P&S 247 Years Strong

SPRING 2014

Columbia Medicine

Columbia University College of Physicians & Surgeons

Optogenetics

A revolutionary way to see what goes on inside the brain

Columbia-Bassett Inaugural Class Graduates

The first students who started an innovative program in 2010 prepare to begin residencies

Diversity's New Meanings

Students learn about the multicultural richness of the medical center and its neighborhood

MEDICINE GETS PERSONAL

Precise, Predictive, and Collaborative Care

MANHATTAN TIMES / MIKE FITELSON

Dear Readers,

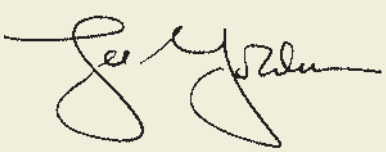
No profession is more personalized than medicine. Our patients trust us with the most sensitive details of their lives and rely on us to help them in their most vulnerable times. Our clinicians, researchers, educators, and trainees have embraced the health care model called personalized, or precision, medicine, a concept that runs through every idea articulated in the P&S strategic plan, "2020 Vision." We aim to capture vast amounts of new knowledge and apply it in the best possible ways to give our patients the right diagnosis, the right treatment, and the right prognosis at every opportunity. Now, our work in personalized medicine has taken on new importance with an announcement earlier this year that the entire Columbia University will bring its talents and energy to bear on personalized medicine in all areas of scholarship, education, and service.

This issue of *Columbia Medicine* is rich with examples of how we have personalized the Columbia approach to medical care, research, and education. As you will see in our cover story, personalized medicine is more than just precise and predictive diagnoses made possible by genomic advances. Elsewhere in the issue, you can read about how the simulation center in the education building now under construction will improve the way we help the next generation of clinicians cultivate the culture of personalized patient care. Education is a personalized endeavor, too, and another article in this issue describes a new option that expands scholarly projects for students who want to dig deeper into an area of study intended to generate new knowledge or reinforce a passion in medicine or science.

And personalized medicine also applies to the relationships we build and maintain with our medical center neighbors. An expanded effort to engage all medical center students in the many cultures that coexist in our neighborhood, in our patient population, and in our city has taken shape under the leadership of Hilda Hutcherson, MD, associate dean in our newly named Office of Diversity and Multicultural Affairs. Read about the office's exciting offerings in a feature inside this issue.

These articles illustrate the great work going on throughout P&S and show how together we are moving closer to the 20/20 vision that we all believe lies within our grasp.

With best wishes,



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COVER ILLUSTRATION BY DAVIDE BONAZZI. ARTICLE, PAGE 14.

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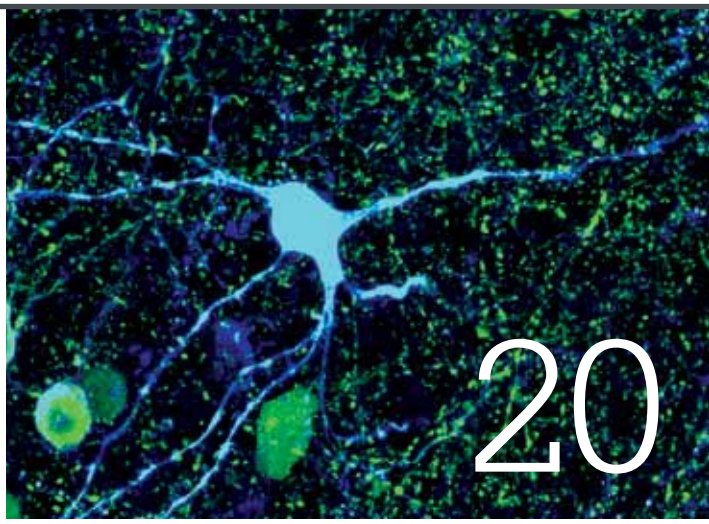

P&S letters

A Historical Moment

Thanks for the link and interesting information about Clifton Latting'72 and his family as appeared in the Spring and Summer 2013 e-News for Alumni. [See the Spring and Summer 2013 e-newsletter and other issues online at www.columbiamedicinemagazine.org/webextras.]

I would like to draw to the attention of our readership a major contribution made by Dr. Latting to the course and direction of P&S. At a meeting of the P&S Alumni Council around 1970, two medical students—Clifton Latting and Charles Lovell, who were invited to the meeting (a rarity in those days)—stood up and offered a challenge. Referring to the paucity of minority students and faculty at P&S, Cliff said, "We think it is about time we saw more black faces in the Black Building."

The council (including me, the only minority member) was flabbergasted by such behavior!

However, to everyone's ultimate credit, the council responded by forming "The Committee on Special Students" with yours truly as the first chair.

It was the activity of this committee that initiated a program aimed at increasing minority student recruitment even before the then administration of the school bought into it.

Later, P&S formally got involved with minority recruitment and enrollment, BALSO was formed, and, as they say, "the rest is history."

It might be interesting to members of BALSO as well as alumni of P&S to know this story.

Kenneth A. Forde'59
Via email

Karen Hein

I was pleased to see the report on the career of Karen Hein in your latest edition (Fall 2013). As a resident in family medicine at Montefiore Hospital, I was inspired by Karen's teaching on the Adolescent Unit and admired her pluckiness riding her bike across the Bronx.

Thank you for highlighting this remarkable woman in medicine.

Emilie Osborn'76
Via email

Autism

The article about the DSM-5 (Fall 2013) says autism was "not distinctly identified until 1980."

Autism was described by Leo Kanner in 1943.

Asperger's syndrome was described, in German, by Hans Asperger in 1944. (I doubt that many English-speaking doctors read the German medical literature in 1944.)

Autistic patients were presented at P&S during the early 60s, on both pediatric and psychiatric rotations.

Charles B. Brill'61
Philadelphia, Pa.

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Faculty and staff should contact their departmental administrators to update their addresses, which are obtained through the Columbia University personnel system.

All others with address changes should contact P&S Communications at 212-305-3900.

Practice, Perfected

By Sharon Tregaskis

"For the things we have to learn before we can do them, we learn by doing them," declared Aristotle in "Nicomachean Ethics." The ancient Greek philosopher had in mind the perfection of character when he penned his practice-makes-perfect credo, but it is no less relevant to an array of modern-day pursuits—from mastering the perfect pie crust to performing a piano concerto.

Increasingly, in fields where a beginner's mistake can be fatal—from aeronautics to the military to medicine—lifelike simulation-based training bridges the gap between learning and doing. At P&S, medical students practice everything from taking a patient's medical history or performing a physical exam—with actors playing the part of "standardized patients"—to suturing and resuscitation on high-tech mannequins. Midway through their fourth year, students prove their competency in simulated scenarios as part of the U.S. Medical Licensing Examination's Step 2 clinical skills assessment.

Adults retain 5 percent of the content of a lecture but 75 percent of what they learn while doing a task, says James Lee, MD, assistant professor of surgery and associate medical director of the NewYork-Presbyterian/CUMC Simulation Center.

The best simulations have narrowly defined objectives and incorporate participant reflection and expert feedback, says Dr. Lee. In the debriefing, learners are helped to reinforce what they did well in relation to the learning objectives and identify areas of improvement.

The simulation center manages the selection and training of standardized patients and acquisition and availability of a pastiche of equipment distributed throughout departments within the hospital and medical center.

The role of simulation training for medical students will increase when Columbia's 14-story Medical and Graduate Education Building opens in 2016. The 100,000-square-foot facility will set aside nearly 15 percent of its space for a simulation center: 13,300 square feet dedicated to training rooms featuring standardized patients and computerized, whole-body mannequins.

Students will be trained to a level of proficiency before they ever see a patient, says Dr. Lee, by having them practice in a simulated environment.

Particularly powerful will be suites of dedicated practice exam rooms wired for high-fidelity sound and video recording. Students will have the opportunity to practice more frequently with standardized patients, and professors will be able to use playback much as the coaches of professional athletes and musicians do—to highlight effective behaviors and point out mistakes. Feedback is a critical element of training, says Dr. Lee. Individuals learn from experience, but they sometimes learn more from the reflection.

Right: Lobby of simulation center

Below: Artist's rendering of the simulation center in the new education building

CoSMO Celebrates 10 Years of Caring for Neighbors

By Joseph Neighbor

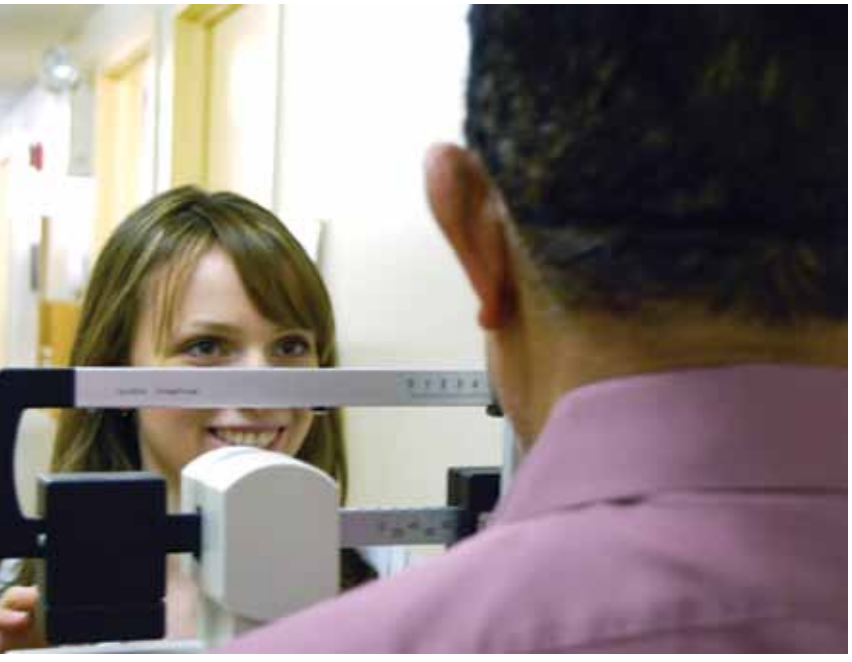
On a drizzly Saturday morning in March 2004, Columbia Student Medical Outreach (CoSMO), a student-run primary care clinic for the uninsured, welcomed its first four patients. It was a moment long in the making. For nearly four years, the founding group of medical and nursing students had been seeking out the approval, funding, and help they needed to breathe life into the project. Similar attempts at Columbia had failed. But after obtaining the blessing and aid of NewYork-Presbyterian and Columbia plus grants and donations from private sources, the effort bore fruit when CoSMO officially opened its doors at 21 Audubon Ave.

Over the past decade, CoSMO has become a pillar of the community, delivering free medical care, labs, health education, and prescriptions to a roster of nearly 200 patients. Once a week, 15 to 20 students from all CUMC schools plus faculty advisers volunteer their free time to help some of society's forgotten members.

"CoSMO offers more direct, intense engagement with the patient, ideally with their full story," says Cyrus Boquín, MD, MPH, CoSMO medical director and faculty adviser since 2006. "Of course we go through all the medical problems, but I think, since these patients are coming from an often undocumented background, the importance of talking about their humanity is even greater. There's something different about this person's story in front of you. They're invisible or unvalued by a lot of our nation—but not here."

The clinic was created to fill a void; while emergency rooms care for the uninsured in moments of crisis, what happens to these patients—many of whom are suffering from recurring ailments that require expensive treatments—after they return to the community?

"When you read medical school admissions essays, you see that people write, 'What I want to do is to help people.' Well, that's what we're doing here," says Dr. Boquín, assistant professor of medicine at P&S. "We're here to serve. It's remarkable how passionate everyone is about this service commitment."



Though CoSMO's mission remains the same, recent health care reforms have introduced new opportunities and new responsibilities. With the Affordable Care Act, tens of millions of Americans—including many of CoSMO's patients—are eligible for insurance for the first time. "There's no mandate for free clinics to help people get insurance," says Zoe Sansted'16, CoSMO's outgoing chair of social work. "Our job, up until this year at least, was to care for people who needed our care—we do a really good job at that. But we decided as a clinic that, in addition to caring for people who meet our eligibility requirements, it was our responsibility as humans to also help them get the best care they possibly can."

While the Affordable Care Act will help millions get health care insurance, it does not completely solve the problem that CoSMO was created to address. The need for a clinic dedicated not only to the uninsured, but also the uninsurable is as acute as ever.

By paying prescription costs for all patients, the number of whom has grown considerably, CoSMO has become imperiled by its own success. At the moment, it is not accepting any new patients. Despite receiving limited funds from P&S, most of the clinic's considerable expenses—Dr. Boquín estimates the costs as high as $30,000 a year—are met by donations. Fundraising efforts, including readings by Pulitzer Prize-winning author Junot Díaz and the poet Martín Espada, have been helpful in keeping CoSMO afloat.

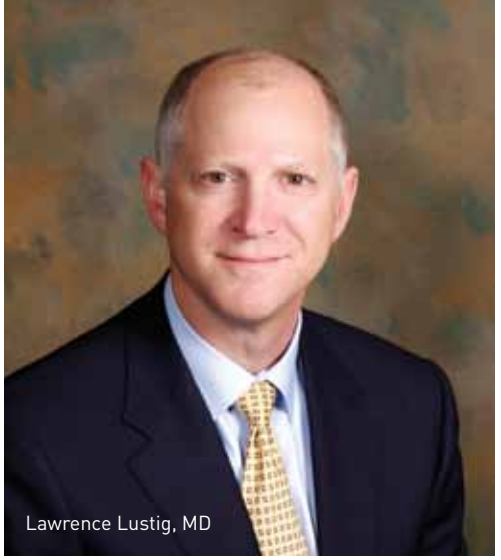
How the clinic helps the community is clear, but CoSMO also has value in the benefits to students who volunteer. First-year medical students, working under the tutelage of third- and fourth-year students and faculty advisers, get an opportunity to interact with patients before they embark on their year of clinical rotations. Also, the governing council—entirely made up of students—provides students with early administrative and leadership experience.

"From my perspective, this is an essential part of our education—medical students, nursing students, everyone," says Maryl Sackeim'14, one of CoSMO's three co-chairs. (Margot Cohen'14 and Nicole Edison'14 are the other co-chairs.) "Students learn how to really care for patients beyond their medical needs. And working with people who are going into different fields of medicine makes it a dynamic, vibrant teaching environment."

CoSMO's interdisciplinary nature makes it a rich learning experience that augments the education that takes place in the classroom and during rotations. Students training in medicine, nursing, social work, health education, dentistry, and physical therapy are all in the same place, unified by a shared sense of activism. This synergy of expertise and moxie leads the student volunteers to creative solutions and a renewed sense of purpose.

"This is the remedy to burnout," Dr. Boquín says. "CoSMO is a unique, hallowed site of professional reinvigoration for me. It's hard to imagine a better, more emblematic representation of professional activism. We need more of it as a nation, as a city, as a world."

Hearing Loss Expert Joins P&S as ENT Chair


Lawrence Lustig, MD

Lawrence Lustig, MD, a leading expert in hearing loss, will join P&S this year as chair of the Department of Otolaryngology/Head and Neck Surgery. He also will be otolaryngologist-in-chief at NewYork-Presbyterian/Columbia University Medical Center. Both appointments are effective July 1, 2014.

Dr. Lustig, currently professor of otolaryngology/head and neck surgery at the University of California, San Francisco, succeeds Lanny Close, MD, who stepped down in May 2013 after nearly 19 years as chair and chief. During Dr. Close's tenure as chair, the department quadrupled in size. Joseph Haddad Jr., MD, the Lawrence Savetsky Professor of Otolaryngology/Head and Neck Surgery and director of pediatric otolaryngology/head & neck surgery at NewYork-Presbyterian/Morgan Stanley Children's Hospital, served as interim chair and chief during the search for a new chair.

Dr. Close remains on the faculty as professor of otolaryngology/head and neck surgery.

Dr. Lustig treats the full spectrum of ear disorders in adults and children, as well as skull base disease. His specialties include skull base surgery, cochlear implants, the genetics of hearing loss, cochlear gene therapy, balance disorders, and hair cell physiology. He has written book chapters and published more than 125 articles in peer-reviewed journals. He co-edited a textbook, "Clinical Neurotology: Diagnosing and Managing Disorders of Hearing, Balance and the Facial Nerve."

Dr. Lustig joined UCSF in 2004. He has served as chief of the Division of Otology & Neurotology at both UCSF and San Francisco General Hospital, director of the Douglas Grant Cochlear Implant Center, clinical chief of the otolaryngology service on the Parnassus campus, and co-director of the Center for Balance and Falls. Before joining UCSF, Dr. Lustig was on the faculty at Johns Hopkins University, where he completed a fellowship in otology, neurotology, and skull base surgery. He received his MD from UCSF, where he completed a residency in otolaryngology/head and neck surgery.

Scholarly Projects Plus

In recent decades, the Amazon Basin has seen an increase in cases of human rabies, most often caused by bites from *Desmodus rotundus*, the common vampire bat. Benjamin Stoner-Duncan'14 wanted to know why. Having studied ecology before beginning medical school, he funneled his interest into his scholarly project but soon discovered that an issue of such magnitude and complexity required more than the four months set aside for scholarly projects. He was accepted into Scholarly Projects Plus, a new program that allows students to take up to 10 months of their senior year for extended research under the guidance of a faculty mentor.

"Scholarly Projects Plus is a pathway for students who are particularly qualified and motivated to do scholarly work of significant duration and depth," says Jonathan Amiel, MD, associate dean for curricular affairs at P&S. "By focusing on scholarship, not just research, this new program allows students to engage in a broad continuum of work, from molecular systems all the way up into societal level, even global and geopolitical."

All medical students meet with Dr. Amiel in the summer of their major clinical year to draft personalized plans for their scholarly projects, choosing one of six tracks: basic science, clinical research, global health, population health, narrative and social medicine, or medical education. With the help of the senior faculty track director, students are paired with a mentor who lends the project a sense of scope while providing direction and focus.

"The great thing about Scholarly Projects Plus is that it's not discipline-specific," says Jennifer Punt, VMD, PhD, associate dean for student research and director of the scholarly projects basic science track. "The scholarship moniker allows students to think more broadly, from clinical research to the humanities."

Two students in the Class of 2014 and two students in the Class of 2015 have chosen the extra time provided by Scholarly Projects Plus. The program does not extend medical school; the extra scholarly project time replaces other electives.

The extra time was important to Mr. Stoner-Duncan for a project requiring international travel, foreign ethics committee approval, and the collaboration of the Peruvian Ministry of Health. The project also demanded a diversity of expertise, as evidenced by Mr. Stoner-Duncan's choice of mentors: Daniel Streicker, PhD, a well-respected disease ecologist at the University of Glasgow, and Christopher Tedeschi, MD, P&S assistant professor of emergency medicine, whom he approached for "his interest in international and wilderness medicine, his academic acumen, and his excitement for cross-disciplinary collaboration."

"We're trying to find risk factors for human predation," says Mr. Stoner-Duncan. "Specifically, in examining whether open-air housing, proximity to deforestation or livestock populations, or beliefs or knowledge about bats are correlated with outbreaks. I am interested in the root causes of these outbreaks and in elegant and creative solutions that could lead to informed vampire bat-rabies control strategies."

Mr. Stoner-Duncan sees this project as the starting point for even deeper inquiries. "Much of my work to date has included laying the groundwork for future investigation, building relationships within Peru, and scouting locations for ongoing data collection," he says. "The extra months have given me the time to expand the project and submit our first manuscript for publication, while preparing for a second field expedition once the rainy season ends in northern Peru." *— Joseph Neighbor*

COACH, a New Way to Train Doctors

While a resident at NewYork-Presbyterian/Columbia in 2004, James Lee, MD, started considering the implications of a law first passed in New York in 1989 then expanded throughout the United States in 2003 that limited a medical resident's time in the hospital to 80 hours per week. Before 1989, it was not uncommon for residents to spend 100 hours or more in the hospital in a week, gaining experience and learning their trade through sheer volume and repetition.

"In the traditional, hands-on model of teaching medicine, whether or not you were overtly taught something didn't matter so much, because you cared for so many patients that eventually you learned how to take care of people. This was learning through on-the-job training," says Dr. Lee, now assistant professor of surgery at P&S. "With the new work hours restrictions, suddenly doctors were graduating with one-third less experience than previous generations, and experience is absolutely critical to becoming an excellent physician. I started thinking there must be a way to leverage technology to bridge that gap in experience."

With the help of a part-time programmer and his brother, a software designer, Dr. Lee set out to design an education program that uses the latest technology to ensure that health care providers will have the requisite skills to practice medicine at the highest level.

COACH—Comprehensive Online Archived Care Heuristic—was the result of that hard work. The educational platform, which he describes as "the Wikipedia for medicine but with oversight," is a learning management system that aggregates the latest medical information and techniques, which is then accessed via an online portal, collectedmed.com. Each discipline has its own "pod"—that is, voluntarily populated with content by the user community and edited by a panel of experts in that field to assure its accuracy.

James Lee, MD

JÖRG MEYER

"COACH is a multitenancy solution. The analogy is that COACH is like an apartment building: The common areas, the grass, the maintenance are all taken care of by the landlord," says Dr. Lee. "But in the individual apartments, each tenant can choose the paint and furniture. COACH takes care of all the infrastructure needs and each partner has a pod that they can customize as they like. We hope to have a pod for every medical discipline. Of course, this model and platform can be used for any educational need from K-12 through industry applications."

While a textbook can take five years to write and edit before reaching the student—by which time it is often out of date—COACH evolves in real time. Its versatility is one of its strongest attributes. Some partners, including groups at Columbia, use it as a learning management system while others use it as part of a "flip the classroom" approach, where learners gain foundational knowledge at home and apply it in real world situations the next day. Currently, 97 percent of general surgery residents nationwide use COACH through the American Board of Surgery's SCORE curriculum. Other partners include the American Society of Breast Surgeons, whose breast surgery manual Dr. Lee describes as "the first wiki with oversight textbook," and Heartsource, a consortium of heart-focused hospitals and groups across the United States.

Dr. Lee was prompted to create COACH while studying various theories of adult learning, including what is known as cognitive pre-training, a method used by NASA. In the case of medicine, a student using cognitive pre-training is instructed in everything he or she needs to know before interacting with patients; the hands-on work that follows focuses on building upon that bedrock of knowledge. According to a large body of research, cognitive pre-training achieves roughly two-thirds the benefit of actually doing a task.

But training the next generation of surgeons and physicians is only part of what COACH can do; given medicine's rapid changes, even highly experienced doctors can benefit from a constantly evolving, updated body of information. "In this day and age, it's impossible for one person to know it all, there's just too much information. Yet in medicine, we still hold to the impossible ideal of a physician who is a walking encyclopedia of everything. This model just doesn't work anymore," says Dr. Lee. "Medicine should go the way of law. In law school, they don't teach you each individual law, there's too much of it. The primary focus is teaching you how to find the relevant law and applying it intelligently. In this new model, COACH would be the ultimate resource for finding the necessary medical information. By taking the learning curve out of the patient interaction, COACH is making medicine safer and more efficient."

