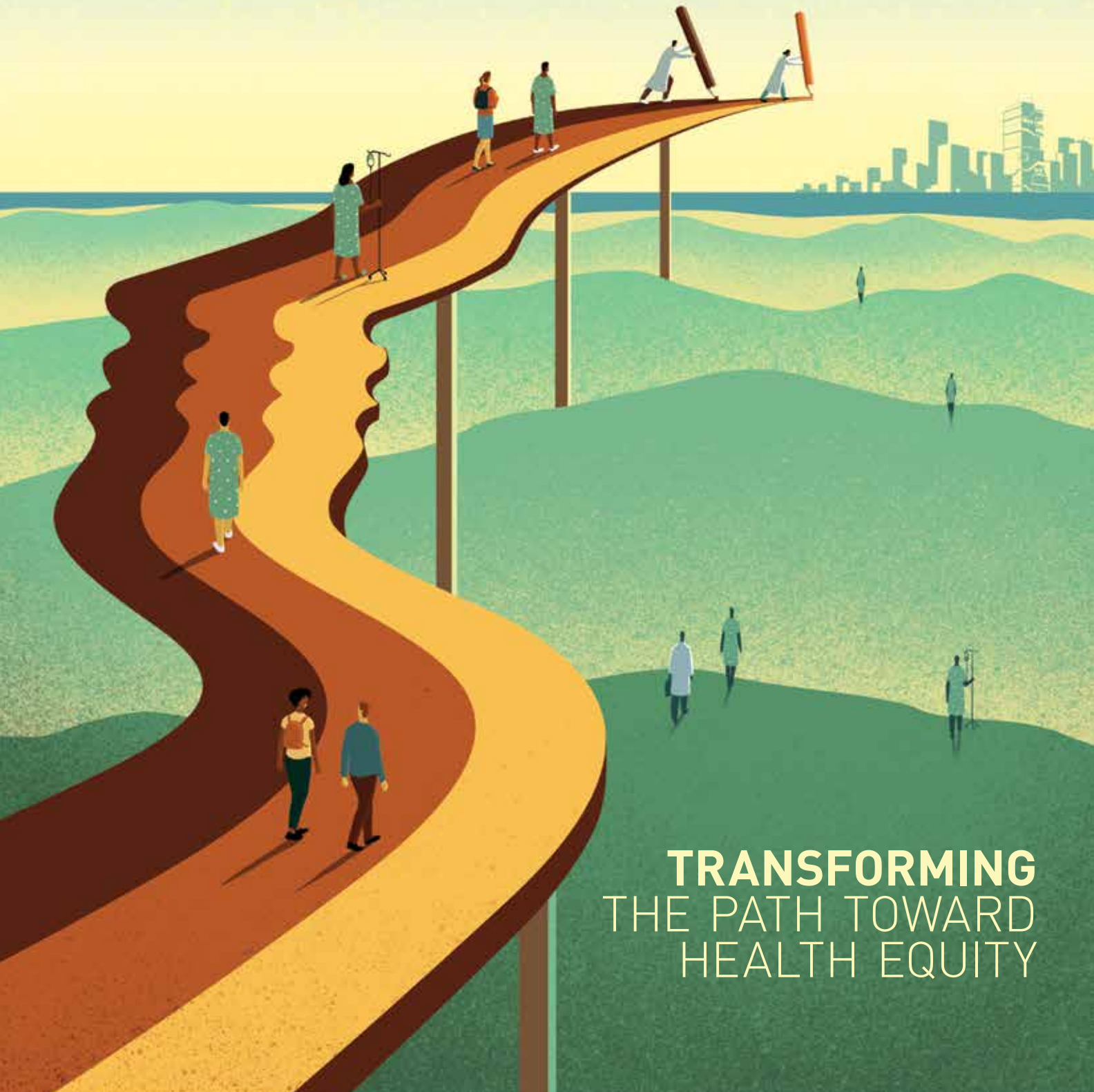


Columbia Medicine

2021-2022 ANNUAL REPORT

Columbia University Vagelos College of Physicians & Surgeons



**TRANSFORMING
THE PATH TOWARD
HEALTH EQUITY**

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It Takes a COMMUNITY to Reduce Health Disparities

Premature death rates are much higher in New York City's Black and Latino communities than in predominantly white neighborhoods. That's a statistic that a new coalition of New York City researchers hopes to change. Columbia will lead the effort, called the COMMUNITY Center, to study multiple chronic diseases by working with community-based partners and health care workers to produce sustainable interventions that will result in health equity.



