegenerative and other diseases.

“In some ways, this is akin to what a virus does,” explains Eberwine. “When a virus infects a cell, it affects the host cell

genome and the RNAs that it can make. By putting the RNA of one cell type, in the correct amounts, into another cell type, we were able to change its function.”

As Sul points out, “This research overturns the notion that all cells are permanently hardwired with little ability to change their physiology.”

Eberwine also notes another significant difference between earlier attempts to reprogram cells and the new approach. “We didn’t have to make the host cell pluripotent” – that is, having the ability to develop into any of three major tissue types. Instead, he continues, “we can

“THIS RESEARCH OVERTURNS THE NOTION THAT ALL CELLS ARE PERMANENTLY HARDWIRED WITH LITTLE ABILITY TO CHANGE THEIR PHYSIOLOGY.”

directly convert from one cell type to another, without the intermediate step.” The scientists put an excess of astrocyte messenger RNAs into the neuron cell body using a method called phototransfection, which they created a few years ago. It produces temporary pores in the cell membrane. “The RNA population

was then diffused into the cell, and the host cell did the rest.”

Kim explains part of the conceptual thinking behind the new form of reprogramming, likening the differentiated cells to ecological communities such as forests and meadows. They have similar organisms “but have settled on particular characteristics that we recognize as distinct. And, just as ecological communities can be nudged from one type to another, we thought we could nudge differentiated cells from one type to another through the use of the RNA population.”

The Penn investigators used an approach called Transcriptome-induced phenotype remodeling, or TIPeR. Unlike the method used to produce induced pluripotent stem cell (iPS), it cuts out some intermediate steps. To create iPS cells, the host cells must be de-differentiated to a pluripotent state and then re-differentiated with growth factors into the destination cell type.

The newer approach more closely resembles the prior nuclear transfer work: first, the nucleus of one cell is transferred into another cell, then the transferred nucleus directs the cell to change its phenotype based upon the RNAs that are made. Similarly, TIPeR makes use of RNA populations to direct the DNA in the host nucleus to change the cell’s RNA populations to that of the destination cell type, which in turn changes the phenotype of the cell.

There are about 100,000 mRNA molecules in a neuron at any one time. The researchers transferred nearly twice as many, about 200,000 astrocyte mRNAs, into the neuron, effectively weakening the ability of the neuron mRNA to be trans-

RNA: Cell Reprogrammer

By Karen Kreeger

lated and made into protein. In essence, what the scientists did was extract and produce mRNA from an astrocyte, then use phototransfection to create pores in the neuron cell membrane through which to flood it with an excess of astrocyte mRNAs. Far outnumbering the neuron mRNAs, the astrocyte mRNAs take over like a virus, then are translated into astrocyte proteins in the cell's cytoplasm. These astrocyte proteins then influence gene expression in the host nucleus so that astrocyte genes are turned on and proteins enriched with astrocyte cells are made.

To track the change from a neuron to an astrocyte, the Penn team looked

at the RNA profile, shape, and physiology of the new cell. "For now, these are astrocyte-like cells," says Eberwine. "While the cells don't look like neurons any longer, they don't have the mature star-like astrocyte shape, but rather look like immature astrocytes. The new cell expresses astrocyte proteins and has an astrocyte-like physiology. We start to see changes within a week, and they are stable over the life of the primary cell culture."

Collaborating on the studies were investigators from several disciplines: from the School of Engineering and Applied Science, David Meaney (Bioengineering)

and Vijay Kumar and David Cappelleri (Mechanical Engineering); and from the School of Arts and Sciences, Miler Lee (Biology). Additional contributors from the Department of Pharmacology include Chia-wen Wu; Fanyi Zeng; Jeanine Jochems; Tae Kyung Kim; Tiina Peritz; Peter Buckley; and Minsun Kim.

Future studies are expected to investigate the generation of distinct cell types and the core set of RNAs responsible for generating particular cellular phenotypes.

The current work was funded by grants from the W. M. Keck Foundation, the National Institutes of Health, and the State of Pennsylvania. ▼



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Development Matters

ECONOMIC PRESSURES INCREASE IMPOR



Presentation of Diplomas, Class of 2008, Verizon Hall at the Kimmel Center. Another generation of Penn Medicine students takes an important step towards a career in medical practice or research.

The recession that threatens our institutions also threatens the future of health care. Because of the high costs of a medical education, some of the nation's brightest, most inventive students may decide against entering medicine. Ultimately, that decision could have an impact on all of us.

Today at Penn and the nation's other top medical colleges, the cost of a four-year medical education plus expenses is more than \$260,000. Fifteen years ago, 80 percent of the seniors graduating from U.S. medical schools owed a median of \$50,000, according to the Association of American Medical Colleges. Last year, the average debt was \$140,000, and 17 percent of the graduates faced more than \$200,000 in debt.

At the same time, students face increased difficulty in obtaining loans.

The cost might seem daunting even during an economic boom. With unemployment at record highs and families at all levels facing hardships, students find the decision to attend medical school even more difficult to make.

"The best way we know to continue attracting the brightest students is through scholarships," said Arthur H. Rubenstein, M.B.,B.Ch., dean of the School of Medicine and executive vice president of the University of Pennsylvania for the Health System. "We've set an ambitious goal in the Making History campaign of \$100 million for student financial aid. We know our alumni will help because they understand scholarships pay off many times over by benefiting students today while allowing them to become the leaders of tomorrow."

Medicine Requires Rare Talents

Medicine demands students who can assimilate advances in diverse fields while providing compassionate care in a high-tech world. Penn has been able to attract such students because of its high rankings and internationally renowned faculty. But, in the end, the amount of financial aid a school offers often weighs heavily in students' decisions. And the School of Medicine lags behind its competitors.

The school ranks seventh among its peers in scholarships and among the lowest in school-subsidized loans. In 2007, the school offered need-based scholarships to just 38 percent of the students.

"Increasing Penn's capability to offer financial aid is an important institutional priority that we are aggressively pursuing in the current campaign. It's a must-have to keep Penn Medicine competitive," said Gail Morrison, M.D. '71, G.M.E. '76, vice dean for education in the School of Medicine. "With just over \$24 million raised toward our \$100 million goal as of March, we have a ways to go."

Scholarships Benefit Society as Well as Students

According to the Association of American Medical Colleges, medical-school debt can influence students about what and where to practice. Some may choose the higher-paying specialties in order to pay off their debts more quickly. Many experts believe this trend has contributed to a shortage of general practitioners in small towns and rural areas, a situation that has left thousands of Americans without adequate care.

This trend also threatens to keep the nation's brightest students from entering two lower-paying fields crucial to health care: research and public health. Having reached critical junctures, both areas require sharp and innovative minds to discover cures and find solutions. For Penn, which has one of the nation's largest training programs for medical scientists, the need to provide funds for medical students interested in research is pressing.