— Joseph Neighbor

The original 10 members of the first Columbia-Bassett Program class with Walter Franck'64, senior associate dean for the Bassett affiliation, left, and Henry Weil'86, P&S assistant dean for education at Bassett, right. Students, from left: Andrew Gomez, Krista Suojanen, Daewoong Lee, Mark Harris, Haley Masterson, Freda Ready, Blake Alberts, Monika Laszkowska, Katherine Schwartz, and Allan Guiney.

As First Class Graduates, Columbia-Bassett Students Reflect On the Unique Experience

By Bonita Eaton Enochs, Editor

If the Columbia-Bassett Program set out to give a handful of medical students a close-up look at patient care in a nonurban hospital system while opening their eyes to myriad career possibilities in a changing health care landscape, the program delivered. Eight of the 10 original Columbia-Bassett students—with home states listed as Arizona, California, Kansas, Massachusetts, New York, and South Dakota—graduate in May 2014 from P&S, the first students to complete the innovative program begun in 2010 to combine traditional medical education in New York City with hospital-based outpatient and inpatient clinical education at Bassett Medical Center in Cooperstown.

The other two students are on course to graduate—one after an extra year to earn a master's degree in public health and another after completing military service in his native South Korea. The graduating students plan to specialize in urology, emergency medicine, medical school or hospital administration, pediatric neurology, family medicine, international surgery, internal medicine (either cardiology or gastroenterology), and pediatrics/neonatology. Variously described as a rural medicine curriculum, a primary care curriculum, and a health care delivery curriculum, the "Bassett track" is all that but should not be limited to those definitions, says Henry Weil, MD, assistant dean for education at Bassett. "This program emphasizes relationships on all levels—relationships among students and patients, fostered by the longitudinal curriculum; among students and more senior physicians, like the preceptors assigned in their yearlong clinics and the single mentor each student is assigned upon enrolling in the program; among students and the rest of the medical staff; and, perhaps most significant, relationships among the students themselves."

A common theme among the Columbia-Bassett graduates who discussed their experience is the feeling of family among the group of Columbia-Bassett students and the wider Bassett and Cooperstown community. "The Columbia-Bassett Program had a small, personal, familylike feel within the context of a large, diverse, academic powerhouse of Columbia," says Monika Laszkowska. "The Bassett community embraced our presence and faculty proactively found ways to enhance our learning. Our preceptors got to know us well over the course of the year and could really speak to our strengths and weaknesses as we developed as clinicians."

Columbia-Bassett students (10 students have been chosen each year since 2010) spend the first 18 months of medical school in New York City, studying basic science fundamentals alongside P&S classmates. In January 2012, the inaugural class started core clinical rotations at Bassett. After 10 weeks of "rapid inpatient blocks" in ob/gyn, surgery, neurology, and psychiatry, the students started a 40-week longitudinal patient care curriculum. They rotated through primary care and specialty clinics, says Walter Franck, MD, Columbia's senior associate dean at Bassett, and built panels of patients they followed throughout the students' time at Bassett. "This allowed students to work with people in the fullness of their journey in pursuit of health, cure, or palliation, as opposed to only seeing patients in isolated, brief, intense periods of illness," adds Dr. Weil.

"The Bassett program's longitudinal curriculum gave me an interesting view of medicine, and I settled on emergency medicine after I watched a few of the patients in my portfolio come through the emergency room," says Allan Guiney, who did not have a specialty chosen when he started medical school. Mr. Guiney grew up in Cooperstown. "Both my parents worked as physicians at Bassett, so I expected that the Columbia-Bassett program would be a unique opportunity for me to learn medicine in a community where I had deep roots. The program provided that, and also a lot more. It was rewarding to follow patients throughout the gamut of their medical care."

"We were able to take ownership of our patients and follow them across a variety of services and specialties," says Ms. Laszkowska. "Both the longitudinal program and the opportunity to work for a full year in one hospital system lent itself well to some amazing student-patient relationships. From helping to deliver my first baby, to my first surgical case, to my first time helping to break the news of a new cancer diagnosis, to my first patient death: These are all experiences that made a huge impact on me during my clinical development and helped shape me as a doctor and an individual."

For Haley Masterson, the unique curriculum contributed directly to her decision to pursue pediatric neurology: "The structure of the longitudinal curriculum involves repeated exposure to different specialties, so when I found myself drawn to pediatrics and neurology, I knew it wasn't just because of one preceptor or one particularly good month; it was the cumulative effect of two specialties that had a profound impact on me over the course of 10 months, multiple clinics, and multiple preceptors."

Freda Ready credits the longitudinal curriculum with allowing her to explore various areas of medicine at her own pace. "The faculty was fully engaged in my education, and many of them have been my advocate with residency programs as I go through the match process." She plans to return to Africa to pursue a career in international surgery. For her scholarly project, she studied barriers to treatment for women with endometrial and ovarian cancers in Cape Town, South Africa. "The performance improvement training at Bassett helped me think about how to define the problems with the health care system that were contributing to delays."

"I could not have predicted how profound my patient experiences in the longitudinal clinical curriculum would be," says Katherine Schwartz, who plans a career in pediatrics and may specialize in neonatology. "I have had a fairly roundabout path to pediatrics. I entered medical school thinking I would go into ob/gyn, but as I was going through my first year of medical school I realized that I liked almost everything. My first semester I was able to shadow in anesthesiology, neonatology, obstetrics, and emergency medicine, and I had the privilege of seeing several organ transplantation surgeries. When I started my major clinical year in Cooperstown I began ruling things out and I quickly came to know that what mattered most to me was the interaction with patients and their families during challenging times, and by the end of the year I was deciding between ob/gyn and pediatrics. Doing a sub-internship in the NICU I realized that pediatrics, and specifically neonatology, could give me all the things that I had identified as being important to me in medicine: contact with patients and their families, variety of pathology and acuity, and procedural work."

The Columbia-Bassett Program not only introduced medical students to a range of career choices as physicians, it also introduced students to the idea of a career in medical education. "A big change to my career plans that developed during medical school was my desire to pursue medical education. This was not really an area I had even considered before entering medical school," says Krista Suojanen, who plans a career in internal medicine first as a clinician educator then in an administrative role. "I had a number of fantastic teachers who really got me excited about learning and about medicine and made me realize what an impact those involved with medical education could have."

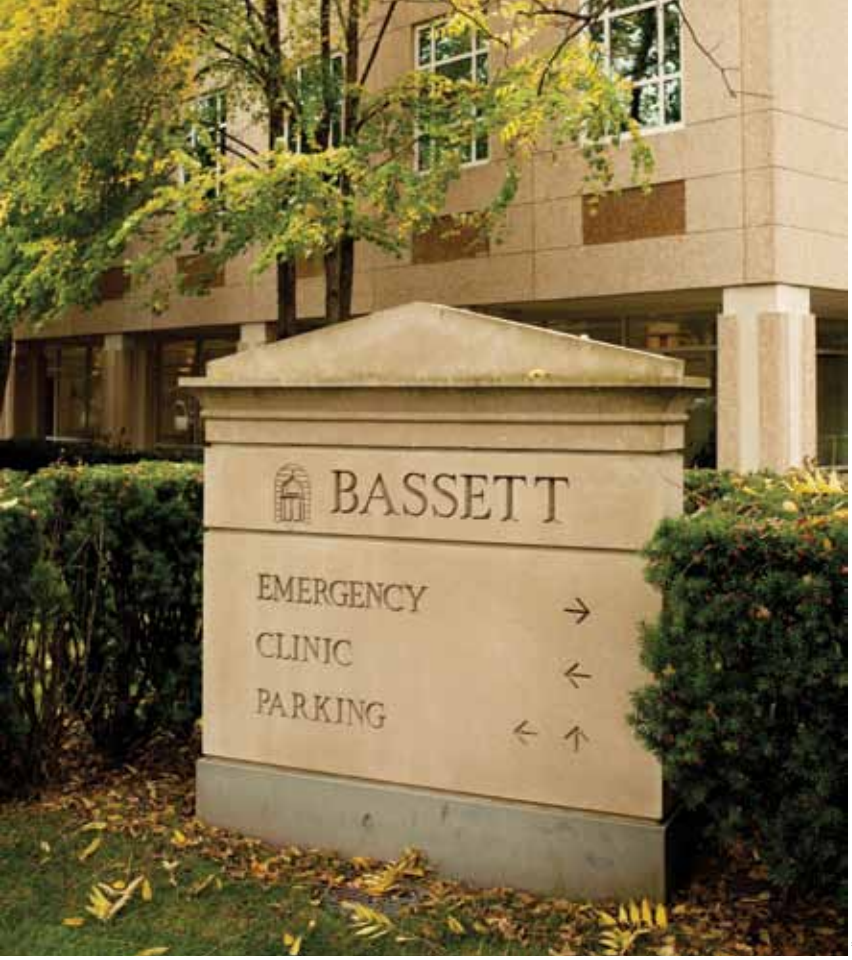
While most Columbia-Bassett students did not have a specialty chosen when they started medical school, some kept to their original plans while others changed their minds. Blake Alberts, a native of South Dakota, plans a career as a urologist. "My career plans were far from certain when I began medical school, but they probably remain quite similar to the loose plans I had entering P&S. I chose to enroll in the Bassett program so that I could better understand rural health care delivery, and now I hope my future career involves developing an improved delivery model for rural urology care.

"I would enjoy leading a urology division within a large integrated health system. My home state is South Dakota, where health care has largely been taken over in the last 10 years by two competing integrated health systems. While there are downsides to this, I think it provides opportunity for a rural state like mine to expand specialty health care services to regions that have never before had access. Currently, urology remains exclusively private practice in South Dakota; however, if it has not already occurred by the time I finish training, I would be thrilled with the opportunity to return to South Dakota as a fellowship-trained urologist, poised to develop a urology program within one of these large systems."

Andrew Gomez initially planned on a career in orthopedic surgery, a good match for his undergraduate mechanical engineering degree. He now plans a career in family medicine. "There are several reasons why I changed directions. First, as a naïve first-year medical student I was drawn to the allure of surgery without much consideration of the reality of the hard work involved. I prefer to maintain a certain work-life balance, which seems challenging in such a rigorous field like surgery. I credit the Columbia-Bassett program for providing me with the information to make an informed decision regarding the future of primary care and my potential role in this field," says Mr. Gomez.

"I hope to be a physician who is comfortable treating a wide range of diseases. There are certain ingredients that I think will lead to my satisfaction as a family physician, including building therapeutic relationships with my patients, teaching (patients or students), and integrating my background as an engineer and entrepreneur. Family medicine affords me an array of possibilities in terms of these considerations, which range from starting a clinic in another country, developing and implementing lean process technologies, or simply working as an employee at an ACO," adds Mr. Gomez.

A unique aspect of the Columbia-Bassett Program is the SLIM (Systems, Leadership, Integration, and Management) curriculum, which incorporates business and public health coursework to help students understand the U.S. health care system through study of care delivery, strategies for quality improvement, and cost and payment issues. "The SLIM curriculum gave us a really unique gateway to learning about health care systems management and policy from professors at the Columbia Business School and the Mailman



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School of Public Health, various speakers who are leaders in health care, and hands-on performance improvement projects with clinical and administrative mentors at Bassett," says Ms. Laszkowska. "I have a strong appreciation for how empowering I found the SLIM curriculum to be. Through carrying out my own projects, I saw just how difficult and important it is to continue to refine how we deliver health care to patients. Most importantly, I realized that the scale of such efforts can vary from an individual doctor working to make their practice more efficient to an entire institution acting to try to improve patient safety and outcomes. I learned the importance of asking the right questions, and I was able to build a tool set that enables me to use data-driven, collaborative approaches to find the right answers."

"Our SLIM curriculum exposed us to important aspects of medicine (policy, politics, business) not always taught in med school," adds Mr. Guiney.

Adds Mr. Alberts: "The Bassett program provided me with a 30,000-foot view of the health care system that few medical students get without taking time for an MPH or MBA. My residency will include one year of dedicated research time, and I hope to use the knowledge I picked up in the Bassett SLIM curriculum and apply it to urology."

"I've become interested in the arena of quality and performance improvement in hospitals so I could see that playing a role in my eventual career path as well," says Ms. Suojanen. "I think there are huge changes to come in health care that have started to begin to take shape during these four years that make it hard for me to completely envision what the future will hold."

For Mr. Gomez, the SLIM curriculum's use of statistics, scientific papers, speakers, and other evidence "clearly delineated the need for a stronger and more effective primary care system in the United States. I'm encouraged to see innovative thinkers in medicine looking toward the engineering field for its wisdom in reducing undesired outcomes, implementing lean strategies for mitigating waste, and using information technology, among other examples."

Like all P&S students, the Columbia-Bassett students completed scholarly projects, and several of the projects related to the SLIM curriculum or were carried out in Cooperstown. Mr. Alberts integrated concepts from the SLIM curriculum to study hospital readmissions among patients undergoing radical cystectomy for bladder cancer. Mr. Gomez developed a predictive model to prevent unnecessary meniscal surgery following a traumatic knee injury. Ms. Laszkowska worked on a cardiology project with two Bassett mentors to assess the relationship between chest pain perception in cardiac ischemia and sensitivity to capsaicin. Ms. Suojanen's medical education project focused on whether aspects of communication can be taught and the ideal time for teaching the skills; members of the Columbia-Bassett Class of 2015 were study subjects.

These Columbia-Bassett students acknowledge the risk of being the first students in a new program. "I knew that choosing the Columbia-Bassett program would be a risk, as it was a new program," says Ms. Suojanen, "but the ability to train in both a small hospital in a rural area of New York and a large academic center in the middle of NYC was an invaluable opportunity and one that deeply enriched my education and overall experience."

Ms. Masterson also acknowledges the uniqueness of the opportunity: "I cannot express how grateful I am to have been given an opportunity to be part of the Columbia-Bassett program, particularly the inaugural class. I think chances like this come across only once or twice in a career, and I'll always be thankful that I said yes to this one."

"My experience at P&S," says Mr. Gomez, "has been a whirlwind which will require much introspection and processing long after this experience ends."

Aside from the accolades for the Columbia-Bassett curriculum, Bassett mentors, and the experience itself, the inaugural Columbia-Bassett students reserve their strongest praise for each other and their New York City-based classmates.

Mr. Alberts: "The group of 10 that traveled to Bassett became a strong family unit. We did everything together during our major clinical year, and I anticipate we will be a group that assembles at Bassett reunions for years to come."

Mr. Gomez: "I feel remarkably privileged to be part of a long tradition of medical students that have trained here. One major reason I chose P&S was because I wanted to be surrounded by a diverse set of talented peers. My expectations were far exceeded in this regard as I've had the fortune of meeting other engineering-turned-medical students, students who worked in finance, were artists, travelled the world, and many who are just incredibly smart."

Mr. Guiney: "Looking back now, I see that nearly every aspect of my education at P&S was top-notch, but the thing that made the biggest impact was the quality of the students I learned with."

Ms. Schwartz: "I could not have predicted how close I would get with my fellow classmates."

Mr. Alberts realized how unique P&S is during rotations last summer. "I rotated at top institutions with students from other top medical schools. They learn the same pathology we learn at P&S, but they are not doing it in NYC at a school that encourages its students to pursue everything from rugby to theater. During my senior year of college, I was deciding between P&S and a school back in the Midwest. I am grateful I chose P&S."

Scenes from Match Day 2014

The residency match results for the P&S Class of 2014 neared perfection as 150 of the 151 graduates participating in the match this year received residency assignments. The most popular residencies are internal medicine (35 matches), pediatrics or pediatrics-primary care (15), and orthopedic surgery (14).

Match results by student name and by specialty can be found online at **columbiamedicinemagazine.org/webextras.**

Photos by Amelia Panico

New devices, procedures, guidelines for clinicians

Clinical advances

New Center Offers Individualized and Precise Radiation Oncology Treatment

The new Irving Radiation Oncology Center, part of the Herbert Irving Comprehensive Cancer Center, opened last fall to provide patients with high-precision radiation therapies and the most advanced diagnostic imaging for children and adults with cancer.

The center's new technology allows clinicians to safely and precisely target smaller tumor volumes with higher dose radiation, while sparing healthy cells from unnecessary radiation exposure. Image-based target verification technology allows physicians to individualize treatment to each patient, allowing maximization of the treatment dose. In-room, real-time imaging can monitor the tumor response and biological behavior as the patient is being treated.

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"This new technology offers greater customization and allows for a dramatically reduced treatment course, from weeks to days," says K.S. Clifford Chao, MD, the Chu H. Chang Distinguished Professor and chair of radiation oncology at P&S.

The 12,500-square-foot Irving Radiation Oncology Center is an extension of NewYork-Presbyterian's existing radiation oncology space, which has been renovated, and is housed on the lower level of the Morgan Stanley Children's Hospital. Unlike most radiation oncology treatment centers, the Irving Center is open and filled with natural light. Patients, family, and caregivers have access to computers, Wi-Fi, and an interactive children's sitting area while waiting for appointments.

The center was made possible through a $25 million gift to NewYork-Presbyterian Hospital from Herbert Irving, for whom the National Cancer Institute-designated Herbert Irving Comprehensive Cancer Center is named, and his wife, Florence. Mr. and Mrs. Irving have advanced cancer care by giving more than $200 million to NewYork-Presbyterian Hospital and Columbia University Medical Center over the past 30 years.

"The Irving Radiation Oncology Center reflects Herbert and Florence Irving's vision that the most promising way to reduce the global burden of cancer requires the top researchers to work side by side with top clinicians, all in modern facilities," says Lee Goldman, MD, executive vice president and dean.

Laparoscopic Surgery Could Increase Number of Liver Transplants

Liver transplant surgeons at P&S are the first in the country to report a fully laparoscopic hepatectomy—the removal of a portion of the liver—from a living adult donor for adult and teenage recipients. The procedure offers hope for addressing the shortage of livers available for transplant.

In the September 2013 issue of the American Journal of Transplantation, the team, led by Benjamin Samstein, MD, assistant professor of surgery, reported on two of the center's five successful fully laparoscopic hepatectomies from living adult donors for adult and teenage recipients. The group is one of three teams in the world, and the only one in the United States, that have reported successful procedures.

"This is a small step, but I think a useful one," says Dr. Samstein. "We're at the forefront of perhaps a new era for living-donor liver transplants."

Because of a nationwide shortage of organs from deceased donors, living donors are an important source of organs to aid patients living with end-stage organ disease, particularly of the liver and kidneys. Yet only about 4 percent of liver transplants are done with a living donor, compared with nearly 50 percent of kidney transplants.

One factor in the discrepancy may be the surgical technique used to remove the organ. More than 90 percent of living-donor kidney transplants are done laparoscopically, says Dr. Samstein, while most liver donor surgeries are still done through complex open surgery. The traditional open procedure leaves the donor with a greater risk of postoperative mortality, morbidity, and pain and a longer recovery period that lasts, on average, eight to 12 weeks, two to three times longer than the recovery period for a laparoscopic kidney donor.

In 2009, Columbia surgeons began doing fully laparoscopic hepatectomies on adult donors for transplantation into children. Pediatric recipients require 15 percent to 20 percent of a healthy adult liver for transplant, but adult recipients need 30 percent to 60 percent, necessitating a more central cut through the donor liver.

The American Journal of Transplantation article detailed two living adult donors who underwent laparoscopic surgery to donate portions of their livers to adult family members. In these two cases, donor recovery time was half that of open-surgery donation with no additional postoperative donor complications. The donors also appeared to have less pain and lower risk of postsurgical hernia.

The authors caution that this procedure should be performed only in select cases and only by teams with significant experience in both living-donor procedures and laparoscopic liver surgery, as laparoscopic hepatectomies require specific training.

"Donor safety continues to be paramount and the adoption of new surgical techniques ultimately needs to demonstrate that it meets the safety standard of old techniques before adopted," they wrote.

NewYork-Presbyterian/Columbia remains the only center in the country performing fully laparoscopic living-donor hepatectomies for transplant into both pediatric and adult recipients.

"Clinical innovation and scientific progress constitute the core of the Center for Liver Disease and Transplantation's mission," says Jean C. Emond, MD, the Thomas S. Zimmer Professor of Reconstructive Surgery (in pediatrics). Dr. Emond was a member of the team that pioneered living donor liver transplantation, which is now considered one of the most important advances in the treatment of severe liver disease.

Irving Bone Marrow Transplant Unit Opens in Harkness Pavilion

The Irving Bone Marrow Transplant Unit, a state-of-the-art facility for comprehensive bone marrow transplant care, opened this spring on the 11th floor of the Harkness Pavilion. The new unit features 18 inpatient rooms, a high-tech nurses' station for individual patient monitoring, and a specialized airflow system to protect patients with weakened immune systems.

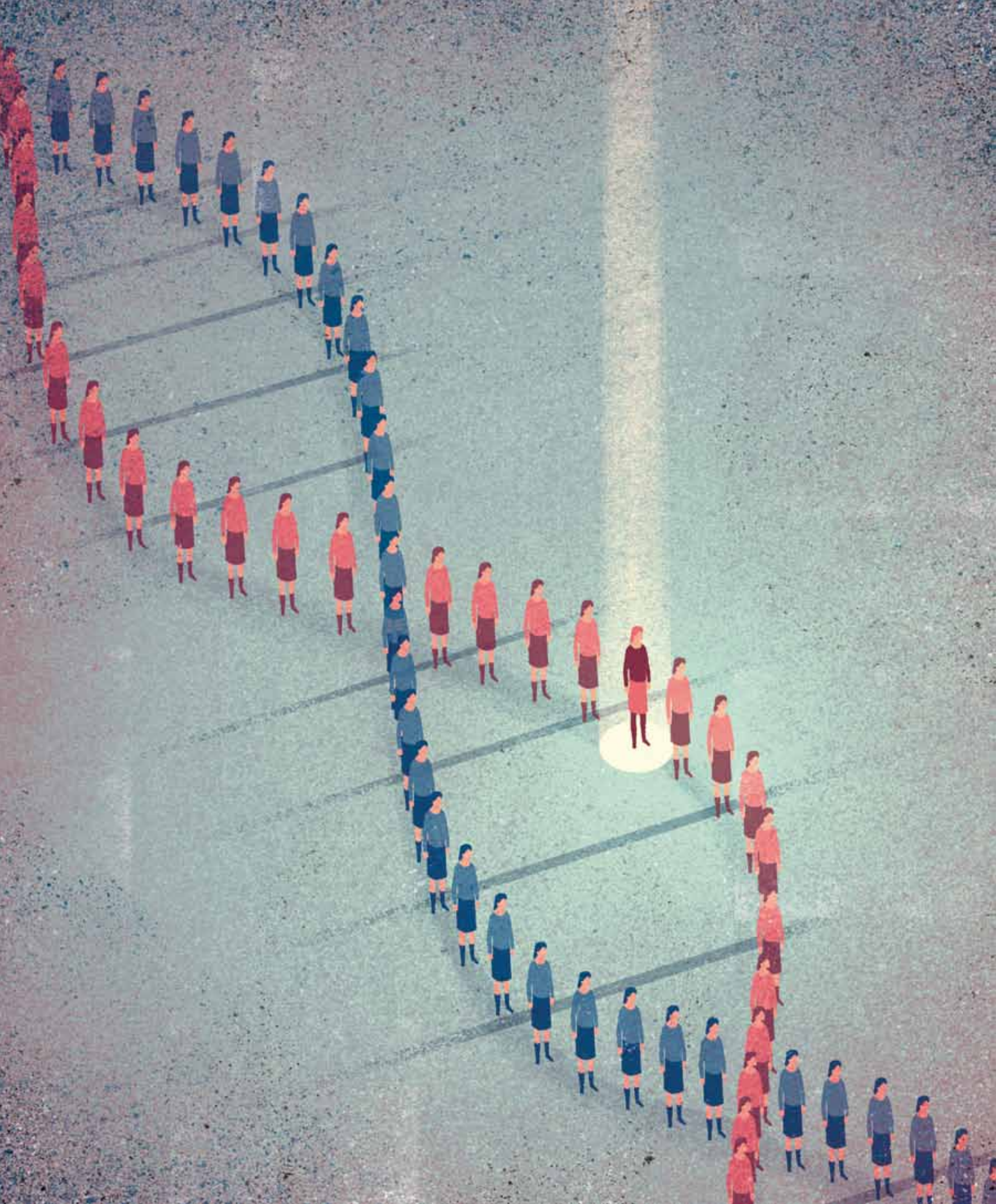
The unit, supported by a $20 million gift to NewYork-Presbyterian Hospital from Herbert and Florence Irving, delivers patient-centered care for BMT recipients and will advance research to make BMT a safe and viable lifesaving therapy for a wide range of patients.