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A Systemic Response to Systemic Racism

As part of a formal effort to reduce systemic racism in medical education, VP&S students, faculty, and staff have come together to work through the Anti-Racist Transformation (ART) in Medical Education project. The project is a framework for a three-year, systemic approach that calls on 11 participating medical schools to create a transformative, ongoing anti-racism strategy. The project builds upon existing VP&S anti-racism task force work that outlines advances in curriculum, admissions, student support, and the learning environment.



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VP&S Welcomes New Faculty Who Bring Wide Range of Expertise

More than 200 new faculty have joined 22 departments across VP&S this past year, bringing with them expertise in women's health, movement disorders, pediatric genetic disorders, adolescent mental health, facial pain management, RNA dynamics, and surgical research.



On the Cover

The VP&S journey toward health equity takes many paths, including recruitment of faculty, improvement in patient care, a new framework in education, and programs to reduce health disparities.

Illustration by Davide Bonazzi

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2022 VP&S Annual Report

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‘There is no more important endeavor than the work that occurs every day at VP&S’

Each of you has your own reason for appreciating VP&S, and my understanding of your enthusiasm has grown every day since I joined Columbia in March. Because our medical school was founded over 250 years ago, its excellence and legacy can be appreciated on many levels—whether it’s the breadth and depth of our research, the preeminence of our medical education, or the compassionate work that our faculty and alumni do in northern Manhattan and communities around the world. For me, the most powerful way

to appreciate VP&S is to hear about the impact of our work on people and their families. Each day I hear stories from faculty, staff, and students that reaffirm my commitment to VP&S and its shared values.

One story is from Glen Markowitz, a pathologist who knows the value of Columbia because of the care his parents received here when he was growing up. When Glen was a teenager, his mother was successfully treated for metastatic breast cancer, and his father underwent multiple complex procedures to treat



congenital aortic valve disease. Glen aspired to be a doctor at Columbia, the place that saved both of his parents' lives despite their health challenges. Today, when Glen walks up the hill each day from the parking lot, he thinks about how fortunate he is and how proud his parents were that he could be part of this great medical center.

Scott Schell, who leads our communications team, recalls the commitment of clinicians who resolutely fought his wife's cancer, all the while honoring her wish to live her life as fully as possible until the end. Don Landry, a VP&S graduate now in his 16th year as chair of the Department of Medicine, can tell many stories about his alma mater. True, some of those stories are about his two sons completing their degrees at Columbia, one a PhD in theoretical physics and the other a VP&S grad. But his most telling story is about his colleagues in the Department of Medicine and throughout VP&S and NYP who cared for his son, the future physicist, when he was intubated for months with Guillain-Barré syndrome. Hospitalists and myriad specialists across neurology, pulmonary and critical care medicine, infectious diseases, nephrology, cardiology, gastroenterology, ophthalmology, rehabilitation medicine, otolaryngology, interventional radiology, and nutrition provided the best care available

on this planet—and to great effect. That our own, in their most desperate moments, look to our doctors to treat their loved ones and themselves says all that needs to be said about the world class quality of our care.

Sometimes the stories I hear are about the impact of mentors. Sandro Luna, a final-year MD/MBA candidate, praises his advisory dean, William Turner. Sandro credits Will for a range of impressive acts, from making Sandro feel at home in a new city as a first-year student, to supporting his vision for a clinical trial, to guiding him and classmates through the rotation changes caused by the pandemic. Says Sandro: "The pride in his work is evident. He sets an aspirational benchmark." That type of leadership by example has long been the source of educational excel-

lence at VP&S and continues to be a trademark of our faculty today.