Penn scholarship recipients often speak of the freedom and opportunity to pursue their ideals that financial support gives them.

"My generous scholarship has made it possible for me to pursue a career in medicine," said Jorge Uribe, Class of 2010. "A Penn Medicine education will allow me to achieve my future goals of working in academic medicine and improving the quality of medical care and research along the U.S.-Mexico border."

Scholarship donors also frequently mention the benefits to society.

TANCE OF SCHOLARSHIPS

"I believe these talented scholarship students will become the stars of the health-care system in America – the top doctors, the top researchers, the top policy makers. And that bodes well for the health of this nation," said Henry Jordan, M.D. '62, G.M.E. '67, a Penn Medicine trustee, chair of the Penn Medicine campaign, and co-chair of the University's Making History campaign.

Dr. Jordan and his wife, Barrie, have demonstrated their belief in medical education at Penn by establishing several endowed scholarships and creating a new challenge fund for scholarship donors.

Many Ways to Support Our Students in 2009: A New Challenge Accelerates Creation of Endowed Scholarships

Announced last year, the Jordan Family Challenge is designed to encourage more people to participate in giving to endowed scholarships and to increase the value of these gifts. Contributions to the Jordan Family Challenge Fund are pooled and used to create the John Morgan Scholarships, named for the School of Medicine's founder and first professor. The Jordans provide a partial match to challenge gifts, and the pooled gifts make funding available to students as quickly as possible.

So far, approximately \$500,000 has been pledged to the challenge, and an anonymous donor has provided an additional \$1 million to the matching funds.

Class Scholarship Funds. Penn alumni have a long tradition of giving back. Many classes from the Class of 1926 onward have established endowed class scholarships that

welcome gifts of all sizes. This academic year, 39 students benefited from financial aid from these funds.

The Annual Fund. A significant portion of annual fund giving goes to student financial aid. In this economy, annual fund gifts are more important than ever as need for assistance rises and the poor performance of institutional investments has reduced operational revenue.

Planned Giving. Each year the School of Medicine benefits from generous estate gifts to establish or help support scholarships. The school also offers instruments such as charitable gift annuities that confer income and tax advantages now as well as funding for scholarships later.

The Gift of Time. Penn Medicine holds occasional panel discussions and other mentoring opportunities that enable alumni to share their experiences with students. For instance, this winter, alumni from the biotechnology, pharmaceutical, and health-care industries participated in a panel discussion on "Medicine in the New Economy."

The school also encourages alumni participation in hosting programs for students and residents who are interviewing in distant cities.

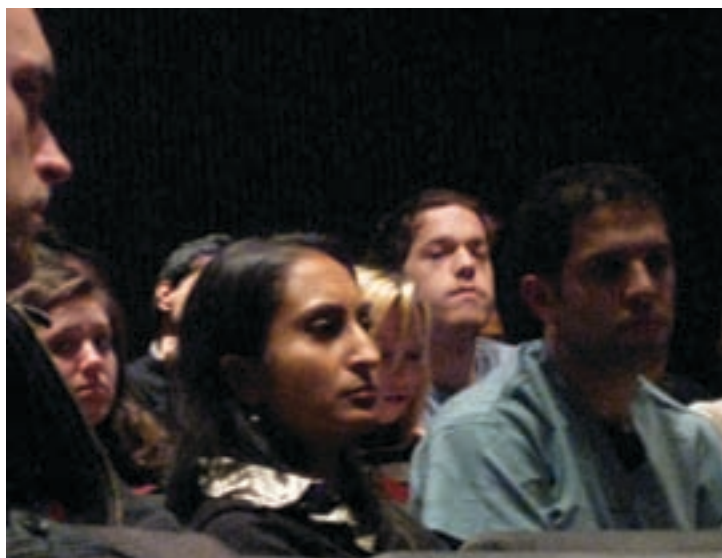
The Gift of Choice

Scholarship donations can take many forms. Ultimately, the goal is to increase the number of talented students who are able to select medicine as a profession and to allow physicians the financial freedom to apply their expertise as they choose.

"The School of Medicine attracts young people who are really enthusiastic and idealistic about helping people," said Dr. Jordan. "But it's really hard to choose a career path of public health or working with the underserved when you have huge loans to pay back. So when we give money for scholarships, often we're ultimately helping patients who might not have had access to high-quality care."

For information about scholarship giving or volunteering, please contact

Vanessa Marinari
Senior Director, Alumni Development and Alumni Relations
Penn Medicine
215-898-9692
marinari@upenn.edu



Students face the future at the "Medicine in the New Economy" student-alumni panel at Penn this February.



Students celebrating at Commencement 2008. Approximately 85 percent of all students received financial aid to help make this day possible.

Residency Matches for 2009

Penn students seek to practice in a wide range of specialties, as matches for the Class of 2009 show:

Anesthesiology	9
Dermatology	7
Emergency Medicine	6
Family Medicine.....	3
General Surgery.....	7
Internal Medicine/Research	33
Medicine – Preliminary	18
Medicine – Primary.....	7
Neurological Surgery	2
Neurology.....	5
Obstetrics/Gynecology – Preliminary	1
Obstetrics/Gynecology.....	1
Ophthalmology	7
Oral and Maxillofacial Surgery.....	3
Orthopaedic Surgery	2
Otolaryngology	6
Pathology	2
Pediatrics.....	15
Physical Medicine & Rehabilitation.....	1
Plastic Surgery	4
Psychiatry	10
Radiation Oncology.....	3
Radiology – Diagnostic.....	6
Surgery – Preliminary.....	3
Transitional*	11
Urology.....	2

* Transitional specialists focus on helping chronically ill children bridge the gap in health care between pediatricians and physicians for adults.

Recent Gifts

George K. Bartle Trust, \$1.7 million – An outside-managed perpetual trust for Penn Presbyterian Medical Center.

The estate of **Ralph M. Weaver, C '41, M.D. '44**, has generously contributed \$3 million for financial aid at the School of Medicine. The funds will be disbursed to the Medical Class of 1944 Scholarship Fund, the 21st Century Medical Scholarship Fund, and the Ralph and Sallie Weaver Endowed Scholarship.

*To make a gift to Penn Medicine, or for more information, please contact the **Office of Development and Alumni Relations**, 3535 Market Street, Suite 750, Philadelphia, PA 19104-3309, or call 215-898-0578.*

Alumni Events

You can find out more about these and other upcoming events at www.med.upenn.edu/alumni/calendar. Please email any questions to PennMedicine@alumni.med.upenn.edu.

June

Tuesday, June 9 – Networking and Dessert Reception at the home of Dr. Eric Seifter, Ellicott City, Md. 7:00-9:00 p.m. By invitation only.