BMT has evolved into the standard of care for patients with blood cancers, including leukemia and lymphoma, and other blood disorders, and its use is expected to grow by 20 percent over the next decade.

BMT and other forms of cellular therapies can be used to custom-tailor a patient's immune system. The pioneering work of Megan Sykes, MD, director of the Columbia Center for Translational Immunology and the Michael J. Friedlander Professor of Medicine and professor of microbiology & immunology and surgical sciences, has demonstrated that BMT combined with organ transplantation can induce tolerance of the donated organ without the use of long-term immunosuppressant therapy. With the largest solid organ transplant program in the country, NewYork-Presbyterian will be in a position to help the BMT unit lead efforts to make combined transplant procedures the clinical standard.

The unit is led by Markus Mapara, MD, PhD, professor of medicine. Dr. Mapara plans to develop new approaches to improve the outcomes of patients undergoing hematopoietic stem cell transplantation by preventing or reducing treatment-related complications such as graft-versus-host disease and preventing recurrence of the underlying disease.

A particular focus of his research is transplants in patients who do not have matched donors. Approximately 25 percent of patients who need a bone marrow transplant have a matching donor in their family, while the remaining patients must be matched with a compatible donor in national and international registries. The chance of finding a match in registries is about 70 percent for whites but lower among ethnic minority patients. Partial matches from first-degree relatives have made BMT possible, especially in patients from ethnic minorities.



Medicine Gets PERSONAL

Improved Diagnosis, Treatment Goals of New Interdisciplinary Effort in Personalized Medicine

By Aliyah Baruchin • Illustration by Davide Bonazzi

A patient sits in a waiting room at Columbia's Herbert Irving Comprehensive Cancer Center, referred to Columbia based on reported symptoms and a recent blood test. His nascent chart includes his age, birthplace, current medications, profession, medical history, and results of a recent MRI. An hour from now, that chart will also include a diagnosis and recommendations for an initial treatment plan.

The information in the chart will be used to shape and guide this patient's care. But researchers such as Nicholas Tatonetti, PhD, assistant professor of biomedical informatics and director of clinical informatics for the cancer center, would like to know more—a lot more. Dr. Tatonetti works in a discipline known as network medicine, an integrated study of the entire network of biological processes at work in complex disease. He has his eye on the day when multiple levels of prediction, based on data from gene, protein, and metabolic interactions, in conjunction with clinical observations and understanding of disease and pharmacological processes, become the new standard of care: What do we know about this patient's genome before he walks through the door? What are the particular molecular characteristics of his specific disease? How will it respond to treatment with the therapies available? What will be the medications' side effects for him?

Bringing that level of precision and predictive ability to patient care—"the right drug for the right patient at the right dose at the right time"—is the goal of Columbia's new interdisciplinary focus on personalized medicine. In the decade since the Human Genome Project completed its mission, determining the sequence of the human genome and identifying just 20,000 genes, it has become apparent that many factors—overproduction of a particular protein, infection, and environmental exposure in addition to gene mutation—affect disease mechanisms and progression. Rapidly evolving technologies that make DNA sequencing dramatically faster and less expensive along with new technologies to monitor virtually all aspects of cell physiology have led to the generation of unprecedented amounts of information (big data) that is starting to yield to new computational approaches and high speed computers, all of which promise to make diagnosis and treatment as patient-specific and precise as possible.

To harness the potential created by these scientific advances for the benefit of patients, P&S Dean Lee Goldman, MD, has made personalized medicine a key goal of the medical school's strategic plan. "At Columbia, we have enthusiastic consensus in support of personalized medicine—the personalized application of scientific advances to modern diagnosis and treatment, easily accessible and attentive care for the people who entrust us with their health, and personalized education for each of our individual students," says Dr. Goldman.

The effort brings together several centers under the auspices of the new Department of Systems Biology: the JP Sulzberger Columbia Genome Center, the Center for Computational Biology and Bioinformatics, and six NIH-funded centers of excellence for the study of systems biology of human disease. Other research venues involved include a full complement of shared genomics technology resources at the Herbert Irving Comprehensive Cancer Center; the newly opened New York Genome Center, of which Columbia was a founding member; the Institute for Cancer Genetics; the Department of Pathology & Cell Biology; the Department of Biomedical Informatics, and more.

Personalized medicine requires an interdisciplinary approach, which enhances collaboration across all clinical disciplines at the medical center and many basic sciences, including partnerships with researchers throughout Columbia. "The promise of harnessing genomic data to better predict the future course of disease and the efficacy of treatment for individual patients is just extraordinary," says University President Lee C. Bollinger. "Unlocking this potential will take not only the vast research prowess of our medical center, but also the computational capacity and multidisciplinary creativity found across the University, from engineering to the basic sciences. What lies ahead is a comprehensive institutional effort commensurate with the significance of this endeavor." (See accompanying article.)

When a tumor's individual weakness is found—and the right tool identified to exploit that weakness—patient care can be revolutionized.

That level of collaboration is already creating enormous energy. "This is very much an evolving field," says Wendy Chung, MD, PhD, associate professor of pediatrics in medicine and a member of the university's newly formed task force on personalized medicine. "It's a combined effort to learn as we go; we're trying to approach this as a partnership with providers, patients, and researchers. And by doing it in this way, we move things forward faster for patients."

Drawing New Boundaries

At the heart of personalized medicine is a fundamental reframing of how to classify disease. In cancer, for example, medicine has long characterized diseases by cell type or location in the body, but within those categories, clinicians and researchers now know, many different types of disease exist. "One of the things that's really come out of the investigations in the past 10 to 15 years is this finding that there is incredible heterogeneity within cancers," says Alex J. Rai, PhD, associate professor of pathology & cell biology and director of the special chemistry laboratory at NewYork-Presbyterian Hospital. It is possible, by using the right technologies, to determine that two cancers which may look the same based upon organ or cell type classification are in fact fundamentally very different. A cancer of one organ, such as breast cancer or liver cancer, for example, should perhaps no longer be thought of as a singular disease but potentially myriad diseases. Different tumors grow and respond to therapies very differently: One cancer may grow very slowly and not pose an immediate threat to the patient's health, while another may grow quickly and be very aggressive. One type may respond well to one medication while another type does not respond at all.

Awareness of these differences has emerged because, for the first time, researchers have the ability to get a nearly complete molecular picture of an individual patient's tumor, says Brent Stockwell, PhD, associate professor of biological sciences, chemistry, and systems biology and a Howard Hughes Medical Institute Early Career Scientist. "The question is, given all that information, what is the Achilles' heel of that particular tumor?"

That is the question driving much of cancer research. And when a tumor's individual weakness is found, and the right tool identified to exploit that weakness, patient care can be revolutionized. One early example was the success of the targeted therapy imatinib, which won FDA approval in 2001 to treat chronic myeloid leukemia. "Since then, the goal has been to extend this approach to all other tumors," says Stephen Emerson, MD, PhD, director of Columbia's Herbert Irving Comprehensive Cancer Center. But other types of leukemia, even though they have similar-looking cancer cells, are caused by very different mutations and so remain untreatable. "Our job is to figure out the best technologies to use to distinguish one type of cancer from another based upon its genetics, then to figure out what the right clinical studies are to test what we think are the best ways to treat them based upon those genotypes."

Personalized medicine, then, seeks to dismantle the notion of one-size-fits-all therapies. "It's really looking at the molecular etiology of disease or susceptibility to disease," says Dr. Chung. What epigenetic drivers or genetic defects are propelling each individual tumor to grow or metastasize? Discovering individual disease mechanisms not only reveals the great heterogeneity within traditional categories of cancer, but also blurs the boundaries between those traditional categories, sometimes revealing similar causes of seemingly disparate types of cancer. This too holds important promise for therapy. "If we see the same molecular drivers in cancers in other parts of the body, we can co-opt existing medications for those other tumors."

Use of Personalized Medicine Beyond Cancer

While personalized medicine has thus far had the greatest impact on cancer diagnosis and treatment, its promise at Columbia encompasses everything from neurodegenerative disease to stillbirth to depression. As Dr. Chung looks for novel breast cancer susceptibility genes in Ashkenazi Jewish families, she also does parallel work in pediatric cardiomyopathy, searching for potential molecular causes in the 30 percent to 50 percent of cases in which a genetic basis for the disorder has not yet been determined.

Dr. Chung also works on determining the molecular characterization of uncommon disorders such as pediatric neurodevelopmental disorders. "I think we've had extraordinary success with children with rare disorders where we haven't a clue

what's caused it—being able to find out, using our most powerful genomic technologies, and now making diagnoses, and in some cases diagnoses that immediately suggest a therapy," she says. In one instance, she and her colleagues identified a cause of one child's rare condition, which they were able to cure with a liver transplant. In another case, they determined the exact cause of a disorder in two children, who are now preparing for bone marrow transplants that offer a known cure.

Researchers in the Department of Obstetrics & Gynecology's Division of Maternal-Fetal Medicine are using genetic and environmental markers to predict which pregnancies are at high risk for complications—thereby limiting additional testing to appropriate patients and reducing unnecessary procedures for women at low risk. Such approaches offer the potential for improving prenatal diagnosis as well. Ronald Wapner, MD, vice chair of research and director of reproductive genetics, in collaboration with Bryn Levy, PhD, professor of pathology & cell biology and director of the Cytogenetics Laboratory, studies the use of chromosomal microarray analysis, a technique that finds anomalies in about 6 percent of fetuses who appear normal in current testing methods, and collaborates with Dr. Chung to sequence the genomes of fetuses with structural anomalies. "We needed better genetic tools to diagnose those problems. Genomics, in particular, has been really important," Dr. Wapner says. "We can give parents better prognostic information about the best care for that fetus and child when it's born."

Ali Gharavi, MD, associate professor of medicine and chief of the division of nephrology, uses genomic technology to study several forms of kidney disease, including a constellation of congenital renal defects known as CAKUT, which now shows linkages to other disorders. When he and his colleagues looked at 500 children with kidney malformations from 10 different centers across the world, they realized that 10 percent of the children had a major chromosomal disorder not picked up on clinical evaluation. The disorders had been described but in the context of intellectual disability, autism, or schizophrenia—not kidney malformations. "It turns out that in a subset of these children with kidney failure, there may actually be a genetic lesion affecting both kidney and neurologic development that is not being addressed," Dr. Gharavi says. In CAKUT patients who do not have a chromosomal abnormality, he can use genome sequencing to diagnose other unrecognized genetic diseases, or even define new ones. "Making a precise diagnosis is very helpful because you can identify the syndrome; you can evaluate the patient's risk for other health problems; and you can much better inform the family about what may be going on, and what's the risk to the next pregnancy. By finding shared biological pathways with other disorders, we may find that some drugs used for treating other conditions may be useful for the treatment of kidney disease."

The research of two other members of the university's personalized medicine task force focuses on research in genetics and beyond. Gerard Karsenty, MD, PhD, the Paul A. Marks Professor of Genetics & Development, department chair, and professor of medicine, studies the role of the skeleton as an endocrine organ capable of influencing other organs via secretion of the hormone osteocalcin. Dr. Karsenty investigates the molecular mode of action in osteocalcin's remarkable effects on other organs, regulating systems including glucose metabolism, energy expenditure, male fertility, and cognition. Angela M. Christiano, PhD, the Richard and Mildred Rhodebeck Professor of Dermatology and professor of genetics & development, has unraveled the genetic basis of complex autoimmune diseases, in particular a form of hair loss known as alopecia areata. A team that includes Dr. Christiano, immunologist Raphael Clynes, MD, PhD, and dermatologist Julian Mackay-Wiggan, MD, has built a translational pipeline focusing on hair disorders, spanning from genetic studies to preclinical mouse models to clinical trials using drugs that were selected on the basis of understanding the genetics and pathophysiology of the disease. These studies promise to enable personalized therapies for hair loss disorders using patient-derived stem cells for the common forms of hair loss and use of drugs that are already showing success in treating alopecia areata.

The Department of Pathology's Laboratory of Personalized Genomic Medicine is a Clinical Laboratory Improvement Amendments (CLIA)-approved laboratory. Its 10 board-certified geneticists and pathologists use a variety of biochemical and genomic platforms to evaluate a wide range of genetic and neoplastic disorders. Peter L. Nagy, MD, PhD, assistant professor of pathology & cell biology, is one of the laboratory's directors who lead the effort to develop and validate the exome and transcriptome sequencing tests that are offered for clinical use. He sums up the mission of the laboratory: "We want to provide a genetic diagnosis that guides the clinicians to treat their patients and helps patients to cope with their disease. The laboratory works as a team with clinical colleagues from across the medical center to accomplish this goal."

Personalized Medicine Means Interdisciplinary Medicine

And what if no actionable genetic or epigenetic mutations can be found? At the center of Columbia's personalized medicine effort is the new Department of Systems Biology, which brings together researchers specializing in molecular biology, genetics, computational biology and bioinformatics, structural biology, mathematics, chemistry and chemical biology, physics, computer science, and other fields. According to founding director and chair Andrea Califano, PhD, the Clyde and Helen Wu Professor of Chemical Systems Biology, the new department seeks to provide an in-depth, systemwide characterization of all molecular interactions. It is this systems-level approach to disease biology that can systematically identify disease drivers and druggable targets for the 90 percent of cancer patients who lack a clearly actionable genetic mutation. This has become possible only in recent years through major advances in science and technology that require a fully interdisciplinary approach.

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Dr. Califano, who serves on the NCI precision cancer medicine working group, collaborates with clinicians across the medical center—including those studying prostate cancer, breast cancer, neuroendocrine tumors, and glioma—to develop personalized therapy, including combination therapy, the use of multiple drugs to kill tumors lacking the actionable mutations that would make them sensitive to single targeted agents. He identifies instances in which simultaneous inhibition of two unmuted genes completely shuts down a tumor, but inhibiting each gene individually has no effect on cancer growth. "If you shut down one or the other, nothing happens. If you shut down both of them, these tumors cannot cope and their cells die," Dr. Califano says. In collaboration with Jose Silva, PhD, assistant professor of pathology & cell biology, and with clinicians Matthew Maurer, MD, and Kevin Kalinsky, MD, assistant professors of medicine, Dr. Califano has launched a phase one/two clinical trial for combination therapy in HER2-positive breast cancer patients who are resistant to treatment with trastuzumab.

The work of systems biology underscores how the promise of personalized medicine depends upon the creation of powerful new teams of researchers and clinicians from across the medical center and the university. "It's engendering a novel method of treating disease in a multidisciplinary way," Dr. Califano says.

Technology as Power

In all of these efforts, technology is the power source. Jingyue Ju, PhD, the Samuel Ruben-Peter G. Viele Professor of Engineering, professor of chemical engineering and of pharmacology, and director of the Center for Genome Technology and Biomolecular Engineering at Columbia, is one of the world's leading innovators of technology that makes sequencing faster, cheaper, smaller, and more accurate.

Dr. Ju, who co-invented the fluorescence energy transfer sequencing technology that enabled the completion of the Human Genome Project, is now working with next-generation sequencing—known as massively parallel four-color DNA sequencing by synthesis (SBS). This SBS platform, which uses cleavable fluorescent nucleotide reversible terminators invented in Dr. Ju's laboratory, is the dominant approach for next-generation DNA sequencing systems. He also co-leads a team that recently received a $5.25 million NIH grant to develop a miniaturized handheld device for single-molecule electronic DNA sequencing. "The goal in mind is that the ultimate system you develop needs to be user-friendly, robust, and economical," he says. "Electronics coupled with innovative molecular engineering can really be miniaturized, so this can be the next wave, in particular for health care and personalized medicine."

Genomics technologies, too, underscore how research facilities are connected. In its Department of Systems Biology, Columbia has grouped all the computational activities and high-throughput data generation activities (sequencing and drug screening) under one umbrella. "We run the Columbia Genome Center, where we can screen millions of compounds in a week," says Dr. Califano. "So we're now running a large number of drug assays, including collaborations with the Stem Cell Initiative and with the cancer center." The new department has become a core facility of the cancer center, which is heavily engaged in the application of genomic technology to the study and treatment of cancer. Adds Dr. Emerson, "We have also developed, through the support of the National Cancer Institute and donors, 15 shared core facilities in areas like proteomics or genomics technologies that provide the analytics you need to figure out what these tools mean."

Columbia's leadership in the New York Genome Center consortium extends the medical center's genomics capabilities. The NYGC's new facility provides comprehensive services, including sequencing, bioinformatics analysis, experimental design, high-performance computing, and data storage. An important figure in the creation of the NYGC has been co-founder Tom Maniatis, PhD, the Isidore S. Edelman Professor and chair of the P&S Department of Biochemistry & Molecular Biophysics. One of the early leaders in molecular biology, Dr. Maniatis led the development of recombinant DNA methods and their use in the study of gene regulation mechanisms. He describes the dual purpose of NYGC to complement and link its participating institutions. "The role of the NYGC is both structural and intellectual. The structure is the large-scale sequencing capacity, bioinformatics, and data storage. And the center will also act as an intellectual 'hub' for scientific exchanges, meetings, education, and collaborations."

The importance of the collaborative NYGC has become increasingly clear in recent months. In January the center became one of the five genome centers in the world to acquire the Illumina HiSeq X Ten system, which is expected to enable ultra-high throughput sequencing of whole human genomes. Systems in the previous generation took many weeks to process, but the new technology is designed to provide a prompt readout of the entire genome within three days for a reduced cost of approximately $1,000 per genome. More recently, the center announced an initiative with IBM to test the IBM Watson cognitive system for genomic research that may help oncologists deliver more personalized care to cancer patients. The first project will be to evaluate Watson's ability to help oncologists develop more personalized care for patients with often-fatal brain tumors called glioblastomas.

Two of the newest researchers at the NYGC have joint appointments at Columbia. Tuuli Lappalainen, PhD, and Joe Pickrell, PhD, have joined the center as junior investigators and core members. Dr. Lappalainen, a statistical geneticist, holds a joint appointment in systems biology at CUMC, and Dr. Pickrell, a human geneticist, holds a joint appointment in biological sciences at Morningside, strengthening the cross-campus links to Columbia's institutional membership in the NYGC.

The Future is Now

For Dr. Chung, another key to advancing personalized medicine at Columbia is using informatics to leverage the possibili-

An All-Columbia Effort on Personalized Medicine

Columbia President Lee Bollinger announced in February the creation of a University-wide task force to explore the potential of personalized medicine "to help us plan for the extraordinary promise of new scientific advances, especially in the areas of genomics, data science, and the core science and engineering disciplines for what is variously referred to as precision, or personalized, medicine."

P&S Dean Lee Goldman co-chairs the 41-member task force with President Bollinger and Provost John Coatsworth. Other members represent faculty from the four medical center schools, NewYork-Presbyterian Hospital, senior CUMC leadership, Morningside faculty and administrators, Columbia Trustees, and the CUMC Board of Advisers.

The broad membership of the task force reflects the broad scope of the field, from the exploration of fundamental issues of human self-understanding to the review of the legal, policy, and economic implications of revolutionary changes in scientific knowledge and medical practice.

The task force, says Dr. Goldman, will galvanize efforts around the science, policy, and clinical implementation of personalized medicine. "The adoption of this initiative by President Bollinger and the entire university is an affirmation of the vision of our faculty, who made this the top scientific priority in our strategic plan. With the commitment of all of Columbia University, we have the opportunity to broaden the intellectual approach to personalized medicine within Columbia and beyond. I can think of no better way to harness Columbia's scientific and intellectual prowess in support of our mission to advance knowledge and health."

Columbia is not the first university to call attention to personalized medicine, says Dr. Goldman, but "Columbia is the first major university to bring together the full breadth and depth of the entire university to advance it. The energy that comes from this initiative will galvanize work across multiple disciplines that might otherwise not be so well coordinated."

The task force will extend the effort beyond Columbia by working in partnership with NewYork-Presbyterian Hospital, the New York Genome Center, and the New York Structural Biology Center. The task force's full membership list is available at the magazine's website, columbiamedicinemagazine.org.

ties inherent in the electronic medical record. "This is about being able to take very complex data and analyze it, but it's also about supporting physicians or other providers, in real time, to make the right decisions for the patient," she says. That can be accomplished by pre-populating electronic medical records with both patient-specific and disease-specific genetic and genomic information. "Through an electronic medical record—the EMR—you can help clinicians understand this information and integrate it. You don't distract them with useless information. And they don't forget it over time; it comes to them, they're reminded of it, it taps them on the shoulder."

In the Department of Biomedical Informatics, Dr. Tatonetti is adapting algorithms he developed for the FDA's Adverse Event Reporting System to the EMR. "The goal will be to do a variety of predictive analytics where we dynamically identify patient groups and cohorts," says Dr. Tatonetti. "Then we customize predictive models to anticipate what adverse drug effects they might encounter, or who might be required to return to the hospital, or who might have the best outcomes for a particular drug."

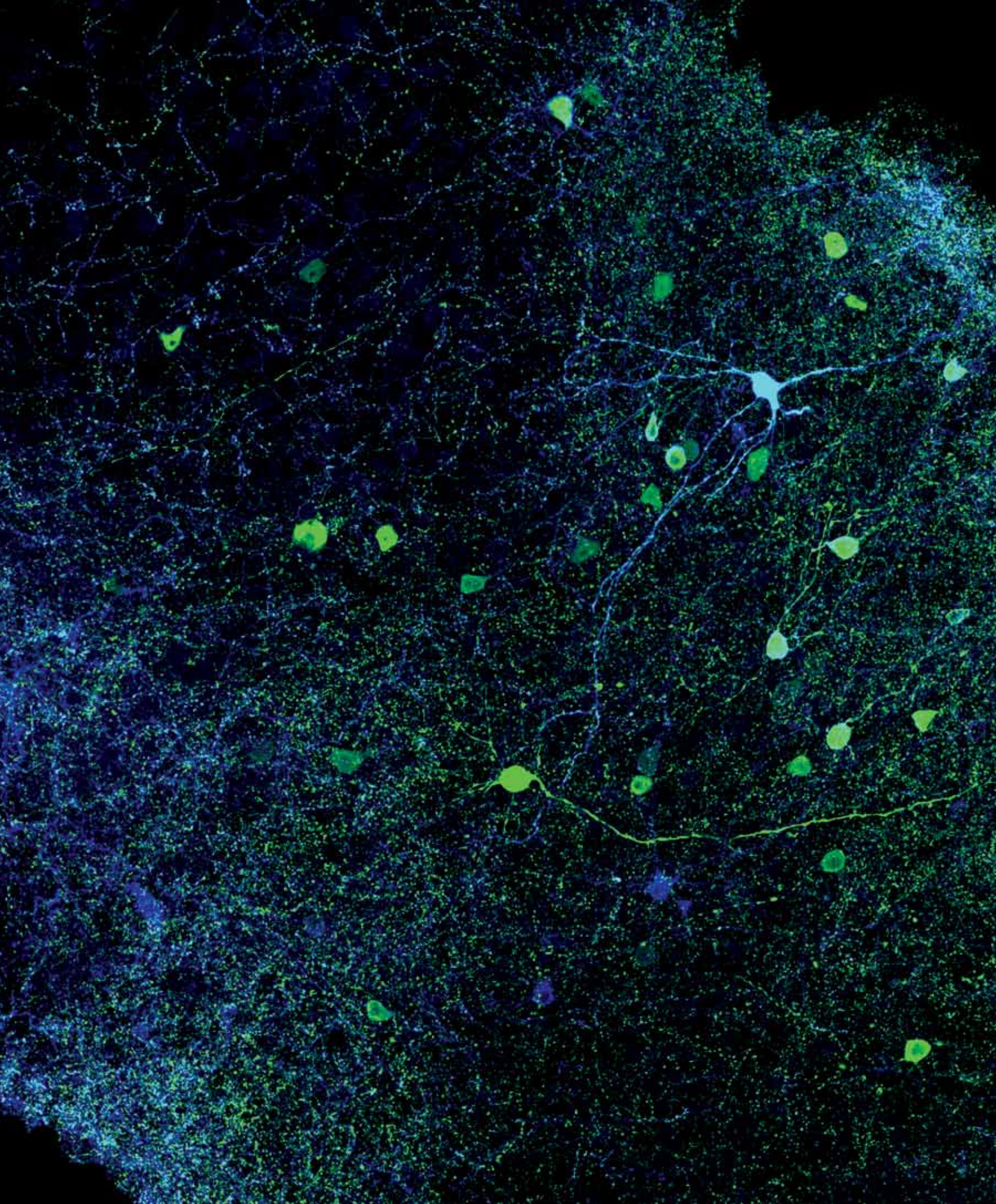
Advances in personalized medicine have, of course, raised complicated ethical and administrative considerations in terms of patient care and communication. "When you start generating an entire genome's worth of sequence on a person, the question becomes, what does the patient want to know from that?" says Dr. Chung. Some patients may want to know everything, some may want to know nothing, and others may opt to get information in stages, as public awareness evolves and as personal interest in what they want to know changes as they age. "There are some real ethical puzzles that we're dealing with right now in trying to think through, as well as provide, mechanisms to do this in line with patient preferences—to make sure we understand what they want and to give them the correct information," says Dr. Chung.

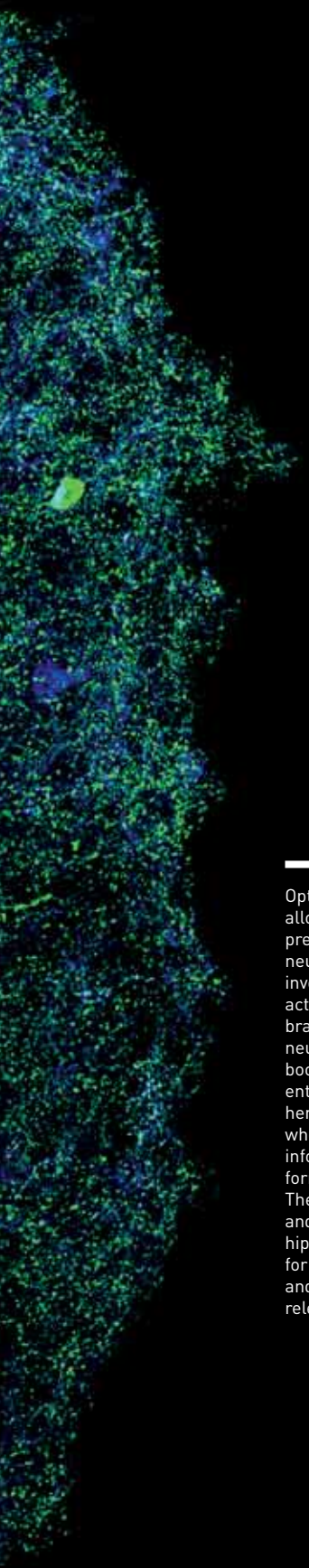
Resolving these types of issues will become more pressing if sequencing technologies and personalized medicine continue to advance at the current pace—as most researchers expect that they will. Dr. Tatonetti is optimistic about what these advances mean for the medical center. "Down the road, we can really leverage this new technology that we've been installing in the hospital and the clinic to make this vision of a learning health center a reality, where we are constantly changing and adapting our clinical practice to suit the needs of the patient population at that second," he says. That fluidity, he adds, would also include trials. For example, if he had a hypothesis about a new drug-drug interaction that might be dangerous, he could automatically launch a trial that would reside in the clinical record, monitoring patients as they are prescribed these drugs, even suggesting to physicians who want to participate that they can adapt their behaviors. "We can monitor those behaviors over time. Instead of taking five or 10 years for us to identify a new drug interaction, it could take months, or less than a year."

Dr. Chung believes that Columbia's emphasis on personalized medicine has an implicit advantage in the medical center's diverse patient population. "That really gives us tremendous opportunities in terms of the practical impact of this," she says. "We have the ability to make this very widely accessible, based on differences in race and ethnicity, in socioeconomic levels, in educational levels, in cultural backgrounds. Because if we can make it work here, you can make it work anywhere." ❖

P&S Strategic Plan:
bit.ly/PSstrategicplan

Andrea Crawford contributed writing to this article.





THE OPTOGENETICS REVOLUTION

By Keely Savoie

ILLUMINATING THE BRAIN'S BLACK BOX

A mouse enters an environment that it previously learned to associate with a mild footshock. It freezes, crouching in anticipation of an electric shock. But then, a fiber optic filament beams light deep into its brain, shutting off the neurons that encoded this fear memory. The mouse begins its normal investigation of the environment, all traces of fear erased with a flash of light. This is the power of optogenetics: the ability to switch neurons on or off with light and to map, with exquisite precision, the neural circuitry of the brain.

Since the advent of modern neuroscience, scientists have sought to understand how the billions of neurons in our brains act separately but in concert to create what we experience as learning, thinking, memory, and behavior. However, the endeavor to understand the intricacies of the functioning brain has long been limited by the difficulty of observing and manipulating neurons as they work together in a live, behaving animal.

"Understanding how the 100 billion nerve cells in our brain function to generate sensation, movement, memory, and thought is one of the most fascinating and challenging problems in science," says Steven Siegelbaum, PhD, chair of neuroscience at P&S.

Until recently, even the most precise tools for investigating living, functioning brains, including fMRI, could only yield images of neuronal activity

Optogenetics technology allows scientists to identify previously unknown neuronal connections involved in regulation of activity between two distinct brain areas. Inhibitory neurons send memory-boosting signals from the entorhinal cortex (shown here) to the hippocampus, where multisensory information converges to form long-term memories. The balance of excitatory and inhibitory signals in the hippocampus is important for the discrimination and storage of only relevant information.

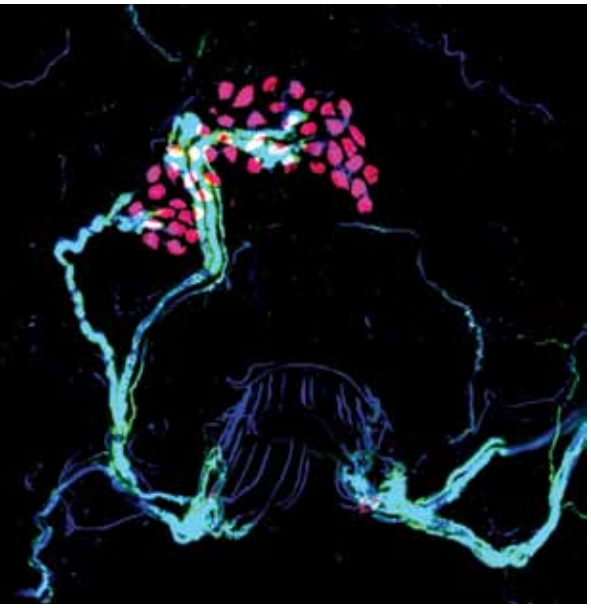
Images by Jayeeta Basu and Stephanie Cheung

on a large scale—what René Hen, PhD, professor of neuroscience and of psychiatry, calls "blobs of brain consisting of many cell types." At the other end of the spectrum, researchers interested in the function of a single type of neuron were limited to recording electrical signals from a candidate cell with a microelectrode and then painstakingly hunting down its synaptic partner with a second electrode. Only after the experiment was over would microscopic imaging of fixed brain slices reveal which neuron type had been probed.

Those who wished to experimentally manipulate the brain were similarly stymied, limited to crude and irreversible techniques such as removing tissue and observing the effects or using genetically engineered mouse models. Selective and reversible activation or deactivation of specific populations of neurons simply was not possible.

Today, the field of optogenetics has changed all that. Optogenetics allows researchers to insert light-sensitive molecules, called opsins, into specific populations of neurons. Then, with light beamed in through fiber optic strands, researchers can turn those neurons on or off with millisecond precision.

Optogenetics is not just for brain scientists. Sensory neurobiologist Ellen Lumpkin used the technique in skin cells for the first time, revealing new insights about the way we are able to sense fine details and textures with our fingertips. She recently discovered that skin cells called Merkel cells (labeled pink) work together with neurons (light blue) to transmit information about touched objects to the brain. Learn more at bit.ly/merkelcells



KARA MARSHALL

"Optogenetics has given us a whole new way of controlling different types of neurons," says Dr. Siegelbaum. "Neuroscience is now at the point where advances in mouse genetics, imaging, and the development of molecular tools such as optogenetics have converged to give us an unprecedented chance to gain insight into how the brain functions and how alterations in brain function underlie neurological and psychiatric disease."

Lowly Beginnings

The unlikely stars of optogenetics are light-sensitive proteins from lowly archaebacteria and single-celled algae—pond scum. Decades before a practical application was developed, scientists had been probing the secrets of opsins, proteins found in these organisms that span the cell membrane and respond to light by either opening or closing ion channels—which, conveniently, can trigger the neural code for "on" or "off."

In 2005, Karl Deisseroth, Edward Boyden, and Fen Zhang at Stanford published an article demonstrating that the gene for an opsin called channelrhodopsin could be inserted into selected neurons and used to switch those neurons on with a pulse of blue light. Soon, halorhodopsin was found to exert the opposite effect, turning selected neurons off with a pulse of yellow-green light. The field of optogenetics was born.

Since those early days, many new and improved optogenetics molecules have joined the list. "Optogenetics has led to a new level at which we can probe and understand how the brain works," says Dr. Siegelbaum. "It is the perfect tool in every way for what many of us at Columbia are trying to do in terms of understanding how neural circuits control behavior."

Understanding the Physiology of Memory

One of the most basic functions of the brain is processing and storing information. Memory is the foundation of our consciousness. It informs not just our remembrance of the past, but also our expectations of the future, our hopes, our fears. Ultimately, memory is the basis on which we form our understanding of the world.

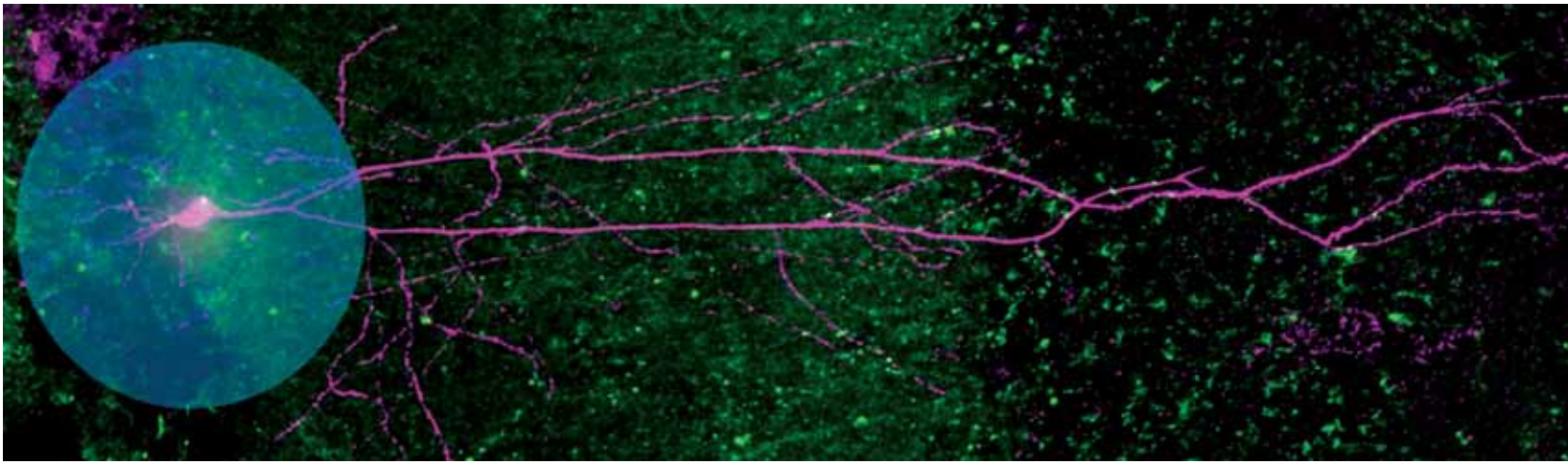
The hippocampus—a seahorse-shaped region in the brain—is known to be associated with learning and memory, but precisely how it stores and retrieves information is not fully understood. Much of what we know about the hippocampus predates the use of optogenetics and has relied on painstakingly laborious research techniques. Optogenetics has given researchers interested in understanding the formation of memory a powerful new way of understanding the most basic questions about how the brain works.

Like the rest of the brain, the hippocampus is comprised of many different types of neurons. More than 80 percent are excitatory neurons, which tend to activate the other neurons in their networks. But while the number of inhibitory neurons, or interneurons, is relatively small, they fall into many different categories, each different type modulating the effects of excitatory neurons in a specific manner. "If you want to understand how the hippocampus processes episodic information and generates memory, you must understand how these different types of neurons interact while a memory is being formed," says Attila Losonczy, MD, PhD, assistant professor of neuroscience.

Using optogenetics in combination with an advanced imaging technique called two-photon microscopy, Dr. Losonczy recently looked at how interneurons influence the formation of fear memories. When neurons are active, they accumulate calcium. In mice that are genetically engineered to express calcium-sensitive fluorescing proteins, those activated neurons produce a tiny flash of light. "Two-photon imaging allows us to track the activity of individual neurons during the course of learning—and we can perform this imaging for days to weeks because the calcium-sensitive fluorescing sensor is permanently expressed in the neuron," he says.

This technique has enabled Dr. Losonczy to identify which of the myriad interneurons in the hippocampal circuit are activated in contextual fear learning—a well-validated technique for investigating memory in mouse models.

His findings, reported in the Feb. 20 issue of the journal Science, show that not all types of interneurons in the hippocampus are equal. He found that interneurons that innervate the dendrite, or input channel, of excitatory neurons were especially important in generating memory. "When we silenced these neurons, we found the animal was not able to learn and remember the context where a fearful event occurred. Moreover, the precise temporal resolution of optogenetics allowed us to reveal that these interneurons play their key role during the presence of the fearful stimulus," says Dr. Losonczy. "On the other hand, when we



New hippocampal microcircuits involved in long-term synaptic plasticity, the cellular basis of episodic memory formation (the memory of people, places, and events), were discovered using optogenetics. By shining light (blue dot) in hippocampal slices, Jayeeta Basu, PhD, an associate research scientist in Dr. Steven Siegelbaum's lab, turned on local inhibitory neurons, revealing their inhibitory effect on CA1 pyramidal neurons (pink, the principal hippocampal output neurons). Adapted from Basu et al., Neuron 2013.

manipulated the activity of the interneurons that innervate the cell body, there was no deficit in contextual fear learning."

The findings were the first confirmation of what had previously only been speculated. "Prior to using optogenetics, we did not have tools in our hands to look so specifically at the activity of those interneurons during learning with such precise temporal resolution," says Dr. Losonczy. "Now is a very exciting time because we are developing the tools to be able to answer questions people have been trying to answer since the advent of neuroscience and answer them in a more precise, specific way. This is a huge step forward, but we are just at the beginning of this journey."

The Physiology of Forgetting

Determining how memories are formed is a crucial step in understanding how the brain works. But where are those memories stored in the short and long term? What is happening in the brain when memories fade? And can the cumulative failures of memory that creep in with age and disease be stopped or reversed?

Christine Ann Denny, PhD, assistant professor of psychiatry and recipient of the NIH's prestigious Early Independence Award, uses the power of optogenetics to gain a deeper understanding of how and why memory fails. Dr. Denny focuses on how the brain encodes and retrieves short- and long-term memories and why memory breaks down in memory-related disorders such as depression and Alzheimer's disease. She focuses on two subregions of the hippocampus known to be directly involved in the formation of new memories, the dentate gyrus and CA3.

"I want to characterize memory traces—what happens when an animal learns as opposed to when it doesn't learn? What happens when it learns but cannot retrieve the memory? Where are the impairments in aging or in Alzheimer's disease?"

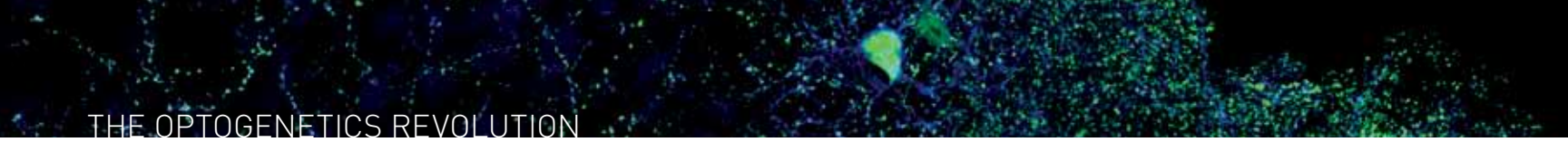
During her graduate work at Columbia in the laboratory of Dr. Hen, Dr. Denny developed a genetic mouse line that enabled her to permanently express a fluorescent label in the neurons that were activated during a particular memory. As she trained mice to fear a particular context, she was able to tag the cells that participated in learning with one color. Later, when the mice were re-exposed to the same fearful context, she was able to label the cells that were activated in memory retrieval with another color. The cells that had overlapping labels represent what she calls a memory trace.

The permanence of these labels has allowed her to look beyond the typical short-term window for studying memory traces and, therefore, she is able to see that the memory traces in the hippocampus become fainter over time, even though conditioned behaviors persist. "This indicates that the memory is not as reliant on the hippocampus for behavioral expression and has possibly been redistributed to other areas of the brain," she says.

> 'I want to stimulate cells using light to see if I can help them stay alive and improve memory. If you can acutely fix a memory impairment using this paradigm, can you chronically stimulate them with light to keep them alive and active?'

She hopes that discovering how short-term memories become long-term memories—and where those memory traces go when they are no longer as reliant on the hippocampus—will shed light on how aging and Alzheimer's disease impair both kinds of memory. The work also may lead to new interventions. "Alzheimer's disease has both short- and long-term memory loss. You can forget where you put your keys but you can also forget the names and faces of your children. I want to characterize how different memories are stored and retrieved and where the dysfunction occurs in memory-related disorders," she says.

If these weaker memories are not being accessed properly, can the neurons that encode them be selectively stimulated using optogenetics techniques? "I want to stimulate the cells using light to see if I can help them stay alive and improve memory," says Dr. Denny. "I want to know if you can acutely fix a memory impairment using this



paradigm. If so, can you chronically stimulate them with light to keep them alive and active?"

Karen Duff, PhD, professor of pathology & cell biology (in psychiatry and in the Taub Institute for Research on Alzheimer's Disease and the Aging Brain), sponsored Dr. Denny's NIH award to recruit new investigators with optogenetics experience to the Alzheimer's disease field. Her program explores how Alzheimer's disease interferes with memory and how optogenetics might point to new therapeutic interventions. "We're coming more from the translational side with the hope that stimulating the brain might help dementia patients. One issue we face is what happens in a degenerating brain cell when you try to stimulate it," she says. "Can you stimulate a cell that is sick and still improve its function, or boost the activity of surviving cells in a degenerating brain to compensate for those lost to the disease?"

In Alzheimer's disease, for reasons not yet fully understood, the brain accumulates beta amyloid plaques and tau tangles. "At the same time we see these plaques and tangles building up, the cells and the synapses start to degenerate," says Dr. Duff. "Ultimately you lose connections."

In the early stages of the disease, cells are lost in the entorhinal cortex, a key conduit between the neocortex and the hippocampus. Initially patients typically present with mild memory loss but progress to profound impairment. Dr. Duff and her colleagues specifically look at the entorhinal cortex-hippocampal circuit to try to understand the precise causes of the initial problem. "With optogenetics we can investigate dysfunction in this circuit in novel mouse models with Alzheimer's disease pathology, looking at what happens with memory in the earliest stages of the disease," she says. "Maybe if you can tweak that stage of the disease, you could defer the disease progressing to the stages where memory loss becomes debilitating."

Here is where Dr. Duff calls her future ambitions "a little science fiction-y." Once the circuits involved in memory are more clearly understood, Dr. Duff wants to determine if targeted electrical stimulation of the brain could help prevent or reverse memory loss—or even retrieve receding memories in patients with Alzheimer's disease, just as fear memories can be reactivated in mice using optogenetics. "As a short-term fix, what if you could boost the ability of a person's brain to function whilst you train it on certain things that the patient wants to remember?" she asks. "What if you didn't train someone to remember a fear memory as they did in the mice experiments, but the memory of a loved one's face, for example, or key landmarks that would allow a person with dementia to better remember their local environment?"