Thursday, June 11 – A Conversation with Steve Larson, M.D. '88, associate professor of emergency medicine, 6:00 – 8:00 p.m., Chicago. By invitation only.

September

Tuesday, September 29 – Back to School Night with the Phillies

Wednesday, September 30 – Medical Alumni Advisory Council Meeting, Philadelphia

Making History: The Campaign for Penn

Penn Medicine has a goal of raising \$1 billion as part of the University's **Making History: The Campaign for Penn**. As of March 31, 2009, Penn Medicine had passed the \$660 million point in gifts and pledges. Penn Medicine has four core goals for the campaign: promoting health, creating knowledge, preparing the next generation of medical leaders, and propelling discovery.

As Gail Morrison, M.D. '71, G.M.E. '76, vice dean for education and director of academic programs for the School of Medicine, has stated: "We are not just training people to be doctors, but to be leaders out there making a difference in the 21st century." So far, within our core goal of preparing such leaders, Penn Medicine has raised \$24 million of the \$100 million scholarship goal. Please help us reach our goal before the campaign ends on June 30, 2012.

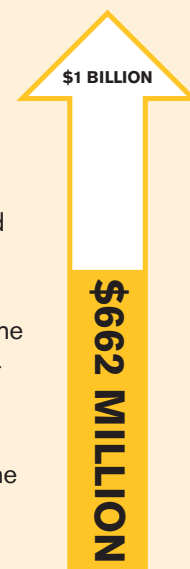




PHOTO: Scott Spitzer

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ADAM LAYTIN
class of 2010

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To find out more about endowing a scholarship, giving to the Jordan challenge, or contributing to your class fund, please contact
Vanessa Marinari
Senior Director, Alumni Development and Alumni Relations
Penn Medicine
215-898-9692
marinari@upenn.edu



Progress Notes

Send your progress notes to:
 Andrea Pesce
 Assistant Development Officer
 PENN Medicine Development
 and Alumni Relations
 3535 Market Street, Suite 750
 Philadelphia, PA 19104-3309

'50s

Ralph "Pug" Heinz, M.D., '55, Chapel Hill, N.C., reports that at age eighty and nineteen years after a liver transplant, he has published a paper on "Imaging Findings in Neonatal Hypoxia" in the *American Journal of Roentgenology*. An emeritus professor of radiology at Duke University, he was awarded the Gold Medal of the American Society of Neuroradiology in 2004. He received the 2007 Alumni Recognition Award from Eberly College of Arts & Sciences of West Virginia University, honoring his medical career. Heinz competes in United States Croquet Association tournaments and recently won his flight at the Southeast Regional Championship in Hilton Head, S.C.

Leon D. Prockop, M.D., '59, was honored in October by the University of South Florida for 35 years of service. For 25 of them, he was chair of the Department of Neurology in the College of Medicine. He continues full time as professor of neurology at U.S.F. with duties in patient care, teaching, and clinical research.

'60s

Elaine C. Sarkin Jaffe, M.D., '69, chief of hematopathology in the laboratory of pathology of the National Cancer Institute, was elected to the Institute of Medicine of the National Academy of Sciences. A senior investigator at the N.C.I. since 1974, she has been president of both the Society for Hematopathology and the United States and Canadian Academy of Pathology. She is among the 10 most highly cited researchers in clinical medicine for the field of oncology between 1981 and 1998. Jaffe is the author of

Surgical Pathology of the Lymph Nodes and Related Organs and was an editor of *Pathology and Genetics: Tumours of Haematopoietic and Lymphoid Tissues* (2003).

Bernard S. Rappaport, M.D., '69, Orinda, Calif., who maintains a private practice in psychiatry, was featured in an article in *Scientific American* (November 18, 2008). Under the rubric "Where Are They Now?", he was profiled as a recipient of a Westinghouse National Science Scholarship (1961). In high school on Staten Island, N.Y., he used chromatography to analyze blood and urine samples, hoping to detect patterns of amino acids that could show if a person had various diseases. Having taught doctor-patient communication to medical students in California for many years, he also served as vice president and medical director of American Biodyne, Inc., a managed mental-health-care company, from 1987 to 1992. Today he devotes part of his practice to serving as an expert witness for the defense in cases in which the plaintiffs are claiming psychiatric damage.

'70s

Marie A. Bernard, M.D., '76, was named deputy director of the National Institute on Aging, where she has a major role in directing the nation's research program on aging and on age-related cognitive change. Before joining the Institute, she held the Donald W. Reynolds Chair in Geriatric Medicine at the University of Oklahoma College of Medicine. A former president of the Association of Gerontology in Higher Education, she has also served as president and chair of the board of the Association of Directors of Geriatric Academic Programs. Her own research interests include nutrition and function in aging populations, with an emphasis on ethnic minorities.

English D. Willis, M.D., '78, has been elected vice president of the Maternity Care Coalition in Philadelphia. She serves as director of clinical-risk-management and safety surveillance for the pharmaceutical firm of Merck & Co.

'80s

Alan F. List, M.D., '80, has been named an executive vice president and physician-in-chief of the H. Lee Moffitt Cancer Center & Research Institute, based in Tampa, Fla. He joined Moffitt in 2003 and had been division chief of malignant hematology there. In 2008, Moffitt was ranked 16th by *U.S. News & World Report* among hospitals for the treatment of cancer in the country, as well as being the best in the state of Florida.

José J. Escarce, M.D., '81, Ph.D., senior natural scientist at the RAND Center for Population Health and Health Disparities, was elected to the Institute of Medicine of the National Academy of Sciences. His research interests and expertise include health economics, managed care, physician behavior, racial and ethnic disparities in medical care, and technological change in medicine. Escarce, who taught at Penn for eight years, is also a professor of general internal medicine in the David Geffen School of Medicine at the University of California at Los Angeles.

Michael Nussbaum, M.D., '81, was named chair of the Department of Surgery at the University of Florida College of Medicine at Jacksonville. After completing his residency in general surgery at the University of Cincinnati, he was a member of its faculty from 1986 to 2008. From 2000 to 2008, he served as chief of staff of the University Hospital there.

David H. Perlmutter, M.D., G.M.E. '81, physician in chief and scientific director for Children's Hospital of Pittsburgh, was elected to the Institute of Medicine of the National Academy of Sciences. At the University of Pittsburgh School of Medicine, he is the Vira I. Heinz Professor and Chair of Pediatrics, as well as professor of cell biology and physiology. Since joining Children's Hospital in 2001, he has led an effort to expand the hospital's basic and clinical research program to enhance the investigation of the molecular basis of pediatric disease and to

develop innovative new therapies for childhood illnesses. Perlmutter has carried out basic research on alpha-1-antitrypsin deficiency, the most common genetic liver disease of childhood, for more than 20 years. His work has led to many new concepts about the pathobiology of liver disease in this deficiency.