While optogenetics is not currently a practical way to stimulate human brain cells, deep brain stimulation (DBS) or transcranial stimulation using electrode wires is being used clinically, especially for Parkinson's disease, and is being tested for therapeutic potential in Alzheimer's patients. "Although it is not known how these stimulation therapies work in humans, in theory they do the same thing to the cell as optogenetic stimulation. They can stimulate neural activity by depolarizing the cell," she says. "Optogenetics allows us much finer control over what populations of cells and circuits are stimulated compared to DBS but the information gathered can then be applied to the more practical therapeutic tools. However, whether stimulation can rescue or prevent memory loss in a diseased brain is a big unknown that we will have to look at in our mouse models."

Learning, memory, and anxiety are clearly linked but the connection has never been fully understood on a neural level

Learning, Anxiety, and Depression

Memory malfunction comes in many forms besides loss of memory. Take anxiety, for example. On one hand, remembering and correctly identifying dangerous contexts are important adaptive traits—learning to identify risk can prevent you from blithely tripping into unsafe situations again and again. On the other hand, overgeneralized fear can lead to anxiety even in safe situations, with emotionally disabling consequences.

While learning, memory, and anxiety are clearly linked, the connection has never been fully understood on a neural level. With optogenetics, questions that were once the province of philosophy and psychology are now the domain of neuroscience. René Hen, PhD, professor of neuroscience and of psychiatry, and Mazen Kheirbek, PhD, assistant professor of clinical neurobiology in psychiatry, use the technique to dissect how learning, memory, and anxiety are linked in a portion of the hippocampus called the dentate gyrus.

"In the past, the problem has been that the neurons of the hippocampus send projections to many parts of the brain, so when you stimulate them you also get activation in all of these downstream structures," says Dr. Hen, who is also a member of the Kavli Institute for Brain Science. "With optogenetics you can tease apart which of the many areas are important. We couldn't do this work without the genetic trickeries and the panoply of optogenetics tools we have developed."

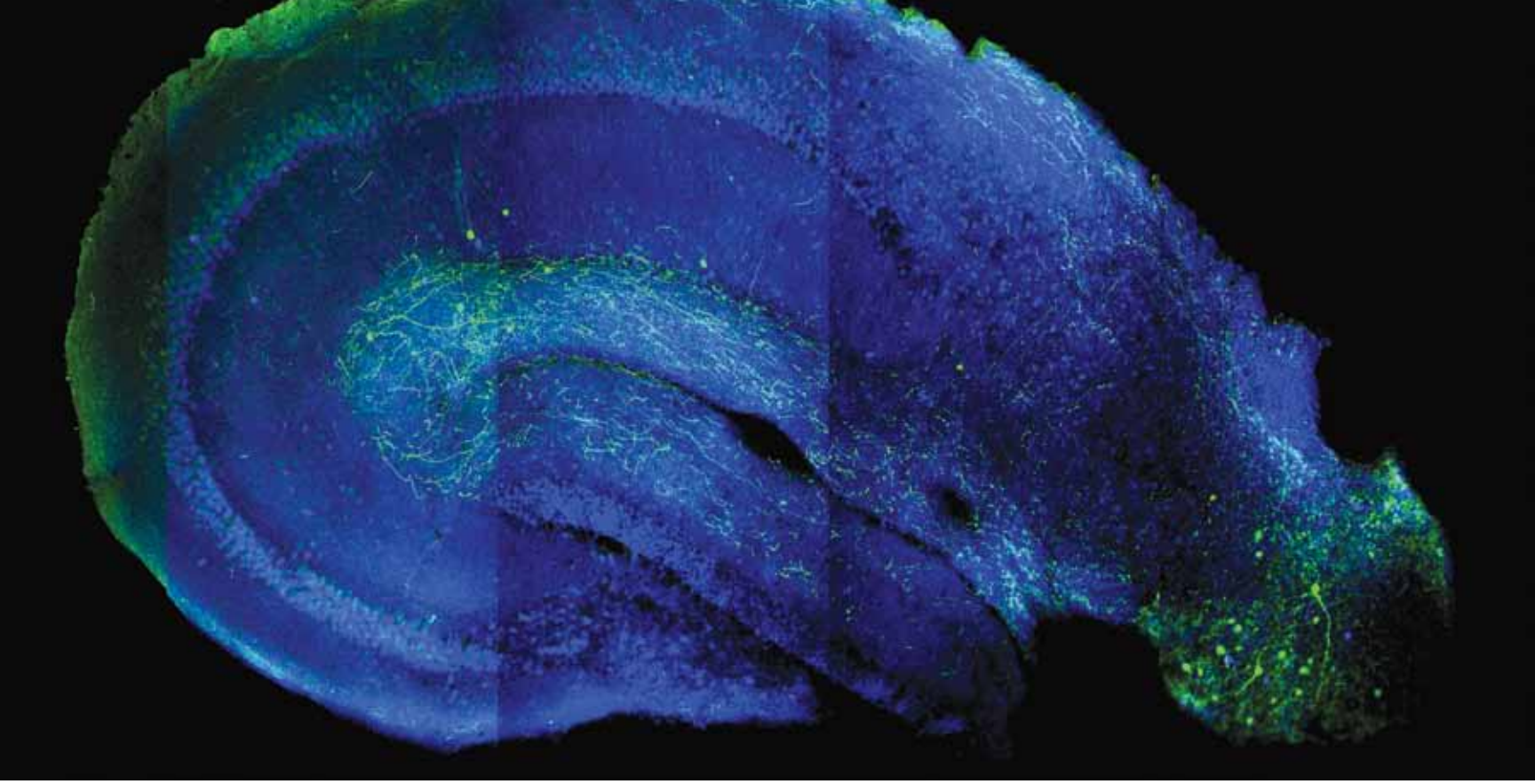
Recent findings published by the Hen lab show that the link between learning and anxiety has a physical location along the dorsal-ventral axis of the dentate gyrus. When the neurons in the dorsal portion of the dentate gyrus were stimulated, learning was disrupted and exploratory activity increased. But when the same type of neurons were activated in only the most ventral part of the region, anxiety was reduced without affecting learning.

"We were able to show that cells that otherwise look the same had different functions according to their location in the dentate gyrus," Dr. Hen says. The findings have therapeutic implications for post-traumatic stress disorder and anxiety or panic disorders, pointing to another potential use of deep brain stimulation, which is used for Parkinson's disease and some other disorders but is not FDA-approved for treating anxiety-related disorders.

The Hen lab is also investigating the role of adult neurogenesis in depression and anxiety. "New neurons are born in parts of the adult hippocampus, and we are trying to test the role that these adult-born cells play in learning, memory, and mood. Using optogenetics allows us to control those cells in real time while the animal is behaving, to understand how they play a role in learning and memory as well as how they play a role in the anxiety state of the animal," says Dr. Kheirbek, who was among the first researchers at P&S to use the optogenetics research technique and brought it into the Hen lab as a postdoctoral fellow.

Their initial findings suggest that the adult-born neurons play a critical role in defending against anxiety. "If you turn off those new neurons you lose the ability to distinguish between fearful and safe situations," says Dr. Kheirbek.

The larger goal of the Hen lab is to find a way to treat psychiatric disorders using the information they glean. "In the big picture, this knowledge



The power of optogenetics allows neuroscientists to functionally map neuronal connections across brain regions using acute brain slices. Previously, long-distance circuitry was challenging to study in slices because slicing severs connections. Optogenetic stimulation can activate even the severed projection axons at their target sites, allowing researchers to trace circuit pathways between different interconnected brain areas. Such techniques allowed Dr. Basu to uncover a "disinhibitory" long-range projection (green) from the entorhinal cortex (lower right) to the hippocampal CA1 (center) that is important for gating dendritic spikes, somatic plasticity, and contextual learning.

will allow us to develop novel antidepressants and novel anxiolytics," says Dr. Hen, who works with pharmaceutical companies to identify therapeutic strategies that can increase the population of new neurons within the hippocampus.

Fear Factor

Although many neuroscientists look in tiny areas of the brain to focus their attention on circuits that are involved in specific neural processes, many of those processes span multiple structures of the brain that interact with one another in complex ways that scientists are only beginning to grasp. Even subtle changes in the way these regions interact with each other can lead to different behaviors.

When it comes to determining whether a situation is safe, for example, the amygdala and the prefrontal cortex are involved in a complex sort of competition, says Joshua Gordon, MD, PhD, associate professor of psychiatry. The determination of whether a situation is deemed safe is ultimately made by whether the amygdala or the prefrontal cortex leads the interaction.

To elucidate this relationship, Dr. Gordon trains mice to associate a specific tone—the fear tone—with receiving a mild shock. The same mice learn to associate a different tone—the neutral tone—with *not* receiving the shock. Then, using microelectrodes that can detect the electric current from a single neuron firing, Dr. Gordon applies mathematical modeling to identify the order in which neurons are activated from different regions of the brain. "After training, we found that both tones engaged synchrony between the prefrontal cortex and the amygdala," he says, "but only the fear tone caused freezing."

His preliminary data have shown that when the fear tone was played, the amygdala fired first, leading the prefrontal cortex. But in response to the neutral tone, the prefrontal cortex led the amygdala, "as if it was telling the amygdala, 'It's OK. You're safe,'" he says. "There is this back-and-forth, and whichever region wins will determine the behavior."

The lab is now engaged in optogenetics research that selectively silences either the amygdala or prefrontal cortex, essentially fixing the results of the contest. "It used to be that we would just make the hypotheses, but without optogenetics we would have no way of proving that, yes, there's this competition that's taking place," says Dr. Gordon. "Now we can influence the competition. We can silence the prefrontal cortex and take that end of the competition away to see if the animal is more afraid than it should be." He is currently analyzing the electrophysiological data from such an experiment in which they silenced the soothing input from the prefrontal cortex and let the amygdala take charge. "We expect that this will cause the animal to inappropriately freeze in response to the neutral tone. That has implications if we can find out how mice—and people—suppress fear responses. We can hope to use that in patients with anxiety disorders."

A Brighter Future for Neuroscience

Optogenetics—whether described as a method, technology, application, or revolution—provides a new array of opportunities to explore the brain. "This field did not even exist when the current millennium began," says Dr. Siegelbaum, "yet from a lowly product of nature we now have the underpinnings of a method that will provide a precise means of stimulating or inhibiting local brain regions, offering the hope of both a better understanding of neurological and psychiatric diseases, as well as, perhaps, novel treatments for these disorders." Optogenetics is the illuminating power source of this new revolution in brain science. ❖

Redefining Diversity
in Broader Multicultural Terms

BALSO Young Docs

Me Too Monologues

PHOTOS BY MICHAEL HERNANDEZ'17
PORTRAITS BY JÖRG MEYER

Office of Diversity is now Office of Diversity and Multicultural Affairs | By Jen Uscher

BALSO Young Docs


Lunar New Year Celebration

Redefining Diversity
in Broader Multicultural Terms

P&S students took breaks from their studies in recent months to learn Chinese calligraphy and paper cutting techniques, join in traditional Indian dances, and listen to an all-female mariachi band while sampling locally made Dominican food, part of an effort to raise student awareness of different cultures.

It is part of a "rebranding" of the P&S diversity office into a place where students from throughout the medical center can organize activities that will allow them to experience, celebrate, and appreciate the multicultural nature of their classmates, patients, and neighbors. Previously focused on underrepresented minority affairs, the office now has a broader reach and a new name: the Office of Diversity and Multicultural Affairs.

"Students told us that that they would like us to expand our programming to include even more cultures within the medical center community. We're starting to address their needs in a more comprehensive way," says Hilda Hutcherson, MD, P&S associate dean for diversity and multicultural affairs and professor of obstetrics & gynecology.

Starting last fall, Dr. Hutcherson and her team reached out to several student cultural and spiritual groups and offered to cosponsor events. Most of the ideas for programming originate with student groups, and the staff of the Office of Diversity and Multicultural Affairs provides funding and assistance to plan, promote, and run each event.

"Me Too Monologues" gave students a forum to share their personal stories about identity, including race, gender, sexuality, religion, class, and nationality

"We're giving medical, dental, nursing, public health, and PhD students the chance to come together, learn about each other, and have fun together. There aren't too many opportunities on campus for that to occur," says Dr. Hutcherson.

One of the popular recent gatherings was a celebration of Diwali, the Hindu Festival of Lights. Held last October, it was presented by the South Asian Health Sciences Association and showcased cultures from all over India through food, dance, and henna painting.

The Medical Center Jewish Association also has hosted programs, including a kosher Shabbat dinner last September that drew more than 150 CUMC students. Lauren Arnold'16, who was co-president of the association for 2012-2013, explained the Shabbat rituals and answered questions at the dinner. "Many of the people who attended had never tried kosher food or celebrated Shabbat before," Ms. Arnold says. "They said we created a welcoming space for them to learn while having a good time."

Later in the fall, the group hosted a talk on Jewish medical ethics by Kenneth Prager, MD, chair of the NewYork-Presbyterian Medical Ethics Committee and professor of medicine. Dr. Prager discussed how rabbinic law applies to medical practice and end-of-life care.

Students from across campus also attended a talk last September called "Trans Health 101" presented by the Lambda Health Alliance, an organization that provides support and programming for gay, lesbian, bisexual, transsexual, and queer students and faculty. Dr. Laura Erickson-Schroth, editor of the book "Trans Bodies, Trans Selves," spoke about the health issues faced by transgender people and the role of professionals in providing health care to transgender patients.

Many of the events now supported by the Office of Diversity and Multicultural Affairs have been traditions at Columbia—Columbia Hispanic Heritage Month and the Lunar New Year Celebration, for example—but now have been expanded to include participants from outside the individual organizations.

In addition to supporting existing events, the Office of Diversity and Multicultural Affairs also supports new events, including this spring's theatrical production called "Me Too Monologues." The production was staged to give students a safe forum to share their personal stories centered on concepts of identity, including race, gender, sexuality, religion, class, and nationality. "Me Too Monologues" was intended to celebrate individual experiences in hope of finding common ground, says Steven Li'17, who directed the performance of student actors who brought to life stories that medical center students submitted anonymously.

Other new diversity initiatives focus on providing academic support to students. For example, to help new students prepare for their first semester at P&S, the Office of Diversity and Multicultural Affairs offered a pilot prematriculation program during the summer of 2013. Most of the students who participated in the two-week program had attended CUMC's pipeline programs designed to enhance opportunities for underrepresented minority and socioeconomically disadvantaged high school and college students who aspire to careers in health care.

Members of BALSO—the Black and Latino Student Organization—who finished their first year at P&S taught the new students in the prematriculation pro-

gram about the curriculum and shared tips on the transition to medical school.

"We learned about the core material we would be presented with during the first semester, study techniques, and pointers on what to focus on," says Michael Hernandez'17. "I referred to the notes once school started and I appreciated that rising second-year students gave us reassurance that we could get through the first semester. It would be difficult, but it would be OK."

The Office of Diversity and Multicultural Affairs will evaluate the prematriculation program to determine whether it helps boost academic performance.

Two members of the class of 2017 who were alumni of CUMC pipeline programs served as teaching assistants in two pipeline programs during the summer of 2013. Mr. Hernandez taught and mentored students in the Summer Medical and Dental Education Program (SMDEP), the six-week residential program offered at Columbia since 1989. Mr. Hernandez attended the program when he was a junior in college and credits it with teaching him how to apply to medical school. He says he valued the chance to offer reassurance to students preparing to go through that process.

Pliceliany Perez'17 served as teaching assistant for both the SMDEP and the Northeast Regional Alliance MedPrep Scholars Program. Intended to help socioeconomically disadvantaged college freshman and sophomores from New York City and New Jersey become more competitive in applying to medical school, NERA MedPrep is a six-week summer enrichment program. Students enroll in the program for three summers. Ms. Perez attended another pipeline program, P&S Strategic Testing Application Techniques, a four-month weekend academic enrichment program that also helps prepare college students to apply to medical school.

She keeps in touch with students she mentored over the summer and offers them encouragement and advice. "I want to give students who come from a background similar to my own the sense that it's possible to get into medical school," she says. "I tell them if I could do it, you can do it too."

BALSO created an outreach program called Young Docs that targets elementary students in the community. Once a month, P&S student volunteers visit an underresourced elementary school in Washington Heights or Inwood. Wearing white coats and carrying stethoscopes and skeleton models, they teach the students about the human body and what it is like to become a doctor.

"These students don't necessarily have access to people who have been successful in the health sciences field," says Danielle Pottinger'16.

JÖRG MEYER

Hilda Hutcherson, MD

"We're trying to galvanize an interest in health sciences from an early age and offer ourselves as role models."

Last December, Young Docs hosted its first science competition for high school students. Open to ninth and 10th graders from throughout New York City, the competition was held in Bard Hall and cosponsored by the Office of Diversity and Multicultural Affairs. Students signed up in teams of two and were asked to construct a 3D model of the human heart and label a hand-drawn schematic of the internal heart structure on a tri-fold poster board. They also chose a heart disease, explained its pathophysiology, and described a treatment for it. Trophies and cash prizes were awarded to the top three teams and all participants received medals.

"We thought it would be empowering for the students to come to the Columbia campus and meet faculty and administrators here. These people could be potential mentors and contacts for them in the future,"


Michael Hernandez'17

PORTAITS BY JÖRG MEYER


Lauren Arnold'16


Christopher J. Gonzalez'16

says Ms. Pottinger. She adds that BALSO would like to make the science competition an annual event and to expand it to include more student teams.

When applicants to P&S arrive on campus for interviews and return for a second look on revisit weekend, Dr. Hutcherson tells them about the school's diversity initiatives and the many opportunities to get involved with community service activities, including Young Docs or pipeline programs. "Some students have said it's one of the reasons they decided to enroll at P&S—the opportunities to give back to younger people who may not be as privileged as they are," says Dr. Hutcherson.

Members of BALSO reach out to prospective students who self-identify on their applications as underrepresented minorities and meet with them when they visit campus.

"Students can see during interview day that there is a welcoming minority community here," says Christopher J. Gonzalez'16, who served as president of BALSO for 2013.

More and more, leaders of individual cultural and spiritual organizations on campus are attending each other's events and coming together to create events. Last December's Taste of the World Night Market, for example, featured 20 student-curated tables with food and drinks from around the globe and drew more than 300 people.

Students provided tasting portions of such delicacies as Native American frybread, Armenian kebabs, noodle kugel, Jamaican jerk chicken and beef patties, Chinese spicy prawns, Egyptian stuffed grape leaves, Sudanese eggplant moolah, and Mexican hot chocolate. They also shared information on the cultural significance behind each dish.

"Using food as a stepping point from which to talk about our backgrounds was amazing," says Ms. Arnold, one of the organizers of the event, held in Bard Hall. "I think the reason it was so successful is that five different student groups—the Asian Pacific American Medical Students Association, the Muslim Student Association, the South Asian Health Sciences Association, BALSO, and the Medical Center Jewish Association—came together with the Office of Diversity and Multicultural Affairs to work on it and that brought a lot of richness to the program."

'We are trying to train physicians and other health care providers to be more understanding of different cultures because the patients they will take care of will be of various cultures and backgrounds.'

— Hilda Hutcherson

Steven Li'17

Pliceliany Perez'17

Other events are being planned with the Association for Native American Health, the Columbia Christian Fellowship, and the CUMC Muslim Student Association. These events allow students to explore other cultures and begin a dialogue about cultural differences in a way that is fun and not intimidating. Dr. Hutcherson says one of the goals of the expanded Office of Diversity and Multicultural Affairs is to continue to support similar new programs that will help students develop cultural competence.

Anne Taylor, MD, the John Lindenbaum Professor of Medicine at CUMC and P&S vice dean for academic affairs, is a leader in faculty mentorship and at P&S is heading efforts to increase the numbers of women and underrepresented minorities in the faculty ranks. "Diversity encompasses much more than simple parameters of race/ethnicity and gender. It also includes culture/ethnicity, religious practices, disability status, sexual orientation, socioeconomic status, and other differences. The first person in a family to graduate from college and go on to medical school brings a different experience than someone who comes from a multigenerational family of professionals. Because P&S is a preeminent medical school with community, national, and global impact, educating our students in an environment that is inclusive prepares them to function in the global community. It clearly signals to the world that Columbia is a welcoming environment that enhances our ability to recruit the most talented students, trainees, and faculty in the world."

"Our medical school and our medical center are judged by the impact our students and faculty have on people's lives, either here on campus, in the community, or beyond," says Dean Lee Goldman. "That impact will be richer and more diverse because the programs that Dr. Hutcherson has implemented will help students understand and experience cultures beyond their own. Everyone benefits from that engagement."

"Ultimately, we are trying to train physicians and other health care providers to be more understanding of different cultures because the patients they will take care of will be of various cultures and backgrounds," says Dr. Hutcherson. "And you have to feel comfortable taking care of everyone." ❖

Learn more about the "Me Too Monologues" at bit.ly/1gdT79H

Alumni News & notes

Marianne Wolff'52, Alumni News Editor
Peter Wortsman, Alumni News Writer
Additional class notes by
Bonita Eaton Enochs, Editor

1937

The Medical Research Center for Arthritis at UCSF has been renamed the Rosalind Russell-Ephraim P. Engleman Medical Research Center for Arthritis. Ephraim has been director of the center for more than 35 years and has raised more than $50 million for the center. He still comes to his office three days a week. See the accompanying article about his memoir, "My Century."

1952

Leslie J. DeGroot, Research Professor at the University of Rhode Island, is one of 15 endocrinologists selected to receive the Endocrine Society's 2014 Laureate Awards. Established in 1944, the awards recognize the highest achievements in the endocrinology field, including groundbreaking research and innovations in clinical care. Leslie will receive the society's Robert H. Williams Distinguished Leadership Award, which recognizes leadership in fundamental or clinical endocrinology. The society cited the impact Leslie's 60-year career as a scientist, teacher, clinician, textbook author, and administrator has had on the field of endocrinology. His research in thyroidology has touched almost every aspect of the discipline, including thyroid hormone synthesis and action, mechanisms of autoimmune thyroid disease, and thyroid cancer. The 2014 Endocrine Society awards will be presented at the group's annual meeting, held in June in conjunction with the 16th International Congress of Endocrinology in Chicago.

1963

The University of Tulsa rededicated its athletic performance center in 2013 as the George S. Mauerman Sports Medicine Center in honor of longtime team physician George Mauerman. George travels coast to coast with the Tulsa basketball and football teams but made time during 2013 to attend his 50th reunion at P&S.

George Mauerman'63 with daughters Heather Paris, left, and Heidi Wendland in front of the University of Tulsa building named for him

1966

At age 13, Alfred Muller appeared on the TV show, "$64,000 Question," for four weeks in January 1956. "The show was live, not pre-recorded," Al says. "It was an exciting adventure for a young high school student and my classmates. My topic was wild animals of the world, and after answering a total of eight questions—two of the questions were 1) What was the largest animal that ever lived? and 2) Where does the aye-aye live?—I had won $8,000, which seemed a fortune in those days. At that point my parents decided to stop while I had enough winnings for college and before I might give an incorrect answer. (Hard to imagine, but Princeton in those days only cost about $2,000 for tuition and board.)" After appearing on the program, Al was contacted by Dr. Fordyce Barker St. John, an alumnus of both Princeton and P&S (Class of 1909). "He heard me mention that I wanted to become a physician and would like to attend Princeton and P&S (as had my grandfather, class of 1898). Dr. St. John became my mentor and remained so until his death at age 89 in 1973. Next to my parents, he was the most important influence in my life, encouraging me through the challenges of studenthood, residency, and service in Vietnam. He epitomized the best qualities of a physician, which I have tried, not always successfully, to emulate. His friendship, and example, proved far more valuable than the quiz show winnings." Al has had a long career as an internist in the Washington, D.C., area and is now semi-retired. He hopes to make the move to full retirement later this year. Note: The answers to the questions were 1) blue whale and 2) Madagascar.

Alfred Muller'66

1969

The Endocrine Society selected 15 endocrinologists to receive its 2014 Laureate Awards. John P. Bilezikian, the Dorothy L. and Daniel H. Silberberg Professor of Medicine and professor of pharmacology at P&S, will receive the society's Distinguished Educator Award, which recognizes John's achievement as an endocrinology and metabolism educator. John has mentored a generation of trainees, been an innovator of new educational programs nationally and internationally, and worked as an advocate to recruit physicians and physician-scientists to endocrinology. He is chair of the Endocrine Fellows Foundation, a

not-for-profit organization that has provided competitive research grants to endocrinology fellows for the past 20 years. The awards will be presented in Chicago in June during the society's annual meeting, held in conjunction with the 16th International Congress of Endocrinology.

1970

See Alumni in Print to read about a new book written by Sally Kasparek Severino. Sally, who also received a psychoanalysis certificate from Columbia University Center for Psychoanalytic Training & Research in 1980, has long built bridges among psychiatry, neuroscience, and spirituality. She is professor emeritus of psychiatry at the University of New Mexico Health Sciences Center.

Sally Kasparek Severino'70

Andrew Zimmerman has joined UMass Memorial Children's Medical Center. He completed his residency in pediatrics at the University of Michigan and a fellowship in

Andrew Zimmerman'70

The Ever Ebullient Ephraim Engleman'37, Now 103, Looks Back with Pride and Joy

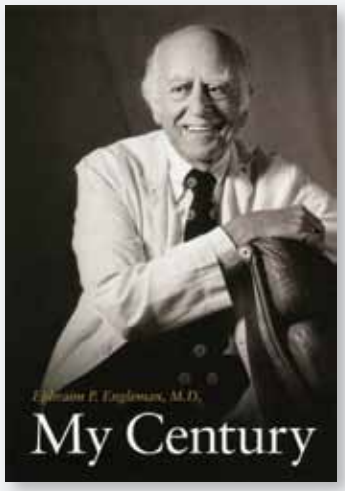
Centennials generally celebrate institutions, nations, and such. "My Century," a new memoir by the distinguished rheumatologist Ephraim P. Engleman'37, as told to Matthew Krieger, celebrates the life of a one-man institution. Age 102 at the date of the book's publication, Dr. Engleman has been saluted on national television ("NBC Nightly News" and "CBS News"), National Public Radio, the San Francisco Chronicle, and the Huffington Post, among other media outlets, and California Gov. Jerry Brown issued a proclamation, calling him "a model of longevity and strong work ethic."

Dr. Engleman still advises selected patients, sits at the head of the UCSF Rosalind Russell Medical Research Center for Arthritis, which he has directed for 34 years, and plays his Stradivarius violin. He also happens to be one of the most dynamic and positive individuals of any age. This writer had the privilege of interviewing him for an alumni profile (Spring/Summer 2009 issue) and has since struck up a friendship. Dr. Engleman still responds more promptly to emails than anyone else, typically signing off "Stay well and keep young!"

In a life that spans much of the 20th century and spills into the 21st, he started out as a violinist in the orchestra of a silent movie house and went on to a stellar career as one of the founding fathers of American rheumatology. "The longer you live, the more goodies you receive," writes Dr. Engleman. Among the goodies he received are gold medals from the American College of Rheumatology and the P&S Alumni Association, the Ephraim P. Engleman Distinguished Professorship in Rheumatology, a Medal of Honor, and the renaming of the research center he helped found as the Rosalind Russell-Ephraim P. Engleman Medical Research Center for Arthritis, at UCSF, where he has spent the greater part of his career.

So what's the secret? "The best childhood personality predictor of longevity, I was a bit surprised to read," Dr. Engleman writes, "is conscientiousness. It's so un-sexy, but it does describe me as a child and an adult." A happy marriage is right up there near the top of his list of "10 Tips on Longevity." He has been married to his wife, Jean, for 72 years and counting.

"The fourth major predicator [of longevity]," he adds, "is having good, challenging work." Training at the Joseph H. Pratt Diagnostic Hospital in Boston, affiliated with Tufts University at the time, then at Mass General, he witnessed the advent of cortisone, among other medications and innovations, and himself helped foster a veritable revolution in the treatment and care of arthritis and other joint diseases. At UCSF he was the first in Northern California to offer cortisone treatments. A past president of the American Rheumatism Association, he was elected in 1975 to chair the National Commission on Arthritis, "charged by Congress to study in depth the clinical, social, and economic effects of arthritis on American society and to recommend specific actions to improve the situation." Among the committee's recommendations, he writes, "the one I'm proudest of is the creation of the National Institute of Arthritis, Musculoskeletal and Skin Diseases."



Music is a second theme that runs throughout this memoir. A collector of vintage violins, including one dubbed the "Engleman" Stradivari, Dr. Engleman continues to perform in public. His repertoire bridges the divide between classical and popular music. His biggest stage success, he recalls, was "as a member and unofficial master of ceremonies of the Family Club in San Francisco, at age 95, imitating Mick Jagger flamboyantly dressed in wig, glasses, and leather vest, singing 'I Can't Get No Satisfaction.'"

Well, maybe Mick couldn't, but Eph sure can! Better than that, the reader is guaranteed satisfaction.

The book is available only through Amazon.com. All of the author's proceeds from book sales go to the Rosalind Russell-Ephraim P. Engleman Medical Research Center for Arthritis at UCSF.

— *Peter Wortsman*

neurology at Johns Hopkins Hospital and is board-certified in pediatrics and pediatric neurology. He has a special interest in the causes and treatment of autism. At UMass, he directs clinical trials through the medical school's autism and neurodevelopment groups.

1974

In September 2013 on Capitol Hill, John Eng was honored with the Golden Goose Award for his research on the poisonous venom produced by the Gila monster, which led to a drug that protects people with diabetes from nerve damage, kidney failure, and blindness. The Golden Goose Award was created in 2012 to celebrate researchers whose seemingly odd or obscure research funded by the federal government turned out to have a significant and positive impact on society. The ceremony was attended by members of the scientific and research advocacy communities.

1976

M. Philip Luber is professor and interim chair of the Department of Psychiatry and associate dean for graduate medical education at the University of Texas Health Science Center at San Antonio. He is a 1986 graduate of the Center for Psychoanalytic Training and Research.

M. Philip Luber'76

1979

Mary T. Bassett, a member of the faculty in the Department of Epidemiology at Columbia's Mailman School of Public Health and program director of the African Health Initiative at the Doris Duke Charitable Foundation, was appointed in January 2014 as New York City Commissioner of Health. Mary previously served in the New York City Department of Health and Mental Hygiene as deputy commissioner, overseeing programs that addressed noncommunicable diseases and maternal and child health. She also led the district public health offices in Harlem, Central Brooklyn, and the Bronx. She was quoted in a press release issued by the mayor's office: "We don't believe in a back-seat approach to protecting public health. We will be aggressive and innovative in tackling today's epidemics. Whether it is protecting a community facing the loss of a hospital or ensuring that all neighborhoods enable healthy choices as people eat, work and play, we will meet New Yorkers where they live and ensure their health—both mental and physical—is protected." Other P&S alumni who have held New York City's top health commissioner job are Haven Emerson, an 1899 graduate, who served as commissioner from 1915 to 1917; Israel Weinstein'26, who served from 1946 to 1947; and Thomas Frieden'86, who served from 2002 to 2009 and now heads the CDC.

Mary T. Bassett'79

1980

Alan Engler has become a docent and leads tours of Grand Central Terminal in New York City. The program is under the auspices of the Municipal Art Society of New York, and Alan leads tours a few times a month.

1982

See Alumni in Print to read about a book by Richard Usatine, professor of family and community medicine and dermatology and cutaneous surgery at the University of Texas Health Sciences Center San Antonio. Richard completed his family medicine residency at UCLA Medical Center. He has co-authored six books and is lead author of "The Color Atlas of Family Medicine" and "Dermatological and Cosmetic Procedures in Office Practice." He has published more than 100 peer-reviewed articles and won numerous teaching awards. In 2000, he was recognized as the national recipient of the Humanism in Medicine Award, given by the Association of American Medical Colleges.

Richard Usatine'82

1983

Tim Wang, the Dorothy L. and Daniel H. Silberberg Professor of Medicine at P&S, has been elected vice president of the American Gastroenterology Association, the largest and most prestigious GI organization in the United States. His term as vice president begins in May 2014; in 2015 he becomes president-elect before becoming president in 2016.

1986

See Alumni in Print to read about the latest book by Barron Lerner. Barron, who also has a PhD, is now professor of medicine and population health at New York University.

1988

Scott Campbell is an attending emergency physician at Kaiser San Francisco Medical Center and was recently honored by the Hospital Council of Northern California with the Hospital Hero Award for his work to improve the efficiency of emergency care delivery throughout the city. Scott has served as adviser to the mayor and the City of San Francisco for the past decade on issues related to ambulance diversion and ED overcrowding. Scott partnered with McKinsey & Company to identify root causes and execute solutions, including the creation of a sobering center, a medical respite center, and a fast-track psychiatric field evaluation protocol. He is currently president of the San Francisco Emergency Physicians Association.

Scott Campbell'88

1994

See Alumni in Print to read about a book co-edited by Calvin Chou.

Performing at Carnegie Hall...Again

Aidin Ashoori'17

First-year P&S student Aidin Ashoori is an accomplished virtuoso pianist who first showed an interest in music when he was a toddler and began studying piano at age 4. He has won local, state, and international-level piano competitions and in February performed at Carnegie Hall in New York City for the second time during an Alexander & Buono International Master Class Series Recital. His Carnegie Hall debut was in 2009 while he was an undergraduate at Rice University, where he earned a bachelor's degree in biochemistry and cell biology.

"The acoustics of the hall are impeccable," says Mr. Ashoori. "The sound projection is astonishingly rich and crystal clear, not only to the audience but also to the people on stage. This makes it very enjoyable since there would be minimized perceptional and interpretational discrepancies between listeners and performers. I am gratefully honored to perform at such a grand location and it wouldn't be possible without such wonderful support from faculty and students at P&S."

At P&S he is an active performer in the P&S Club's Musicians' Guild. He practices regularly in the practice rooms at the Bard Hall dormitory, one of which houses the Steinway piano that is said to have belonged to Sergei Rachmaninoff.

In Mr. Ashoori's life, music, science, and medicine have been inseparable. He started scientific exploration of music when he was a high school student, which led to publications in peer-reviewed journals in the areas of music, neurology, and psychiatry, two of which are titled "Mozart's movements and behavior: a case of Tourette's syndrome?" and "Movement Disorders in Musicians," under the supervision of Baylor neurologist Joseph Jankovic. While at P&S, Mr. Ashoori has studied the molecular and behavioral links of post-traumatic stress disorder under the supervision of Nobel laureate Eric Kandel. He also has investigated the electroneurophysiology of professional musicians in collaboration with David Eagleman, a Baylor neuroscientist and New York Times bestselling author, and Brian Eno, a musician and producer who has worked with artists including Coldplay, U2, and David Bowie.

Calvin Chou'94

Calvin, who also has a PhD, is professor of clinical medicine at UCSF and staff physician at the VA Medical Center in San Francisco. As a faculty member of the American Academy on Communication in Healthcare (AACH), he is nationally recognized for his efforts in education and research to enhance communication between patients and physicians. He directs VALOR, an innovative longitudinal program based at the VA that emphasizes humanistic clinical skill development for medical students. He also holds the first endowed Academy Chair in the Scholarship of Teaching and Learning at UCSF. He has delivered communication skills curricula for providers at medical centers across the country, including Mayo Clinic, Cleveland Clinic Foundation, and Stanford University; he recently returned to NewYork-Presbyterian (and the Hammer building) under the auspices of AACH to help develop a program to enhance communication skills training for faculty to bolster patient experiences of care.

1995

Daren Anderson received the Primary Care Leadership Award at the sixth annual Primary Care Summit, hosted by the Connecticut Center for Primary Care on Nov. 21, 2013. Daren was honored for his leadership in quality improvement in primary care. He is vice president and chief quality officer for the Community Health Center Inc. of Connecticut and director of the Weitzman Quality Institute in Middletown, Conn.

Daren Anderson'95

2010 + 2011

During the 2014 Steven Z. Miller Student Clinician's Ceremony in January, Emily Vail'10 received one of the six Arnold P. Gold Foundation's Resident Teaching Awards given by the Class of 2015. Emily is a resident in anesthesiology at NewYork-Presbyterian. Other alumni nominated for resident awards were Bryan McColgan'11 (medicine resident) and Moeun Son'10 (obstetrics & gynecology resident). As finalists, Drs. McColgan and Son were noted in the Circle of Excellence at the ceremony.

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ALUMNI PROFILE

Thomas P. Sculco'69:
The Hands-On Surgeon-in-Chief of the Hospital for Special Surgery

By Peter Wortsman

Thomas P. Sculco'69, surgeon-in-chief and medical director of the Hospital for Special Surgery, the institutional gold standard in orthopedic care—and himself a world-renowned orthopedic surgeon specializing in hip and knee replacement—likes to recount a conversation he had with one of his most famous patients, the late great Vladimir Horowitz. Dr. Sculco first treated the maestro's wife, Wanda, and subsequently attended to a knee problem Horowitz was having. On their first meeting, the piano virtuoso, well into his 80s at the time, extended his hand and the orthopedist asked, "Mr. Horowitz, aren't you concerned that I might crush your fingers by shaking your hand?" "Well, Dr. Sculco, you're a surgeon, aren't you?" the pianist replied with a wink. "You have as much respect for your hands as I have for mine, so I have no problem shaking yours."

After more than 10,000 total hip replacements and countless replaced knees, those expert hands are still going strong. *Columbia Medicine* interviewed Dr. Sculco at his office at the Hospital for Special Surgery in New York in September 2013.

Founded in 1863, the Hospital for Special Surgery, the biggest and arguably the preeminent musculoskeletal center in the world, has been described as a tertiary medical center in a community hospital setting. With a staff of some 100 orthopedic surgeons who perform 28,000 orthopedic operations a year, HSS has, amazingly enough in the view of its surgeon-in-chief, "retained its relatively collegial family kind of feel. Everybody knows everybody, everybody cares about everybody."

Much like the institution over which he presides and at which he has spent his entire professional career, Dr. Sculco manages to perform at the top of his game while maintaining a down-to-earth, unassuming manner. A native of Westerly, R.I., where his grandfather had migrated as a stone cutter from Italy and where his father, a Juilliard-trained jazz trumpeter who played with big band legends Tommy Dorsey, Harry James, and Benny Goodman, retired from the limelight to teach music at the local schools, Dr. Sculco still retains a healthy helping of small town civility. His open smile and seemingly easygoing way belie a fierce commitment to his calling, to the people in his care, and to those who report to him. Benjamin Bjerke-Kroll'09, a third-year surgical resident, calls him "a model mentor. A caring and compassionate surgeon and hard-working leader, Dr. Sculco manages to strike a rare balance of personability and professionalism with his patients and those lucky enough to train with him. He makes himself available to his residents whenever possible. You just want to be like him."

From the Classics to Orthopedics

His was not a typical path to medicine and orthopedic surgery. A classics major at Brown University, Thomas Sculco originally aspired to become an archeologist. He was also intrigued by and did extremely well in biology, zoology, and comparative anatomy but did not take the full complement of pre-med classes. Impressed by his academic performance and his potential, the chairman of biology at Brown asked him, "Did you ever think about medical school?" That got young Sculco thinking. A beloved uncle was a neurosurgeon. On a whim he applied to just one medical school, P&S, figuring if it didn't work out he would head off to Athens for a dig at the ancient Agora, in which he was scheduled to participate. In an admissions interview with the legendary P&S professor of medicine, Yale Kneeland'26, "your classic wise old internist," who likewise came to medicine from a background in the humanities, they mostly discussed the virtues of studying Latin. And to the applicant's great surprise and delight, shortly thereafter he received an acceptance letter. The beneficiary of a generous scholarship, Dr. Sculco returned the favor many years later by endowing a named scholarship at P&S.

Dr. Sculco fondly recalls Dr. Kneeland's eloquence and wit in his class on physical diagnosis, his presentations always replete with memorable and mnemonic bon mots, including a description that leapt to mind of one particular heart murmur as "sounding like a humming bird flapping its wings." Other favorite P&S faculty members were Drs. Malcolm Carpenter in neuroanatomy and P.R. Srinivasan in biochemistry.

Readily acknowledging that he has never met another classics major in orthopedic surgery, Dr. Sculco nevertheless believes that a background in the classics, and the humanities in general, "allows you to approach the patient in a holistic way." The clear sentence structure of Latin, he firmly believes, teaches intellectual problem solving. "Medicine is problem solving. You take all the data, the history, the physical, the X-rays, the lab work, you put it together and synthesize it, and you come up with a solution. Latin helps you organize your thought process into a problem-solving mode. Taking the data, namely taking apart the sentence and putting the pieces back together, proved a great mental discipline ideally suited to the practice of medicine."

While he did have to buckle down and study extra hard in basic science in the first two years to catch up on classes he had not taken, he hit his stride in the clinical experience. "The interaction with patients is what really grabbed me and made me love medicine."

Another dedicated mentor at P&S, Dr. Keith McElroy, a Canadian orthopedic surgeon on the clinical faculty and preceptor for his orthopedics rotation, inspired him to enter the field. "He got me very excited about all the amazing things you could do. Total hip replacements had just been introduced. You could see people who came in crippled and walked out with a smile. It seemed like a very uplifting specialty."

After an internship and residency in general surgery at Roosevelt Hospital, he completed a three-year residency in orthopedic surgery at the Hospital for Special Surgery. After winning a prestigious Bowen-Brooks Scholarship from the New York Academy of Medicine that took him abroad to study orthopedic practice in several countries, he fulfilled his military service as an orthopedic surgeon at Andrews Air Force Base in Maryland. He then returned to New York to join the clinical faculty in the Department of Surgery (Orthopedics) at Cornell University and the staff at the Hospital for Special Surgery. He was named professor of clinical surgery (orthopedics) in 1991 and professor of orthopedic surgery at Cornell in 2002. He was appointed director of orthopedic surgery and chief of the surgical arthritic service at HSS in 1993 and surgeon-in-chief and medical director in 2003.

The Art and Craft of Hip and Knee Replacement, According to Dr. Sculco

Dr. Sculco likes to listen to classical music to aid concentration as he directs his surgical team through the three "movements" of an operation. "The beginning part of an operation, essentially the exposure, is usually pretty routine, how you get into the hip. But then you get into the guts of the operation, and it becomes more intense. Now you've got to create a new socket, a new femur. Everything gets relatively quiet until you get the hip or knee in. The next and last part of the operation is the closure, and that's more relaxed. The hard work is done, you're happy with what you've accomplished.

"As a rule, you want it all to be fairly routine. It's when it slips out of the routine that problems occur," says Dr. Sculco. Ten thousand total hip replacements and innumerable knees into the game, the seasoned orthopedic surgeon teaches his residents to respect the creative challenge. "Every hip is a little different. You are, after all, taking something that's abnormal and you've got to create something that is as normal as you can get once you've replaced it. There's a great deal of creativity involved, particularly in the more complex cases. It calls for problem-solving skills, some engineering, some sculpting, and, of course, a cool hand."

He still recalls one of his first cases, that of an elderly woman with a severely malformed hip. "I'd been in practice for maybe two weeks, three at the most. The hip was completely dislocated, an arthritic and old congenital hip problem, the worst I'd ever seen. I showed the X-ray to my old mentor, Philip D. Wilson Jr.'44. I said, 'I know I can do this case, but would you mind scrubbing in with me?' It all went beautifully, absolutely no problem. I did the whole operation myself. But I always tell young surgeons: Beware of surgical hubris. Never be too proud to ask for help and advice. You can risk bruising your ego. Always remember it's the patient that matters most."

An Innovator in the OR

Ever an innovator in surgical technique, Dr. Sculco helped develop less invasive approaches. "In the past," he says, "we were more radical than we needed to be with our incisions and our exposures. That increased blood loss and interfered with recovery. Bottom line, the function was delayed." In the course of streamlining the operation, Dr. Sculco developed a series of instruments. "A few of them are patented, but all are out there for other surgeons to use. I'm happy to say that a lot of people, a lot of companies have copied them."

Also interested in anesthetic technique, he championed the use of regional anesthesia. "It's safer than total anesthesia, particularly in older patients. There's much less morbidity, they bleed less, so hospital stay is reduced and they're out and on their feet and back to their normal life in less time."

'I always tell young surgeons: Beware of surgical hubris. Never be too proud to ask for help and advice. You can risk bruising your ego. It's the patient that matters most.'

Dr. Sculco's interest in successful outcomes also extends to the lab. He has been engaged for a number of years in basic scientific research, trying to mitigate the effects of osteolysis, a reaction to wear of implants that produces inflammation and breaks down the bond between the implant and the bone. "We are trying to define the cellular mechanisms triggered by wear debris or reaction to wear debris, causing an inflammation that activates the osteoclast, a cell that can resorb bone and break down the bond between implant and bone." He has published extensively on this and other basic scientific and clinical issues relating to joint replacement surgery.

The HSS Surgeon-in-Chief Keeps One Foot in the OR

His work week is carved out and carefully paced. Monday is reserved for administrative meetings, often from 6:45 a.m. until after 8 p.m. On Tuesdays, he schedules meetings in the morning, then sees patients. He operates on Wednesdays. Thursdays he mostly takes care of institutional business, meeting with department heads at Cornell, hospital chiefs at NewYork-Presbyterian/Cornell, and often also with members of the board of directors of HSS. Fridays he operates. He also operates one Saturday a month.

"In a lot of orthopedic departments when somebody becomes chair oftentimes they stop being clinically active. At this institution that doesn't work very well, because you need to be in the trenches," he says. "I'm in the OR several times a week, where I'm walking around, talking to the nurses and technicians, so I get a good feel of how the place is running.