Harry L. Leider, M.D., '83, has joined Ameritox as chief medical officer and senior vice president. The Texas-based company describes itself as "the nation's leader in pain prescription monitoring" and conducts thousands of monitoring panels per day. Formerly a senior scholar in the health-policy and outcomes department at Thomas Jefferson University, Leider is president-elect of the American College of Physician Executives. He is a founding board member of the Disease Management Association of America and currently chairs its Medicare committee. He also serves on the board of Penn's Institute on Aging.

'90s

Shane S. Pak, M.D., '95, was elected chairman of orthopedic surgery at San Gabriel Valley Medical Center in San Gabriel, Calif.

Samir S. Shah, M.D., G.M.E. '05, assistant professor of pediatrics at Penn and The Children's Hospital of Philadelphia, is the author of *Pediatric Practice: Infectious Diseases*, published in February by McGraw-Hill. Last year, he was co-editor of *Pediatric Infectious Diseases: The Requisites in Pediatrics* (Mosby, Inc.).

Nancy Stanwood, M.D., '95, M.P.H., associate professor of obstetrics and gynecology at the University of Rochester School of Medicine and Dentistry and director of the university's family planning program, has joined the board of Physicians for Reproductive Choice and Health. She took part in the March for Women's Lives in 2004 and joined P.R.C.H. on several trips to Washington, D.C., to share her medical expertise with lawmakers

who were weighing new regulations on emergency contraception, medication abortion, and other reproductive health-care issues. In 2003, she received the National Faculty Award from the Council on Resident Education in Obstetrics and Gynecology of the American College of Obstetricians and Gynecologists. Published in *Contraception* and other medical journals, she conducts research on intrauterine devices, medication abortion, and hormonal contraceptives.

Adam D. Cohen, M.D. '98, G.M.E. '02, has joined the Fox Chase Cancer Center as an attending physician, specializing in leukemia, lymphoma, and myeloma in the Department of Medical Oncology. He has been at Sloan-Kettering Cancer Center in New York City.

'00s

Nicolas K. Kuritzky, M.D. '01, has joined Fox Chase Cancer Center in Philadelphia as an attending physician in the Department of Radiation Oncology. Formerly, he was at Temple University Hospital. His specialty is genitourinary and gastrointestinal cancers.

OBITUARIES

Harvey Bartle Jr., M.D. '33, G.M.E. '37, Bryn Mawr, Pa., a retired psychiatrist and neurologist; June 4, 2008. A former vice president of the medical staff at Bryn Mawr Hospital, he had also been president of Roxborough Hospital.

Frederick A. Rose, M.D., G.M.E. '38, Sedro Woollery, Wash., a retired radiologist; April 18, 2006.

Robert H. Johnston, M.D. '41, G.M.E. '49, Haverford, Pa., a former internist; June 12, 2007.

Russell E. Allyn, M.D., G.M. '42, Harrisburg, Pa., a former urologist; November 17, 2005.

William A. Brodsky, M.D., G.M.E. '44, New Rochelle, N.Y., a former pediatrician; January 20, 2007.

William A. Hadfield, M.D. '46, G.M.E. '50, Drexel Hill, Pa., a former internist who had served as a director of Delaware County Memorial Hospital; June 16, 2008. From 1947 to 1949, he served in the Medical Corps in the Army of Occupation in Kyoto, Japan. After his discharge, he completed a residency in internal medicine at a Veterans Affairs Hospital in Massachusetts and completed a fellowship in internal medicine at Penn. In 1952, he opened a practice in Drexel Hill, where he treated generations of patients for 34 years. At 65, he passed the exam to be board certified in geriatrics.

William C. Stewart Jr., M.D. '46, Grand Rapids, Mich., a retired pediatrician; May 15, 2008. After receiving his medical degree, he served in the Army as a flight surgeon. He did his pediatric training at the University of Michigan Medical Center and was chief resident there from 1950 to 1952. After practicing general pediatrics in Michigan for 20 years, he moved to Madison, Wis., where he completed a fellowship in neonatology and was among the first group of physicians board-certified in neonatology. He started the neonatal unit at Bronson Hospital, Kalamazoo, which he named the Special Care nursery. In 1978, he and his family moved to Wilmington, N.C., where he started his second neonatal unit. The last 10 years of his professional career, he focused on developmental pediatrics. His practice in Wilmington was dedicated to the care of children with attention deficit disorder and other neurobehavioral challenges.

Willis B. Fast, M.D. '47, G.M. '53, Newtown, Pa.; July 14, 2008. He completed his internship and residency in general surgery at Henry Ford Hospital in Detroit. During the Korean War, he served as a captain in the U.S. Army at the William Beaumont Army Hospital in El Paso, Texas. He was appointed to the Department of Surgery at Lower Bucks Hospital in 1953 and later served as president of the hospital's medical staff from 1970 to 1972. He retired in 1986.

Horace B. Mooney, M.D. '47, Ukiah, Calif., a retired psychiatrist; July 29, 2008. He took his internship at Michael Reese Hospital in Chicago and completed a residency in psychiatry at the Veterans Hospital in the Los Angeles area. During the Korean War, he was recalled to military service as a physician, stationed at Travis Air Force Base in California. He practiced in Redondo Beach, Calif., and was a research psychiatrist and assistant clinical professor of psychiatry at the University of California at Los Angeles.

Allison D. Teaze, M.D. '47, Mendham, N.J.; August 29, 2008. He served in World War II and the Korean War as a flight surgeon. He practiced internal medicine in Montclair and then at AT&T in Bedminster.

David F. Bew, M.D., G.M. '48, Jacksonville Beach, Fla., a former radiologist; October 21, 2007.

Anthony M. Spirito, M.D. '48, G.M. '54, Elizabeth, N.J.; February 20, 2008. He interned at St. Vincent's Hospital in New York, then served a tour of duty with the U.S. Army as a physician from 1951 to 1952 in Stuttgart, Germany. After returning to the U.S., he completed his training in ophthalmology at Penn. A licensed medical doctor in New York, New Jersey, California, and Nevada, he had a long career as a private-practice ophthalmologist in Elizabeth, N.J. He was on the staff of Trinitas Hospital and served as chief of ophthalmology. He retired in 1998 and continued as an advisor on ophthalmology until his death. He served on the board of Penn's Scheie Eye Institute.

David R. Brody, M.D., G.M. '49, Staunton, Va., a former surgeon; February 25, 2007. A captain in the Medical Corps serving in World War II in England, he operated on soldiers wounded on D-Day. He was a Fellow of the American College of Surgeons and a member of the International College of Surgeons.