Plus I'm a surgeon, I like doing surgery. I don't want to be sitting behind a desk in my office all day."

For Dr. Sculco, postoperative interaction with patients is not just a professional responsibility, it also satisfies a personal need. "You can be down. Say something didn't go well, you're down about it. You keep telling yourself: I wish I had done it *this* way. Then you see patients for follow-up appointments. A patient will tell you: 'Your surgery really changed my life!' And it just rejuvenates you. And all of a sudden you find that the issues you were fretting about seem to go away. That's what makes medicine what it is. Despite all the headaches and the bureaucracy we have to deal with, nothing can take away from the fact that you have a unique relationship with another human being. It's a special bond. That's why I love what I do."

His office is filled with treasured tokens of appreciation from grateful patients, including artwork by sculptors Mark Di Suvero and Donald Gummer, calligraphy from China, a ritual bejeweled dagger from a Saudi Arabian princess, and a bronze representation of a pair of healthy knees.

Thomas Sculco'69 with students at the P&S Student/Alumni Forum in November 2013. From left are Michael Salna, Tavish Nanda, Cecilia Davis-Hayes, Dr. Sculco, Javier Sanchez, and Diana Lee.

"I'm a Globalist. I Like to Know How Things Are Done Elsewhere."

The Bowen-Brooks Scholarship from the New York Academy of Medicine, which took him to top specialty hospitals in Finland, Switzerland, Holland, Italy, and Great Britain, not only gave him a privileged firsthand look at orthopedic practice abroad, but also instilled a lifelong passion for intellectual border crossings.

"I'm a globalist," he says, "I've been a globalist all my life. I want to know how things are done in other countries, learn from and borrow the best and bring the knowledge back home."

Years later he would apply the same eagerness to engage in international dialogue to help found and direct the Bone and Joint Seminars in Salzburg, Austria, to train orthopedic surgeons from eastern and central Europe. The program has since evolved into an educational forum for young surgeons from all over the world. In recognition of his pivotal role, in 2013 he was awarded the Austrian Cross of Honor, First Class, for Science and Art. Dr. Sculco has been saluted with many other honors in the course of his career, including the 1991 Hip Society's Otto Aufranc Award and its 1995 Charnley Award, the 1999 Arthritis Foundation Lifetime Achievement Award, and the 2005 P&S Alumni Gold Medal for Outstanding Achievements in Clinical Medicine. A member of the Hip Society and founding member of the Knee Society, of which he will serve as president, he has served on the board of directors of the American Academy of Orthopedic Surgeons and is currently on the board of directors of the Arthritis Foundation.

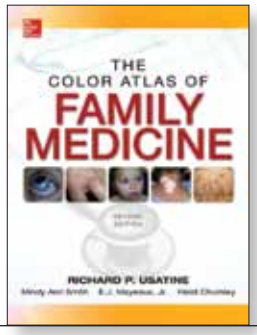
As if he did not already have enough on his agenda, he was the driving force in 2005 in the establishment of the International Society of Orthopedic Centers. He is executive director of the society, which now has 17 member institutions on four continents. The society brings together musculoskeletal specialists from the top academic institutions to share cutting edge research findings and innovations in patient care. The format, according to an article in the journal Medical Meetings (September/October 2010), "is designed to foster idea generation and collaboration rather than simply disseminate knowledge." In Dr. Sculco's words, "Here you have the biggest players [in orthopedic surgery] around the table, a group of very talented and very experienced people trying to resolve the issues we share and to learn from each other." Every meeting also includes a cultural program, often a concert. It helps with the harmony.

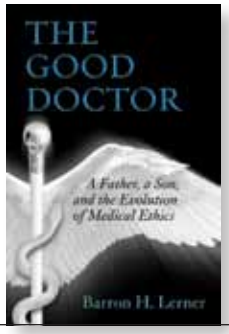
Dr. Sculco also established an exchange program with China and travels there once or twice a year to teach and, on occasion, perform surgery. He has established a symposium run by HSS on hip and knee replacement that has been featured at the Chinese Orthopaedic Association meeting in Beijing for the past three years. He regularly has a Chinese research fellow working with him. Aside from the clinical and research aspects of his Chinese connection he enjoys trying to speak the few words of Mandarin that he knows.

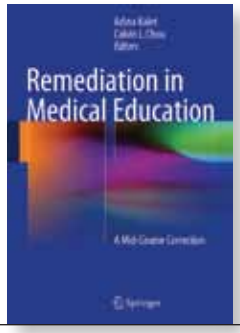
Outside the OR and the committee room, music remains for him an abiding passion. His favorite way to unwind is to attend a concert with his wife, Cynthia. A member of the faculty of the NYU College of Nursing, Cynthia Sculco received her master's degree and doctorate in education from Columbia Teachers College. They have two children, daughter, Sarah Jane, a college guidance counselor at Millennium High School in Brooklyn, and son, Peter'09, an orthopedic senior resident at HSS. Dr. Sculco also serves on the board of directors of Carnegie Hall. "Some colleagues like to play golf or go to the beach; some like skiing. The ideal vacation for me is to travel with my wife to Salzburg and in a week's time take in five operas and maybe three or four concerts."

In a memorable appearance as a guest on "Mad About Music," Gilbert Kaplan's popular radio show on WQXR, Dr. Sculco recounted how once, upon hearing Herbert von Karajan direct the Vienna Philharmonic in a performance of Bruckner's Eighth Symphony at Carnegie Hall, he leaned over to his wife and whispered: "If they're playing music in heaven, this is what they're playing."

Back home on planet Earth in the meantime, Dr. Sculco devotes most of his waking moments to conducting the affairs, setting the tempo, maintaining harmony, and ensuring optimal outcomes at the Hospital for Special Surgery, where he recently completed a second term at the helm.





alumni *in print*

By Bonita Eaton Enochs, Editor

Behold Our Moral Body: Psychiatry, Duns Scotus and Neuroscience

Sally Kasparek Severino'70

Versita: Emerging Science Publishers, 2013

www.neurospirit.net

For centuries, science and religion have been on opposite sides of the debate about the moral nature of human beings. Now science, according to Dr. Severino, is confirming what people of faith have long known: Human morality is embedded in our biology. Drawing on research in neuroanatomy, neurophysiology, and behavioral science, this book affirms the four-fold prophetic vision of morality as expressed hundreds of years ago by philosopher and theologian John Duns Scotus. It proclaims the dignity of the individual and celebrates freedom of will for moral living, stemming from the place of innate natural goodness where love prevails.

The Color Atlas of Family Medicine

Richard Usatine'82

McGraw-Hill, 2013

Dr. Usatine's book, the second edition of this comprehensive atlas, has more than 2,000 images and 240 evidence-based chapters. It is designed to help the physician diagnose and treat the most common health problems in primary care. Each chapter begins with a patient story that ties the photographs to real stories of patients. The photographic legends are designed to connect the images to the people and their human conditions. Special sections are devoted to the essence of family medicine, physical/sexual abuse, women's health, and substance abuse. Many of the images are from the vast photographic collection amassed by Dr. Usatine over 30 years of practice. The book is also available as a smartphone and tablet app.

The Good Doctor: A Father, a Son, and the Evolution of Medical Ethics

Barron Lerner'86

Beacon Press, 2014

Dr. Lerner examines the evolution of medical practice by comparing his experiences with those of his father. The father, an infectious diseases physician, told his son the story of how he once physically placed his body over an end-stage patient who had stopped breathing to prevent colleagues from performing CPR, which would have been the ethical and legal thing to do. This story, plus attempts by the older Dr. Lerner to speed the deaths of his seriously ill mother and mother-in-law to spare them further suffering, angered and alarmed the son, an internist, medical historian, and bioethicist who rejected physician-based paternalism in favor of informed consent and patient autonomy. The book explains how the author came to terms with two different images of his father: the revered clinician and the physician willing to "play God."

Remediation in Medical Education: A Mid-Course Correction

Calvin L. Chou'94 (co-edited with Adina Kalet)

Springer, 2014

Dr. Chou's book offers an evidence-based and practical approach to the identification and remediation of medical trainees who are unable to perform to standards. Assessment of clinical competence and professionalism has become more sophisticated, so medical educators increasingly face the challenge of implementing effective and respectful means to work with trainees who do not yet meet expectations of the profession and society. The book discusses how to use performance-based assessment data to identify failing students, offers practical advice and strategies to instructors, and contains cross-disciplinary conceptual models. Chapters are written by experts in the field, and Dr. Chou co-authored chapters on feedback, on remediation of interpersonal and communication skills, and on a research agenda for this nascent field.

send books (published within the past two years) to:

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(Your Name on) The Best Seat in the House

By Bonita Eaton Enochs, Editor

Whether as a nod to immortality or a dedication to family, P&S alumni have started making commitments to name chairs in the auditorium of the new Medical and Graduate Education Building.

P&S has started a campaign urging alumni to name auditorium chairs with a $15,000 gift payable over a three-year period. "The best seat in the house is the one with your name on it," reads a postcard sent to all P&S alumni in early December 2013.

Construction began in fall 2013 on the 14-story glass tower at 171st Street and Haven Avenue, just a short walk from Bard Hall, where most P&S students live when they begin medical school. The building is expected to open in 2016. The auditorium has 256 chairs that can be named. A metal plate on the back of each chair will note the donor's name, the name of someone to whom the chair is dedicated, or any 35 characters of the donor's choosing. "Naming a chair in the auditorium is a unique and fitting way to leave your legacy at P&S and to honor or memorialize a loved one," says Laura Tenenbaum, senior director of development at Columbia University Medical Center.

Alumni who have already made commitments have indicated that they will have their own names on seats or will honor parents or offspring.

"We encourage alumni to also consider honoring their favorite teacher with a seat in a place where great teaching will continue in the P&S tradition," says Ms. Tenenbaum. "People who graduated in the 1940s and 50s revere Robert Loeb. More recent graduates invoke the names of Steve Miller and Jay Lefkowitch when remembering great teaching. Also, classes can combine resources to buy a seat or a section of seats dedicated to a favorite teacher or mentor. The possibilities for creating a legacy through the auditorium chairs are as numerous as alumni imaginations can conjure."

Herb Peyser'48, a psychiatrist in New York, comes from a long line of P&S graduates, and he considers his commitment "just a mild search for a little, teensy bit of immortality, so when I pass through that door that shuts, there will be written on it for others to see, 'I was here.'"

"'Here' refers to the time and place and to P&S," says Dr. Peyser. His uncle, George Baehr, was a 1908 P&S graduate who helped organize the medical profession and U.S.-based hospital care during World War II after being named by President Roosevelt as chief medical officer of the Office of Civil Defense. Dr. Peyser's daughter, Karen, graduated from P&S in 1979 and is a pediatric cardiologist.

Three members of the family of Doris Pennoyer'54 and Douglass Pennoyer'54, who died within months of each other after celebrating their 60th wedding anniversary in 2011, are paying tribute to the memory of their parents, classmates who married during medical school. The seat is funded by Marguerite "Peggy" Pennoyer'82, an allergist-immunologist in Maine; her husband, Donald P. Endrizzi'82, a Maine orthopedic surgeon; and her brother, William Pennoyer'92, a surgeon in Connecticut.

"Thinking about all of the hours my parents spent huddled over the cramped seats in the P&S auditorium together—Mom writing perfect notes that were works of art and my father's more general surgical type notes—I can't think of a better way to honor them," says Peggy Pennoyer. "We have photographic proof of my father, asleep with his feet draped over one of the chairs during a pathology slide conference right after lunch while my mom continued to take notes.

"I think about the students that will follow in their footsteps and look at the plaque on the seat in front of them in the new auditorium," she adds. "So much time is spent in the auditorium as a medical student, not all of it perfectly focused on the lecture. Perhaps these new students will wonder about these two names in front of them. They have left such a legacy in medicine in our community here in Maine. It is wonderful to be able to leave such a personalized legacy at P&S." The P&S-related Pen-

noyer family also includes Peggy and Don's daughter, Julie Endrizzi'13, an emergency medicine resident at the University of Rochester.

Ellen Gendler'81, a New York dermatologist, has purchased a seat to honor her son, Jonathan R. Salik'15. "I was so honored that Jonathan chose my alma mater as the place to get his medical career started," says Dr. Gendler. "I hope that every student who sits in 'our seat' starts the same tradition in his or her own family. Dedicating a chair in my son's name is my way of acknowledging the swell of pride I feel when I think of the hard work he puts into everything he does and the fine young doctor he is becoming."

Robin Steinberg'80, an ophthalmologist in Massachusetts, is dedicating a chair in memory of her father, Dr. Milton Stanley Steinberg, a cardiologist. "He imparted much sage advice and many clinical pearls to me and inspired my interest in medicine as a career. He was a devoted and loving father who encouraged me to pursue my dreams. I can think of no more fitting way to honor my father's legacy than by commemorating a memorial chair to him. The excellent medical education I received and the wonderful instructors I was exposed to during medical school at P&S served as a rich foundation that propelled me into my rewarding medical career.

"Now, when I return to P&S for alumni reunions or lectures," adds Dr. Steinberg, "I will feel as though my father is there with me sitting at the head of the class."

More information about funding auditorium chairs is available from Laura Tenenbaum at 212-342-2108 or LRT2113@columbia.edu.

in memoriam

FACULTY

Arthur Bank, MD, professor emeritus of medicine and of genetics & development, died Feb. 27, 2014.

Charles P. Felton, MD, clinical professor emeritus of medicine at Harlem Hospital Center, died Jan. 16, 2014.

Peter Johngren, MD, former associate in clinical psychiatry at Bassett, died Jan. 4, 2014.

Eliot J. Lazar, MD, associate clinical professor of medicine and senior vice president and chief medical officer for quality and patient safety at NewYork-Presbyterian Hospital, died Jan. 30, 2014.

Robert S. Neuwirth, MD, former director of obstetrics & gynecology at St. Luke's-Roosevelt Hospital and the first Babcock Professor of Obstetrics & Gynecology at P&S, died Dec. 17, 2013.

Elmer L. Struening, PhD, former director of epidemiology of mental disorders research at New York State Psychiatric Institute, died July 11, 2013.

ALUMNI

1939

Frank J. Schaberg died Feb. 18, 2014. While interning at Holy Name Hospital, he met a nurse, Helen Baenziger, who became his wife. As a captain in the Army Medical Corps stationed in Winchester, England, Dr. Schaberg participated in many evacuation rescue missions from France. During his 50-year practice of family medicine, he offered compassionate care to his many patients regardless of their ability to pay, gaining their respect and devotion. Preceded in death by his wife, Helen, he is survived by six children, 11 grandchildren, and 11 great-grandchildren.

1940

Arnold J. Rawson died at his home in Sarasota, Fla., Jan. 28, 2014, at age 99. After he joined the U.S. Public Health Service during World War II, he was assigned to the Coast Guard as a medical officer for a flotilla of 12 landing craft infantry ships. After the war, he completed a residency in pathology at the University of Pennsylvania, earned a doctor of medical science degree, and was appointed instructor in pathology. He left Philadelphia for a few years to serve as chief of laboratories at Norfolk General Hospital in Norfolk, Va., but returned to the University of Pennsylvania, where he rose to the rank of full professor as he pursued his twin passions of teaching and research. He served as department chair before retiring in 1982. He wrote about 100 scientific papers dealing chiefly with cancer and rheumatoid arthritis. After retirement he spent a number of years at Mote Marine Laboratories in Sarasota, Fla., doing marine mammal pathology. His wife, Mirjam, preceded him in death. He is survived by three children, four grandchildren, and two great-grandchildren.

1945

J. Howland Auchincloss Jr., a retired pulmonologist and emeritus professor of medicine at SUNY Upstate Medical University at Syracuse, N.Y., died March 29, 2013. He was 93. Dr. Auchincloss served in the U.S. Army as ward physician in the tuberculosis service at the VA Hospital in Castle Point, N.Y., and then as ward physician on the medical service at the VA Hospital on Staten Island, N.Y. He was particularly proud, as he once put it on an alumni questionnaire, of "bringing modern pulmonary physiology from the Bellevue Chest Service (Columbia)" (where he trained) "to Syracuse." He established the first intensive care unit at Upstate, treating occupational disease and studying exercise physiology. Among other clinical accomplishments, he devised a method to monitor the pulmonary toxicity of the anticancer agent bleomycin. The author of more than 100 published papers, he served for more than a decade as chairman of the Institutional Review Board, intent on protecting the rights of human subjects. His sense of social justice led him to be active during the civil rights movement. As a founder of the Syracuse chapter of the Medical Committee for Human Rights, he led a small group of doctors to Louisiana to provide care for embattled protestors. His hotel room was bombed, but he continued with his efforts. Outside of medicine he maintained many interests, including electronic music and historic keyboard instruments. Well into his 80s he constructed and played Renaissance lutes and designed a rowboat with forward-facing oars. Preceded in death by his wife, Sarah, he is survived by three daughters and seven grandchildren.

1946

Lillian Recant Ames died May 10, 2013, of congestive heart failure. She was an emeritus professor of medicine at Georgetown University, from which she earned an honorary doctorate. Dr. Ames previously taught for many years as a member of the faculty in the Department of Medicine at Washington University in St. Louis. The author of more than 50 papers on diabetes and metabolism and internationally known for her work on the effects of fasting and starvation on metabolism, she also


Arnold J. Rawson'40


J. Howland Auchincloss'45


Lillian Recant Ames'46


John L. Paulus'49

served for many years as chief of the diabetes research laboratory at the VA Hospital in Washington, D.C. Outside of medicine she maintained interests in painting, Tai Chi, and piano. Preceded in death by her husband, Joseph L. Ames, she is survived by a daughter, a stepdaughter, a stepson, three grandchildren, and a great-grandchild.

Richard A. Bader, a noted pulmonologist, died April 18, 2013. He served in the U.S. Army and was stationed in the Arctic during World War II, co-authoring a pioneering paper on the effects of cold on human metabolism. Dr. Bader worked for a time in the laboratory of Nobel laureates André Cournand'65 Hon. and Dickinson W. Richards Jr.'23 at the Bellevue Chest Service (Columbia). He later joined the faculty of Mount Sinai Medical Center, where he was named the first Horace W. Goldsmith Professor of Medicine and where he co-founded the first pulmonary function laboratory. His research focused on collagen vascular diseases, basic pulmonary physiology, and occupational lung disease. A Mortimer E. Bader and Richard A. Bader Professorship in Medicine was established at Mount Sinai in his name and that of his twin brother. Survivors include his wife, Elizabeth, a daughter, a son, and two grandchildren.

1947

Richard J. Stock, an eminent cardiologist and clinical professor emeritus of medicine at P&S who helped set the gold standard for clinical care, died Nov. 7, 2013. Dr. Stock established the first coronary care unit at Presbyterian Hospital, leading the way in patient care with a bold new vision of medicine's potential to understand and treat acute myocardial infarction. As one of his scores of grateful patients once put it, "Dick Stock leaves no stone unturned; his care is complete, thorough, and humane." By example he helped train generations of physicians. "Teaching keeps you on your toes," he said. "The students are the heart and soul of the whole process." Serving for many years on the P&S Admissions Committee, he had a hand in shaping the character of the student body. "Sheer brain power is not enough; there's got to be the moral fiber," he said in describing the ideal P&S student. Dean Lee Goldman saluted him on his 90th birthday as "the epitome of the P&S physician, the model MD that generations of clinicians have tried to live up to and emulate." Dr. Stock always made time in his busy schedule to help support P&S and the Alumni Association, in which he held almost every leadership position, notably that of president from 1983 to 1985. He served for many years as a dedicated chairman of the P&S Annual Fund. In his capacity as P&S historian, he regaled audiences on countless occasions with painstakingly researched, eloquent, and witty reflections on the history of the medical school. His talks were always a much sought-after part of the program at alumni gatherings. Saluted with two named professorships at P&S, he was honored with a Conspicuous Service Award of the Columbia University Alumni Federation, the P&S Alumni Association Medical Medal of Service, and the P&S Alumni Gold Medal for Excellence in Clinical Medicine. A dynamo of energy in all his pursuits, he also was an accomplished sculptor, an impassioned horticulturist, and a skilled skier and tennis player. Preceded in death by his first wife, Eleanor, and his second wife, Martha, he is survived by a daughter and a son.

1948

Henry H. Bard, a retired general surgeon, died Jan. 3, 2014, at age 91. Dr. Bard served in the U.S. Army during World War II and as a Navy medical officer during the Korean conflict. He spent the greater part of his career on the surgical staff at Glen Cove Hospital, in Glen Cove, N.Y., now an affiliate of the North Shore-Long Island Jewish Health System. Survivors include his wife, Lucie, and a daughter.

Gordon L. Mathes died Feb. 22, 2014. He trained in urology at the University of Tennessee and practiced urology at Baptist Hospital in Memphis for 50 years. He is survived by his wife, Nancy, and three children.

1949

John L. Paulus, a retired pediatrician, died March 30, 2013, at age 87. In his youth he was a state champion golfer and a trombone player. He served as a physician in the U.S. Navy during the Korean conflict. Pursuing a private practice for many years in Redlands, Calif., he also served as a doctor for the University of Redlands football team. Preceded in death by his first wife, Patricia, and his second wife, Judy, he is survived by his third wife, Jacqui, a daughter, three sons, two stepdaughters, 12 grandchildren, and one great-grandchild.

1950

Benjamin T. "Tom" Edwards, a retired general surgeon, died July 10, 2013, at age 88. Dr. Edwards served in the U.S. Air Force, stationed in Germany and Turkey, and later served for a time as the sole physician caring for the staff of the defense early warning radar

stations in Alaska, also tending to the medical needs of native communities. Dr. Edwards pursued a surgical practice in Pima County, Ariz., where he was affiliated with the county hospital. He is survived by a sister and brother.

1952

Wallace V. Epstein died Feb. 19, 2014. An accomplished trombonist, he performed with the student orchestra of the Juilliard School of Music and studied cello after his retirement. In 1957, after training in rheumatology at Presbyterian Hospital, he was recruited by the distinguished rheumatologist, Ephraim Engleman'37, to UCSF. Dr. Epstein is survived by his wife, Sherrie, two daughters, and a son.

Paul H. Gerst, a distinguished retired cardiothoracic surgeon and emeritus professor of surgery at Albert Einstein College of Medicine, died Sept. 29, 2013, at age 86. He served as a medical officer with the U.S. Army during the Korean conflict. A former member of the attending staff in the Department of Surgery at Columbia, Dr. Gerst served for close to four decades as chairman of the Department of Surgery and director of the surgical residency program at Bronx Lebanon Hospital Center. Among other honors, he received the Parker J. Palmer Award from the Accreditation Council for Graduate Medical Education for his stewardship of surgical residency training at Bronx Lebanon. Preceded in death by his wife, Elizabeth C. Gerst, PhD, a former assistant dean at P&S, he is survived by three sons and a granddaughter.