Richard B. Ewing, M.D., G.M.E. '49, Macon, Ga., a retired dermatologist; February 24, 2008.

Dwight R. Ashbey, M.D., G.M. '50, Lancaster, Pa., a retired physician who had practiced pediatrics and child psychology at Pennsylvania Hospital; June 8, 2008. He had been a captain in the U.S. Army Medical Corps in Wurzburg, Germany. He was a clinical associate professor of child psychiatry at Hahnemann Medical College.

Alvin W. Finestone, M.D., G.M. '50, Clifton Forge, Va., a former radiologist; June 4, 2008.

W. W. Walley, M.D. '50, Waynesboro, Miss.; May 11, 2006. He delivered more than 7,000 babies before retiring in 1994. He served on the Waynesboro Board of Aldermen and was a U.S. Army veteran of World War II.

Neil D. Josephson, M.D., G.M.E. '51, Adamstown, Md.; May 2, 2008. An anesthesiologist, he practiced at New Britain General Hospital in Connecticut from 1954 to 1973 and at Rockville General Hospital from 1973 to 1984. In the 1960s, he worked to help start the first Poison Information Telephone Hotline, trained New Britain police officers in CPR, and assisted the Newington Children's Home.

Vincent L. O'Donnell, M.D., G.M. '51, Bethesda, Md., a former pediatrician; January 19, 2002.

Paul Harrison Sr., M.D. '52, G.M.E. '59, Haverford, Pa., a retired cardiovascular surgeon; September 18, 2008. Harrison left Westtown School after his junior year in 1943 to attend Swarthmore College, the University of Pennsylvania, Cornell University, and the U.S. Naval Academy as part of the federal government's V-12 program that trained young officers for the U.S. Navy during World War II. Because he was a member of the Society of Friends, he became known as one of the "Quaker Sailors" who served in the Pacific. After graduating from medical school, Harrison did his internship and surgical residency at HUP. He joined the staff of the former Burlington County Memorial Hospital, now Virtua Memorial Hospital, in Mt. Holly, N.J., in 1958. Until his retirement in 1985, he practiced general



and cardiovascular surgery there and served a year as the hospital's chief of staff. For more than 30 years, Harrison was an avid fund-raiser for Penn's School of Medicine and an enthusiastic fan of Penn sports.

Henry P. Pendergrass, M.D. '52, G.M. '54, Gladwyne, Pa., a former member of Penn's Department of Radiology; September 21, 2008. He followed in the footsteps of his father, Eugene P. Pendergrass, M.D., who had chaired the department. Henry Pendergrass also held faculty positions at Harvard and Vanderbilt universities. In 1964, he published an article in *The New England Journal of Medicine* about his work in Peru while aboard the *S.S. Hope*, a medical mission ship. After earning emeritus status at Vanderbilt, Pendergrass became an adjunct professor of radiology at Penn, retiring in 2005. According to Luther W. Brady, M.D., G.M.E. '56, "Henry was an internationally recognized expert in pulmonary diagnosis using radiological techniques." Pendergrass's honors include the Distinguished Service Award Gold Medal from the American Medical Association and the American College of Radiology Gold Medal. Like his father, he had served as president of the Radiological Society of North America, which honored him with its Gold Medal as well.

Joseph Sataloff, M.D., G.M.E. '52, Bala Cynwyd, Pa., an otorhinolaryngologist who was considered a leader in legislation on occupational hearing loss; September 26, 2008. In 1950 he joined the practice of George M. Coates in a 19th-century brownstone on Pine Street in Philadelphia. He also performed more than 20,000 microsurgical ear operations and taught at Thomas Jefferson University and Drexel University. Sataloff was also an expert in antique jewelry, particularly Art Nouveau jewelry. He published two books on the subject and donated permanent collections to the Philadelphia Museum of Art. During World War II, he served in Guam as a medical officer with the Third Marine Division.

Martin G. Binder, M.D. '53, West Chester, Pa., a retired ob-

stetrician and gynecologist; June 23, 2008. He completed residencies in obstetrics and gynecology at Mount Sinai Hospital in New York and Albert Einstein Medical Center, Northern Division, in Philadelphia, and practiced at Einstein before opening an office in Chester County. For 34 years, he delivered babies in Chester County and was on the staff of Coatesville Hospital and Chester County Hospital. He was also affiliated with Paoli Hospital. He served in the Army Medical Corps in Okinawa after V-J Day.

Charles L. Johnston Jr., M.D. '53, G.M. '57, Richmond, Va.; June 10, 2008. A specialist in hematopathology, he was a professor at the University of North Carolina from 1960 to 1990. In 1959, he was awarded a Fulbright research fellowship, which he used to study in Norway. He also received a U.S. Public Health Service Research Career Development Award from 1960 to 1965.

W. Riley Kovar, M.D., G.M. '54, Omaha, Nebr., a retired gynecologist; May 10, 2007.

Welles Go, M.D., G.M. '57, Virginia Beach, Va., a former thoracic surgeon; February 5, 2008.

Theodore P. Votteler, M.D., G.M.E. '57, Dallas, Texas; May 23, 2008. He started his medical career at Children's Medical Center in Dallas and had a private pediatric surgery practice. He was appointed medical director of surgical services and director of general surgery of Children's in 1960 and retired from the positions in 1993. In 1978, he performed the first of seven successful separations of conjoined twins and became an international authority on separating conjoined twins. In 2001, he retired from pediatric surgery practice. He was also a clinical professor at the University of Texas Southwestern Medical Center. Among his awards was the Tulane Medical School Lifetime Achievement Award.

Robert N. Richards, M.D. '58, Grand Forks, N. Dak.; May 17, 2008. He completed his internship and orthopaedic residency at the Guthrie Clinic and Robert Packer Hospital in Sayre, Pa. In

1962, he went to the Marshfield Clinic in Wisconsin for an additional year of surgery. He practiced there until he came to the Grand Forks Orthopedic Clinic in 1968. He retired in 1994.

Charles G. Hertz, M.D. '59, G.M.E. '63, Stamford, Conn., a former Penn faculty member; November 7, 2008. After operating his own pediatric practice in West Philadelphia, Hertz returned to Penn to serve as director of the pediatric outpatient department for HUP from 1967 to 1971. He was appointed to the faculty in the Department of Pediatrics in 1970. Three years later, he was appointed medical coordinator of the newly formed Penn Urban Health Maintenance Program at the Graduate Hospital, eventually serving as the program director in the 1980s. After leaving Penn in the mid-80s, he worked for a health-maintenance organization associated with the Rush University Medical Center in Chicago and then for the Metropolitan Life Insurance Co. in New York City as their chief medical officer.

Marvin O. Lewis, M.D., G.M. '59, Muskogee, Okla., a former surgeon; May 5, 2008.