Harold H. Orvis, a retired internist, died May 25, 2013. He served as a pilot in the U.S. Air Force and pursued a private medical practice for many years in West Chester, Pa., where he was former chief of internal medicine at Chester County Hospital. An accomplished carpenter in his free time, he also enjoyed flying his own plane. He is survived by his wife, Anna, a daughter, two sons, eight grandchildren, and a great-granddaughter.

1954

Hueston C. King, a former clinical professor in the Department of Medicine at the University of Florida, died Nov. 29, 2013. He served in the U.S. Army and was acting team doctor for West Point Military Academy. He pursued a private practice in ENT/allergy, first in Miami, then in Venice, Fla., where he was affiliated with Venice Hospital. Dr. King was the author, co-author, or editor of several best-selling textbooks in otolaryngology and otolaryngic allergy. He served terms as president of the Greater Miami Ear, Nose and Throat Association, the Florida Society of Otolaryngology, and the American Academy of Otolaryngic Allergy, the country's oldest allergy organization. Preceded in death by his wife, Wilma, he is survived by a daughter and a son.

1956

Thomas Eugene Federowicz died Nov. 27, 2013. The only child of a Pennsylvania coal miner and his wife, he entered Columbia on a football scholarship. During medical school, he met Jeanne Reynolds, a nurse at what was then called Babies Hospital, and they married in 1956. After completing a general surgery residency and a hand fellowship at Roosevelt Hospital, Captain Federowicz served as hospital chief of surgery at Myrtle Beach Air Force Base. He began a private practice in surgery in 1962 after moving his family to Vestal, N.Y., where he and his wife raised nine children. A son described Dr. Federowicz as a physician who "courageously determined to embody the code of Hippocrates, at one point heroically riding in a puddle-jumper plane from Vestal to Lexington, Ky., in order to attempt to reattach the hand of a 5-year-old injured in a farm machine accident." He also taught as an assistant clinical professor of surgery at Syracuse Medical School. After he retired, he helped establish a free clinic in Binghamton and volunteered at the clinic for several years. He also was instrumental in the creation and passage of a 1974 law that mandated that all public school windows in New York state be made of safety glass. Survivors include Jeanne, his wife of 57 years, eight children, and 21 grandchildren. Another son, Dr. Gregory Federowicz, died earlier in 2013.

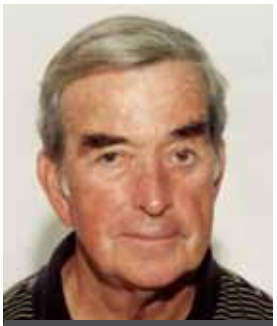
1958

Edwin D. Bransome, a professor of medicine and physiology emeritus at the Medical College of Georgia and medical director of the diabetes center at Aiken Regional Medical Center, died Oct. 15, 2013. A distinguished academic endocrinologist, Dr. Bransome was a past president of the U.S. Pharmacopeia Convention, the policy-making body of the USP. Survivors include his wife, Janet, a daughter, a son, and two grandchildren.

1960

Arthur J. Lennon Jr., a retired internist and former member of the clinical faculty in the Department of Medicine at P&S, who also had an MPH from Columbia, died Jan. 19, 2014. He served as a captain in the U.S. Army during the Vietnam War. For


Paul H. Gerst'52


Edwin D. Bransome'58


Martin L. Sorger'60


Rev. Anne C. Brower'64


John Hadden'65

more than four decades Dr. Lennon was a member of the staff in the Department of Medicine at St. Luke's Hospital, where he served as a former president of the medical board. For many years he was a staff member of the Isabella Geriatric Center, where he served as director of medical services, then as vice chairman of the board. He is survived by his wife, Airlie, a daughter, a son, and three grandchildren.

Martin L. Sorger, an orthopedic surgeon affiliated for more than 30 years with the Montclair Orthopaedic Group in Glen Ridge, N.J., died May 5, 2013. He was 78. A member of the clinical faculty of both P&S and the University of Medicine and Dentistry of New Jersey, he was a recipient of the New Jersey Orthopaedic Society Outstanding Physician Award. He also served for many years on the boards for the Mountainside Hospital Foundation, the Miix Insurance Company, MD Advantage, and the Montclair Kimberley Academy. He is survived by his wife, Susan, a daughter, two sons, and six grandchildren.

1961

Paul A. Graham, a retired general and thoracic surgeon, died March 20, 2013. He was 78. He fulfilled his military service as chief of surgery of the 71st Evacuation Hospital in Pleiku, Vietnam, chief of general surgery at Fort Ord in California, and chief of general surgery at Fort Meade, Md. In retirement Dr. Graham served as a member of the board of trustees of Indian River Memorial Hospital in Vero Beach, Fla., and as vestryman at Trinity Episcopal Church in Vero Beach. Survivors include his wife, Adaire, two daughters, two sons, and 10 grandchildren.

1963

Marc J. Taylor, a retired internist specializing in liver disease and former member of the clinical faculty in the Department of Medicine at Yale University, died June 5, 2012. Co-founder of Southbury Medical Associates, a group practice in Southbury, Conn., he was voted one of the Best Doctors of Connecticut and was also included in Best Doctors of America. Following his retirement from practice, Dr. Taylor served as medical director of River Glen Health Care Center. Also active in conservationist causes, particularly clean water and river conservation, he was founding chairman of the Pomperaug River Watershed Coalition, served a term as chairman of the Housatonic Valley Association, and was a vice president of the Rivers Alliance of Connecticut. He later served as chairman of River Network, a nationwide coalition of conservationists. Dr. Taylor was particularly proud of a Cooperative Conservationist Award from the U.S. Department of the Interior and the River Hero Award from the River Network. He is survived by his wife, Janet, two daughters, and three grandchildren.

1964

The Rev. Anne C. Brower, whose extraordinary career spanned the domains of skeletal radiology, in which she was a renowned authority, and spiritual guidance, as an ordained Episcopal priest, died of lung cancer Oct. 29, 2013. She was 75. Dr. Brower was former chair of the Department of Radiology at Eastern Virginia Medical School. She was a member of the clinical team called in to care for five U.S. presidents (Nixon, Ford, Carter, Reagan, and George H.W. Bush). Dr. Brower also taught for many years as a member of the faculty in the Department of Radiology at the Uniformed Services University of the Health Sciences in Bethesda, Md. The author of a widely read textbook, "Arthritis in Black and White," she was the recipient of the Marie Curie Award of the American Association of Women Radiologists, among other honors. She was also the author of "I Am Not Ready to Die Just Yet," a book she wrote while preparing for the priesthood, composed of the stories of ordinary people who lived "with, through, and beyond their diseases." In 1996, at age 62, she entered the Episcopalian seminary in Alexandria, Va., and was ordained a priest in 2001. Among other positions in the clergy, she served as senior chaplain at Washington National Cathedral. Dr. Brower is survived by her husband, Glenn Allen Scott, a daughter, a son, five stepchildren, and two grandchildren.

1965

John W. Hadden, a research scientist in allergy and immunology and one of the founders of the field of immunopharmacology, died April 1, 2013. Dr. Hadden was professor of pharmacology and experimental therapeutics and former director of the division of immunopharmacology at the University of South Florida College of Medicine in Tampa. An expert in immunomodulatory drugs and cytokines, he published a study that became a Citation Classic. His work helped prove the efficacy of a combined pharmaceutical and biological neoadjuvant approach to cancer therapy. He is survived by his wife, Elba, and two sons.

Stephen B. Kurtin, a dermatologist, former member

in memoriam

Ada Catharine Szeto Rubin'88 GSAS

of the clinical faculty in the Department of Dermatology, and former chief of dermatological surgery at Mount Sinai School of Medicine, died of prostate cancer Nov. 2, 2013. At Mount Sinai he was twice named "Teacher of the Year" and in 2012 earned the "Lifetime Achievement Award." In 2006 Dr. Kurtin moved to Atlanta to join a group practice in dermatology. He was also a competitive swimmer who once placed first in the 50-yard butterfly stroke in an Eastern Invitational AAU Masters Swim Meet. He is survived by two daughters, a son, and seven grandchildren.

1973

Richard M. Handwerger, an ophthalmologist, died Sept. 23, 2013. Dr. Handwerger was founder and director of the first corneal transplant program for Kaiser Permanente in Southern California and regularly presented his most challenging cases at corneal grand rounds at the Jules Stein Eye Institute at UCLA. His clinical acumen, in particular his work on infant corneal transplants, was the subject of multiple radio broadcasts and newspaper articles. After leaving Kaiser Permanente, he pursued a private ophthalmology practice in Beverly Hills. He also served as a medical examiner for the state of California and an independent medical expert reviewer for the California Medical Board. Among other honors, he received the City of Los Angeles Commendation, signed by former mayor Tom Bradley. He gave generously of his time to provide pro bono surgical eye care under the auspices of World Health Volunteers for the poor in Mexico. Dr. Handwerger was a member of the medical advisory board of the Lions-Doheny Eye and Tissue Bank at USC and was affiliated with Cedars-Sinai Medical Center. He was also a pianist and longtime supporter and member of the board of directors of the American Youth Symphony Orchestra.

1983

Jeffrey S. Ben-Zvi, an internist specializing in gastroenterology and former member of the clinical faculty in the Department of Medicine at P&S, died April 21, 2013. Dr. Ben-Zvi was affiliated with Beth Israel Medical Center, New York Community Hospital, CUMC, St. Luke's-Roosevelt, and Lenox Hill, where he served for a time as acting director of the gastroenterology and liver disease clinic. He is survived by his wife, Julie, five daughters, two sons, and a granddaughter.

1986

Alan J. Saffran, an ear, nose and throat specialist and chief of ENT at Orlando Regional Medical Center and Florida Hospital in Orlando, Fla., died of pancreatic cancer Sept. 28, 2013. He made time in his busy professional life to volunteer on multiple occasions to care for children in Mexico. He is survived by his wife, Pamela, a daughter, two sons, a brother, and his mother.

1988 GSAS

Ada Catharine Szeto Rubin died July 20, 2013, at age 50, after a long heroic fight with cancer. She received an MA degree in 1986 and an MPhil degree in 1988 from the biochemistry & molecular biophysics program at Columbia. She married Michael Rubin'88 PhD, and he and their two sons survive her. After moving to Puerto Rico, she received her PhD in microbiology and biology in 2005 from the University of Puerto Rico Medical Sciences Campus. She joined the faculty of the Universidad Central del Caribe School of Medicine in Bayamón, Puerto Rico, as an assistant professor of biochemistry. She conducted research on neuronal nicotinic acetylcholine receptors and objectively analyzed her own illness as part of her research. She had several funded research grants, published many scientific articles, received academic distinctions, and gave numerous presentations at national meetings. "In her professional life, Ada was first and foremost a researcher. She loved to do experimental bench work and explore the cutting edge of molecular neuroscience research. She also derived great pleasure and satisfaction mentoring young scientists and aiding in their scientific and professional development," says her husband. He also recalled her as a dedicated advocate for the promotion of cancer awareness who was active in providing support for other cancer patients.

1991

Arabella I. Leet, a pediatric orthopedic surgeon and chief of staff at the Shriners Hospitals for Children in Honolulu, died Dec. 15, 2013. She previously taught on the faculty in the Department of Orthopedics at Johns Hopkins University, where she served as director of the Orthopedic Center for Children with Cerebral Palsy at the Kennedy Krieger Institute. Dr. Leet published numerous papers in the areas of cerebral palsy, osteogenesis imperfecta, and fibrous dysplasia. She is survived by her husband, Steven Nyman, and a son.

Other deaths among alumni:

William L. Sands'46
John C. Wilsey'47
Horace Crary'48
Gordon L. Mathes'48
Joseph "Skoot" Dimon III'53
Herbert E. Poch'53
Benjamin Wright'53
Richard Naeye'55
Howard Triedman'56
William P. Weiss'56
Paul Kennedy'57
Donald Wilcox'58
Henry Selvey'66

Eli Goldensohn: A Tribute

Eli S. Goldensohn, MD, professor emeritus of neurology at P&S, died March 22, 2013. Timothy A. Pedley, MD, the Henry and Lucy Moses Professor of Neurology and former chair of neurology at P&S, spoke about his friend and mentor at Dr. Goldensohn's service last year. Below are excerpts from his remarks.

By Timothy A. Pedley, MD

Eli Goldensohn was an academic physician to his core. He was a towering figure in epilepsy and EEG, and I want to explain just one aspect that I think is fundamental to understanding the significance of his contributions.

First some background: The EEG is a record of the brain's electrical activity over time, quite analogous to the EKG being a record of the heart's electrical activity. However, as the brain is much more complicated than the heart, the EEG record derives from simultaneous recordings of brain electrical activity from multiple areas on the scalp—at least 22 in routine EEGs, many more in certain conditions like epilepsy. For many years, interpretations of EEG activity were based on "pattern recognition." One pattern of electrical activity was associated with epilepsy, another one with coma, another one with brain tumor, and so on. Eli, however, was one of a handful of people who played a major role in changing the focus of EEG interpretation from one of pure pattern recognition to one that emphasized the link between the underlying physiology of neurons in the brain and how their normal function, or disturbances in their function, leads to the patterns we see in the EEG. Eli argued that we would be able to use the EEG more effectively, and make it a better diagnostic tool, if we had a more thorough understanding of the ways in which the brain's physiology is altered by different diseases and conditions.

This brings me to a second point that I think made Eli one of a small elite group of neurologists at the time: He was a physician-scientist. In addition to working with patients, he had a research laboratory in which he studied the physiology of the cerebral cortex in the actual brains of experimental animals, particularly with regard to the development of epilepsy, and how epileptic activity in the brain's neurons resulted in the particular abnormalities we see on the EEG. Just as one example, working with Dr. Dominick Purpura, Eli was one of the first to record electrical activity from individual nerve cells within both the normal and the epileptic cortex of anesthetized animals.

As a clinician, Eli saw mostly patients with epilepsy. He established the seizure clinic at what was then Columbia-Presbyterian Medical Center and, in addition to providing care to patients with epilepsy, the clinic became a center for testing new antiepileptic drugs and studying patients with particular subtypes of epilepsy. Eli was one of the pioneers in developing an essential tool of modern epilepsy care, video-EEG monitoring, the simultaneous recording of a patient's actions and behavior on video camera along with EEG. This made it possible to analyze second by second and minute by minute the changes in a patient's awareness and behavior in relation to epileptic discharges occurring in that patient's EEG. Video-EEG monitoring has transformed the way we classify subtypes of epilepsy and, as a result, the way we treat patients with different types of epilepsy. Today, surgery provides great benefits to patients with the type of epilepsy that is unresponsive to antiepileptic drugs, and that advance would not be as widely used without video-EEG.

Among the many things Eli taught me were an increasingly sophisticated and critical approach to EEG, the subtleties of managing patients with complicated forms of epilepsy, and a great deal of practical know-how about selecting patients for surgery. He constantly emphasized that everyone—especially academic neurologists—should set the bar for achievement high, saying that if accomplishing something was too easy, it probably was not worth pursuing.

P&S club corner

New (and Reborn) P&S Clubs

Association of Women Surgeons

The P&S Club has approved the Columbia chapter of the Association of Women Surgeons, a national organization created to "inspire, encourage, and enable women surgeons to realize their professional and personal goals."

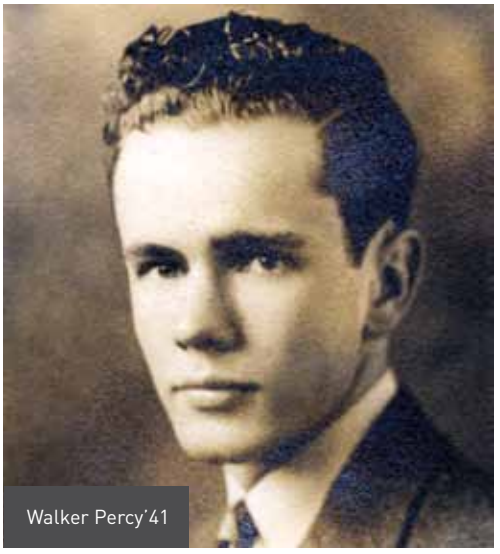
The P&S chapter was founded by Kathleen Kelly'15 and Erin Taylor'14. They have been joined by Jessica Means'17 and Jennifer Ding'17 to organize events and promote awareness on campus. This spring, the club planned lectures, skills workshops, meet-and-greets, and a mentorship program. Anyone—students, residents, alumni—wanting to participate should contact Kathleen Kelly at kmk2188@columbia.edu. *— Kathleen Kelly'15*

Philosophy Club

We do a lot of thinking in medical school. We think about science, about its relation to people, and how to take care of them. We think about public health, economics, even history. As a medical community we like to learn and to question what we learn.

The newly formed Philosophy Club is excited to be part of this community. We hope to add to the many things that we think about, learn about, and question. At its most basic level, philosophy involves asking questions, and that is what we do at our meetings. We ask hard questions such as, "What is the good life?" "Is there such a thing as the 'good'?" "How do we interpret our bodies in relation to our minds?" We rarely posit answers to these questions. In fact, trying to answer them succinctly isn't the point, since some of these questions are unanswerable and timeless. The joy is in talking with one another about challenging topics and strengthening our community as we do it.

So far we have read and discussed the work of great thinkers, including Plato, Kant, and Hegel. Our sessions range from student-led informal discussions to professor-led seminars. One constant at our meetings is tea. Afternoon tea, philosophy and friends are quite the combination and three of the many reasons we are excited to see our new club evolve and deepen over the months and years ahead. *— Dua A. Hassan'17*



Walker Percy'41

Walker Percy Literary Society

In his latest book, "A Dance with Dragons," George R.R. Martin writes, "A reader lives a thousand lives before he dies… The man who never reads lives only one." In this spirit and given the centrality of understanding varied perspectives to medicine, the Walker Percy Literary Society operates as a book club open to the entire CUMC community, aiming to encourage a culture of literary engagement and thereby nurture our development as care providers and people.

So far this year, club participants have read "The God of Small Things" by Arundhati Roy and "This Is How You Lose Her" by Junot Díaz. In late April, the group planned to discuss "This Is How You Die," edited by Ryan North, Matthew Bennardo, and David Malki. Works by Anton Chekhov, Siddhartha Mukherjee, and Samuel Shem have been shortlisted for future meetings and will be chosen, as always, by member input.

We are thrilled that the Walker Percy Literary Society has been revived, and we look forward to sharing good books, good discussion, and good times with the CUMC community. Anyone interested in participating can email Pranav Nanda at pn2260@columbia.edu or Manish Mehta at mpm2172@columbia.edu.

— Manish Mehta'17 and Pranav Nanda'17

COLUMBIA UNIVERSITY MEDICAL CENTER

DEVOTING A LIFETIME TO EDUCATION AND SERVICE

Like the experiences of so many P&S graduates, Eugene Gottfried's life has been one of service—to his country, his community, and his patients. After graduating from the College of Physicians & Surgeons in 1954, he served in the U.S. Navy on active duty for two years (and another seven in the reserves), leaving as a lieutenant commander. A hematologist, he returned to New York to complete a residency at Columbia and a fellowship at the then-new Albert Einstein College of Medicine. He established his own laboratory in lipid chemistry at Einstein, moved to the faculty of Cornell, where he was in charge of the hematology laboratory, then joined the University of California at San Francisco, where he became vice chair of the Department of Laboratory Medicine. Retirement has brought new challenges to conquer, focusing on the needs of his community, particularly readiness for the natural disasters that can so frequently affect his home and neighborhood in Northern California's Contra Costa County.

Both he and his wife, Phyllis, who spent her professional life as a teacher, know the importance of education and of passing on lessons and opportunities to future generations. (Dr. Gottfried also cops to a modestly more self-serving reason: "All my doctors are a lot younger than I am. We've got to keep educating them, because they've got to take care of us.")

The Gottfrieds have established a planned gift at P&S—and another at Columbia College—to fund scholarships and help ensure that Columbia-trained doctors remain unparalleled in their distinction.

EUGENE GOTTFRIED, MD
P&S CLASS OF 1954

For more information about making a planned gift to P&S—and how you can maintain and enhance the excellence that Eugene Gottfried exemplifies—please contact:

Laura Tenenbaum
Senior Director of Development
212.342.2108
LRT2113@columbia.edu

Visit **http://giving.cumc.columbia.edu/1542** today to learn more.

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Personalized Medicine Circa 2001

At the 2001 P&S graduation, University Professor and 2000 Nobel Laureate Eric Kandel gave a commencement address in which he predicted the impact of personalized medicine on patient care. In conjunction with this issue's cover story on the state of personalized medicine, we look back at his thoughts on the topic.

"We have every reason to expect that the revolution in genomics and in brain science will radically change the way we practice medicine. Medicine will be transformed from a population-based to an individual-based medical science; it will become more focused on the individual and his or her predisposition to health and disease.

"Your generation will be the first to reap the benefits of the sequencing of the human genome and use its insights not only to provide better care to patients—better diagnoses, better treatment—but, also, I would hope, more individualized care, more individually tailored diagnoses, and more individualized treatment. Indeed, I would hope that your generation will move us away from the impersonality of managed health care into a new, biologically inspired personalized medicine.

"What reason do we have to believe that this will come to pass? What will we learn from the genome that might orient us more to see the patient as a person rather than as a disease state? The genome of course provides us with a periodic table of life. It contains the complete list and structure of all genes. But it provides us not simply with an average-expectable genome. It provides each of us with our own unique genome. In time, our genome will be a part of our private medical record. As a result, we in academic medicine will collectively have a catalog of all the human genetic variations that account for all the heritable differences between individuals.

"Every disease to which we are prone, including our response to infection, to the consequences of aging, and even our very longevity itself, will be shown to be influenced by polymorphisms in our genes. As a corollary the polymorphisms also will help reveal that complex diseases such as hypertension, depression, and Alzheimer's disease are likely not to be unitary but to be made up of a number of different, intricately related subtypes, each requiring its own distinctive medical management. What will knowledge of these predispositions and subtypes mean for the practice of clinical medicine? This knowledge will serve to decrease the uncertainty in the management of disease. It is likely that clinical DNA testing—the search for genetic polymorphisms in ourselves and in our patients—will reveal our individual risk for all major diseases and therefore allow us to intervene prophylactically in these diseases through diet, surgery, exercise, or drugs, years before the disease becomes manifest. Indeed, genetic polymorphisms will be found to underlie the way our patients respond to these interventions, so that DNA testing will also allow us to predict individual responses to drugs and to determine the degree to which individuals are susceptible to particular side effects. This will allow the pharmaceutical industry to develop new targets and new tools to sharpen the specificity of the drugs they deliver to meet the needs of the individual patient. This knowledge of the biological uniqueness of our patients will alter all aspects of medicine.

"For middle-aged and older people, you will be able to determine the risk profiles for numerous late-onset diseases; ideally people at risk will know of their risk before the appearance of symptoms, so that their disease might, at least, be partially prevented through medical intervention."

— Eric Kandel, MD
Columbia University P&S Graduation Address
May 16, 2001