Dermot A. Murray, M.D., G.M.E. '59, Rockville, Md., a retired anesthesiologist; April 30, 2008. He had served as director of anesthesia at Washington Hospital.

James C. Thompson, M.D., G.M.E. '59, Galveston, Texas; May 13, 2008. After completing his residency at HUP, he was appointed assistant professor of surgery in 1961. In 1963, he began serving as chief of surgery at Harbor General Hospital and as associate professor at the University of California at Los Angeles. He was promoted to professor in 1967. From 1970 to 1995, he was chief of surgery and professor and chair of the Department of Surgery at the University of Texas School of Medicine, where he had academic appointments as the Ashel Smith Professor of Surgery and in physiology and biophysics. A former president of the American College of Surgeons, he received its Distinguished Service Award in 1996. He also served as the president of the American

Surgical Association, the Society for Surgical Chairmen, the Southern Surgical Association, and the Texas Surgical Society. In 2002, he received the highest honor of Penn's School of Medicine, the Distinguished Graduate Award. He also received an honorary degree from the University of Lund, Sweden, and was elected to the American Philosophical Society. He served on several editorial boards and was a visiting professor at medical institutions around the world.

S. Arthur Frankel, M.D. '60, Billings, Mont., a former orthopaedist; August 12, 2007.

Jorge I. Hincapie, M.D., G.M. '60, Brecksville, Ohio; August 18, 1999.

Claire E. Morrison, M.D., G.M.E. '61, Columbus, Ohio; June 20, 2008. Born in Northern Ireland, she retired as a public health physician for the State of New Jersey.

Morton E. Schwab, M.D., G.M. '61, Haverford, Pa., clinical assistant professor of psychiatry at the University of Pennsylvania; June 30, 2008. During World War II, he served in the Army Medical Corps in Europe. He became interested in psychiatry when he treated soldiers suffering from battle fatigue. After his discharge, he trained at the Philadelphia Psychoanalytical Institute and Society. In 1950, he opened a practice in Philadelphia and became a pioneer in the use of psychoanalytical group therapy. He was a director of the Philadelphia Psychoanalytical Clinic.

Paul G. Killenberg, M.D. '63, Durham, N.C., emeritus professor of medicine at Duke University Medical Center; July 23, 2008. He was an intern and chief medical resident at University Hospitals and Case Western Reserve University in Cleveland. He served in the U.S. Army Medical Corps, earning the Bronze Star for service in Vietnam. On the Duke medical faculty for 36 years, he became a national leader in the diagnosis and treatment of liver disease. In 1985, he helped create Duke's Liver Transplant Program. — the first in North Carolina.

While his contributions in the field of liver disease were many, his proudest professional accomplishment was training hundreds of medical students, residents, and fellows. In 2002, the Division of Gastroenterology created the Paul G. Killenberg Medical Teaching award and named him the first recipient. A former ombudsman for Duke University, he was honored with the Duke Medical Alumni Association's Distinguished Faculty Award in 2006.

Harold Askren, M.D., G.M. '61, Indianapolis, a former otolaryngologist; December 18, 2007. He practiced in Newport Beach, Calif.

Myron W. Frederic, M.D., G.M.E. '64, Philadelphia, former chief of neurology at Penn Presbyterian Medical Center; June 14, 2008. After earning his medical degree from Ohio State University, he took an internship and residencies in internal medicine and neurology at HUP. He joined the Penn Presbyterian staff in the mid-1960s. As a youth, he was an Ohio junior chess champion for three years.

Bernard R. Cahill, M.D., G.M.E. '67, Peoria, Ill., a retired orthopaedic surgeon; September 6, 2008. In the Marines during the Korean War, he received a Purple Heart and a Bronze Star. He earned his M.D. degree from the University of Illinois, where he later became a clinical professor of orthopaedic surgery. A pioneer in sports medicine, he became team physician for the U.S. Olympic ski team and helped establish the Great Plains Sports Medicine Science/Training Center. He was appointed to the President's Council on Physical Fitness by President Reagan. A former president of the American Orthopaedic Society for Sports Medicine, he was named to the Greater Peoria Sports Hall of Fame.

Michael J. Dougherty, M.D. '68, G.M.E. '72, Haverford, Pa., a cardiologist at Lankenau Hospital for 31 years; October 28, 2008. He interned and completed a medical residency at HUP and did residencies in cardiology at the University of North Carolina and Fort Sam Houston in San Antonio, Texas, while in the Army. He was

also stationed at the Tripler Army Medical Center in Hawaii for more than three years. After his discharge, Dougherty became a partner with the Kelly Cardiovascular Group at Lankenau.

A. Kenneth Ciongoli, M.D., G.M.E. '74, Burlington, Vt., a neurologist and former physician for the U.S. Olympic boxing team; October 28, 2008. After graduating from the Philadelphia College of Osteopathic Medicine, he taught and was a researcher at the Wistar Institute and at Penn from 1975 to 1977. A clinical assistant professor of neurology at the University of Vermont, he was a founder of Neurological Associates of Vermont. He joined the National Italian Foundation in 1985, served as its president and vice chairman, and had been chairman since 2004. In 1997, he and Jay Parini, an author and critic, edited *Beyond the Godfather*, a collection of essays by prominent Italian Americans. Ciongoli, who had boxed in South Philadelphia when he was young, became Vermont's boxing commissioner in 1982.

Leif H. Finkel, M.D. '81, Ph.D., '85, Wyncote, Pa., professor of bioengineering in Penn's School of Engineering and Applied Science; October 7, 2008. His advisor was Gerald Edelman, M.D. '54, Ph.D., a Nobel Laureate, who was then at Rockefeller University. After graduating from Penn, Finkel joined Rockefeller University as an assistant professor. He was recruited back to Penn in 1989 and advanced to full professor in 1998. With expertise in neuroscience and neuroengineering, he became a strong link between engineering and neuroscience researchers in the School of Medicine. His focus was the computational mechanisms underlying visual perception, especially how visual processes can be integrated, based on cortical connectivity. He also worked on the applications of neuroengineering to disease, with applications to epilepsy, Alzheimer's disease, and schizophrenia. Among his honors was the 1996 Faculty Recognition Award of the Institute of Neurological

Sciences. In 2006, he received the highest teaching honor of Penn Engineering, the S. Reid Warren Jr. Award.

Enyi Okereke, M.D., G.M.E. '92, Voorhees, N.J., associate professor of orthopaedic surgery at Penn; November 25, 2008, of a heart attack while training physicians in Enugu, Nigeria. A native of Nigeria, Okereke earned a doctorate in pharmacy from Mercer University and a medical degree from Howard University. Appointed to Penn's School of Medicine faculty in 1993, Okereke was an expert in disorders of the foot and ankle. He also served as a consultant physician to the Penn Relays, to some of Penn's athletic teams, and to professional teams such as the Philadelphia 76ers. He held health fairs in the Philadelphia area and served as a mentor to inner-city high-school students. In addition, he frequently traveled to Nigeria to conduct health fairs, donate medical equipment, train physicians, and treat patients. Okereke was named a "Top Doctor" in orthopaedic surgery by *Philadelphia* magazine last year and had been program chairman of the Philadelphia Orthopedic Society. In 2002, he received the Jesse T. Nicholson Teaching Award from Penn's Department of Orthopaedic Surgery. He was also a runner who had taken part in several marathons. According to reports, Okereke died in a tertiary-care hospital in Nigeria that lacked both equipment and drugs to help keep him alive.

For information about an endowment fund in Dr. Okereke's honor, contact enyitraumafund@gmail.com.

FACULTY DEATHS

Myron W. Frederic, M.D. See Class of 1964.

Alfred S. Friedman, M.D., Haverford, Pa; July 20, 2008. He earned a doctorate in psychology from the University of Southern California. During World War II, he served in the Army in the States and in Europe, and he helped evaluate participants in

the Nuremberg Trials in Germany. In 1954, he joined the staff of the Philadelphia Psychiatric Center. For the next 47 years, he was a research psychologist at the center, known as the Belmont Center for Comprehensive Treatment, and was its first director of research. He retired in 2001. Friedman wrote many professional articles and books and served on the medical school faculties of the University of Pennsylvania and Thomas Jefferson University. In the late 1950s, he established the Family Institute of Philadelphia with several other psychologists. Until 2005, the institute offered treatment to families and trained therapists. It is now a professional clinical society. In the 1980s and '90s, he did research at the center involving data from 1,000 participants of the National Collaborative Perinatal Project, which tracked children from birth to adulthood. He studied participants to determine the long-term effects of cocaine on the brain, looked at which participants would become drug abusers, and researched the connection between violence and drug abuse.

Gunter R. Haase, M.D., Rosemont, Pa., emeritus professor of neurology; September 13, 2008. Appointed professor of neurology in 1974, he also served as director of neurology at Pennsylvania Hospital. Previously, he had held faculty positions at the University of Oklahoma Medical Center and Temple University, where he headed its neurology department. He had also been a neurologist at the National Institutes of Health. In 1969, he received a Golden Apple Award for teaching excellence from what is now the American Medical Student Association. A native of Germany, he earned his medical degree in Munich, served an internship at St. Luke's Hospital in Denver, and completed residencies in psychiatry and neurology at the University of Denver. For many years he was a member of the advisory committee of the Greater Delaware Valley Chapter of the National Multiple Sclerosis Society, from which he received an award for his service.



Luigi Mastroianni Jr., M.D., an internationally recognized pioneer in reproductive biology; November 25, 2008. He earned his medical degree from Boston University School of Medicine in 1950. He completed his internship and residency in obstetrics and gynecology at Metropolitan Hospital in New York. As an instructor and assistant professor at Yale's School of Medicine, he began his pioneering research on the basic physiology of the rabbit and monkey oviduct by characterizing its metabolism and the nature and timing of its secretions, processes critical to successful conception. After five years at Yale he was appointed professor of obstetrics and gynecology at the University of California in Los Angeles and chief of ob/gyn at Harbor Hospital. In 1965, Mastroianni was named the William Goodell Professor of Obstetrics and Gynecology at Penn and chairman of its department. During his tenure as chair, he established the division of reproductive biology and the division of human reproduction. After more than 20 years as chairman of the department, he became head of the division of human reproduction. Over the years, physicians and scientists from more than 25 countries came through Mastroianni's department, many of whom subsequently rose to major leadership positions in the field of reproductive medicine.

In the 1970s, Mastroianni and his colleagues helped to advance the field of *in vitro* fertilization through their research and, in 1983, he performed the first successful human *in vitro* fertilization in the Greater Philadelphia region. In 1989, Mastroianni shared the King Faisal International Prize in Medicine. In 1992, the Society for the Study of Reproduction presented Mastroianni with its Distinguished Service Award and, in 1993, he was inducted into the Institute of Medicine of the National Academy of Sciences. That same year the Luigi Mastroianni Jr. Professorship in Obstetrics & Gynecology was created at Penn's School of Medicine. In 1998, Penn also established the Luigi Mastroianni Jr. Clinical Innovator Award. His other honors include the Lindback Award for Distinguished Teaching and the Career

Achievement Award of the Association of Professors of Obstetrics and Gynecology. A former president of the American Society for Reproductive Medicine, he was appointed to the Board of Scientific Counselors of the National Institute of Child Health and Human Development.

Mastroianni was also named frequently as one of the "Best Doctors in America" and one of *Philadelphia Magazine's* "Top Docs." Beyond his scientific expertise and his skill in training physician-scientists, Mastroianni was an eloquent advocate for reproductive biology and women's reproductive rights.

Dr. Mastroianni is survived by his wife, **Elaine C. Pierson Mastroianni, M.D.**, an emeritus associate professor of obstetrics and gynecology at Penn.

Enyi Okereke, M.D. See Class of 1992.

Frederick F. Samaha, M.D., associate professor of medicine at Penn's School of Medicine and chief of cardiology at the Philadelphia VA Medical Center; August 26, 2008. He earned his medical degree in 1987 from the University of Cincinnati College of Medicine, which gave him its distinguished alumnus award last year. Samaha was co-author of a significant study of diets, published in *The New England Journal of Medicine* in 2003, that found that obese patients on a low-carbohydrate diet for six months lost more weight and fared better on certain cardiovascular and diabetes measures than patients on a low-fat, calorie-restricted diet. According to Michael S. Parmacek, M.D., chief of the Division of Cardiovascular Medicine at Penn, "Rick personally transformed the Division of Cardiology at the Philadelphia VA Hospital." Samaha had also received the Scissor Award from the VA. Samaha's wife, **Carol Chou, M.D.**, is a clinical assistant professor of internal medicine in Penn's Health System.

Morton E. Schwab, M.D. See the Class of 1961.

James C. Thompson, M.D. See Class of 1959.

LEGACY GIVING

Celebrating 50 Years of Penn Pride



When Charles W. Rohrbeck, M.D. '58, first set foot on campus more than 50 years ago, he was awestruck. He could not believe his dream of going to medical school had come true. Five decades later, while attending Medical Alumni Weekend for his 50th reunion, that sense of awe was still alive.

"I marveled at the new buildings going up and the new realms of research that are being developed," he says. "The School of Medicine is truly the epicenter of learning and I am so proud to be an alumnus."

Rohrbeck, who retired as an obstetrician-gynecologist, lives in State College, Pa., with his wife of more than fifty years, Annette. He volunteers his time serving as a mentor for pre-med students at nearby Penn State and is amazed at how different they seem from the student he was five decades ago.

"They have more knowledge of the study of medicine, more exposure to it. Thus, they are more confident and know what they are getting themselves into!"

Rohrbeck says he often listens to students express their fears of the "exorbitant cost" of medical school. "This is another difference – attending medical school was doable in my time. Now it is almost out of reach."

To make a superior medical education more accessible to Penn Medicine students, Rohrbeck celebrated his 50th reunion by supporting the Medical Class of 1958 Scholarship Fund with a charitable gift annuity. To him, this method of planned giving was a "win-win" situation.

"It is a perfect scenario," he says. "I get a tax exempt annual income, while at the same time supporting Penn in a very meaningful way."

As he notes, another benefit of the charitable gift annuity is that it speaks to the beauty of planned giving in general by leaving a "wonderful" legacy. He wants to give today's students the ability to attend a world-class medical school and have every advantage without worrying over burdensome debt.

"They should follow their dreams, just as I did. As they walk around campus, they should be full of amazement and be proud that they are attending Penn."

Dr. Rohrbeck chose one of a multitude of creative gift opportunities that benefit both the School of Medicine and donors. As you plan your financial future, the Office of Planned Giving is ready to assist in developing an appropriate strategy to incorporate your charitable objectives. Contact Christine S. Ewan, J.D., director of Planned Giving, at 215-898-9486, or you can e-mail her at cewan@upenn.edu. For more information, please visit the web site at www.med.upenn.planyourlegacy.org.

The Right Thing to Do

When the Flexner Report appeared in 1910, the situation of American medical schools was perilous. Abraham Flexner often found mediocre or worse quality, a lack of scientific rigor, and proprietary schools that operated primarily to make money. Although Flexner wrote the report for the Carnegie Foundation for the Advancement of Teaching, it was the Council on Medical Education, created by the American Medical Association in 1904, that had asked the Carnegie Foundation to conduct the survey. Within a few years of the report's publication, matters had improved dramatically as the weaker schools were shut down and other schools strengthened their programs.

Today, academic medicine faces another crisis: the appearance of conflict of interest. We need a response as widely effective as the Flexner Report to restore professional values and the public trust.

Well before the current headlines about physicians who failed to report income from pharmaceutical or medical-device firms, many medical institutions were seeking ways to reduce and prevent conflict of interest. Academic medical centers, like Penn Medicine, had their own conflict-of-interest guidelines. What became increasingly clear, however, was that these mechanisms that depended on individual faculty members' disclosing compensation from industry were often inadequate. In 2002, three medical organizations produced "Medical Professionalism in the New Millennium: A Physician Charter" (*Annals of Internal Medicine*, February 5, 2002). It asserted that physicians "have an obligation to recognize, disclose to the general public, and deal with conflicts of interest that arise in the course of their professional duties and activities."

A few years later, *The Journal of the American Medical Association* released a widely publicized article, "Health Industry Practices That Create Conflicts of Interest" (January 25, 2006). More recently, there was the well-publicized "PharmFree Scorecard 2008" issued in May, 2008 by



the American Medical Student Association, which evaluated conflict-of-interest policies (www.amsascorecard.org). Penn Medicine was one of only seven schools to receive an "A" for its policies. The next month, the Association of American Medical Colleges released a fuller report called "Industry Funding of Medical Education" (June 19, 2008). It, too, echoed the call for greater transparency and disclosure by personnel in academic medical centers. P. J. Brennan, M.D., professor of medicine at Penn and senior vice president and chief medical officer for our Health System, was a member of the task force that issued the report. He has long been a leader in developing ways for academic medicine and the pharmaceutical industry to interact responsibly.

This was the context last December when the senior leaders of Penn Medicine decided to take a major step: to post on the Internet the extramural activities of our faculty members for which they receive compensation from external sources. Our decision was noted in a "Perspective" in *The New England Journal of Medicine* (January 22, 2009). As we explained in a memo to our faculty: "Penn is at the forefront of a group of academic medical centers who believe that by publicly disclosing extramural activities widely and encouraging dialogue, we will fulfill an important public obligation as well as decrease the potential for conflicts of interest." The Web site will be viewable on July 1. We believe it will help reassure not only the general public and the agencies that fund our research and clinical projects, but also the patients and research subjects who place their trust in us. As I told a reporter at *The Philadelphia Inquirer* in December, "I think people realize it is the right thing to do" (December 5, 2008).

Last month, the Institute of Medicine, whose mandate is to provide "independent, objective, evidence-based advice" on the

nation's health, issued what could conceivably become the most influential document on conflict of interest in medicine (April 28, 2009). At close to 400 pages long, it is comprehensive and not at all hesitant to criticize the status quo. *The New York Times* called it "a stinging indictment of many of the most common means by which drug and device makers endear themselves to doctors, medical schools, and hospitals" (April 29, 2009). The report emphasizes the need to prevent bias and mistrust and strongly recommends taking steps to avoid such situations rather than wait to correct them. Among the most notable recommendations are to standardize the content, format, and procedures in making disclosures of financial relationships, so that all institutions can be viewed on an equal footing; and to eliminate corporate support of continuing medical education and professional societies. The report also calls for Congress to create a national reporting program that would require companies to make public all payments to physicians, researchers, and even institutions. (I should note Penn Medicine had some direct input into the making of the report: Lisa Bellini, M.D., G.M.E. '93, associate professor of medicine and vice dean for Faculty Affairs, was a member of the committee that produced it.)

The report gives us much to consider, and we are carefully reviewing its recommendations. It is still early, but, given the prestige of the IOM, the new document may have an impact comparable to the Flexner Report. It is always better for medicine to regulate itself rather than depend upon outside authorities. If properly regulated, relationships between academic medicine and industry can be mutually beneficial – and benefit society as well. Here is a chance to rebuild public confidence in our profession and allow our physicians and scientists to shine without the shadow of doubt. ■

Arthur H. Rubenstein, M.B., B.Ch.
Executive Vice President of the University of Pennsylvania for the Health System
Dean, School of Medicine

UNIVERSITY OF PENNSYLVANIA HEALTH SYSTEM

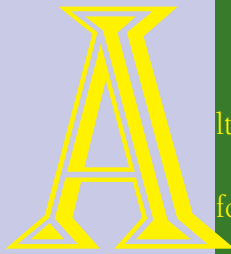
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Although embryonic stem cells were the focus of scrutiny – and controversy – in recent years, many scientists continued to explore other ways to generate or re-program cells for therapeutic use. Now with one of the pioneers in the field as its director, Penn's Institute for Regenerative Medicine seeks to establish itself as a leader among such programs.