I have had the opportunity to have lunch with some of the early career faculty who have started labs at VP&S over the past few years. The stories they shared with me described an exciting future of research discoveries expanding the frontiers of medical science and holding the promise of better human health. I also found it tremendously encouraging to learn about their system of Slack channels, happy hours, and other group activities created to help them through this demanding phase of their careers. Essential to the success of these early career faculty is our research administration team, which is dedicated to providing them with all the support and guidance they need.

At the forefront of all that we do in education, patient care, research, and community engagement is our commitment to diversity, equity, and inclusion. Many programs illustrate our focus on this goal: anti-racist curriculum development, faculty and staff recruitment, student admissions, clinical trials, community health partnerships, pipeline programs to create a diverse next generation of physicians and scientists, and faculty programs that promote our values and behaviors. We are committed to this for the duration because our work toward meaningful change will result in a health care system free of disparities and a work environment defined by respect, support, and positive career growth.

Our impact—and our leadership—are derived from doing difficult but enormously rewarding work: treating the sickest patients, exploring complex research questions, and offering compassion to those facing daunting recoveries. Meeting these challenges has long made VP&S a leader in advancing medicine and providing the best care. Faculty, staff, and students choose Columbia with this in mind. And patients know that the medical school that awarded the nation's first MD degree in 1770 remains at the forefront of medicine two and a half centuries later.

There is no more important endeavor than the work that occurs every day at the Vagelos College of Physicians and Surgeons. There is no group of people more dedicated or more talented than our faculty, students, and staff. It is a special privilege to be part of this environment. I can't wait to see what we accomplish together in the days ahead.

All my best,

Katrina Armstrong, MD
Dean

IT TAKES A COMMUNITY TO REDUCE HEALTH DISPARITIES

By Sheryl Huggins Salomon

Life in the largely Black and Latino communities of northern Manhattan is significantly shorter than it is elsewhere in New York City. In fact, residents of central and east Harlem can expect to live four to five fewer years, on average, than people in the rest of the city, according to the New York City Department of Health and Mental Hygiene. Multiple reasons account for the gap, including the corrosive—and often synergistic—effects of discrimination, food insecurity, inadequate health care, and the precarity of safe housing and environs experienced by many northern Manhattan residents.

These and other adverse social determinants of health increase the risk for developing cancer and heart disease, leading causes of premature death throughout New York City. Such deaths occur among Harlem adults below the age of 65 at a much higher rate than in the predominantly white lower Manhattan neighborhoods of Greenwich Village, SoHo, and the financial district.

A coalition of researchers at VP&S has partnered with colleagues throughout the city in a new approach to address these

and other health disparities. The researchers aim to tackle multiple chronic diseases at the same time, through a center that works hand in hand with community-based partners and health care workers to produce research and sustainable interventions. Named the Center to Improve Chronic Disease Outcomes through Multi-level and Multi-generational Approaches Unifying Novel Interventions and Training for Health Equity (COMMUNITY Center), it launched in September 2021 with a five-year, \$20 million award from the National Institute on Minority Health and Health Disparities.

Other institutions collaborating with Columbia are Weill Cornell Medicine, NewYork-Presbyterian, Hunter College, and the Physician Affiliate Group of New York.

Impact Starts at Home

Columbia has a responsibility to improve the health and well-being of its neighbors living in northern Manhattan, says neurologist Olajide Williams, MD, who leads one of the COMMUNITY projects. Dr. Williams is professor of neurology, chief of staff of the Department of Neurology, and

co-director of the Columbia Wellness Center with Robert Fullilove, EdD, associate dean of community and minority affairs in the Mailman School of Public Health. “We live in a community that is plagued with adverse social determinants of health,” says Dr. Williams, “so it is a moral, civil, and societal responsibility for us to make sure that our backyard is the first place that we address before moving beyond.”

The COMMUNITY Center is an extension of work that Columbia is already doing in northern Manhattan and thus has the advantage of leveraging existing community ties, says Mary Beth Terry, PhD, a cancer epidemiologist who leads the center with colleagues at Columbia, Cornell, NYP, and the Physician Affiliate Group. Local organizations such as Northern Manhattan Improvement Corporation and Community League of the Heights are extending their partnerships with Columbia by working with the COMMUNITY Center, as are local community health workers, including current and retired Columbia nurses and social workers.

“It is often those who are closest to the problem that are closest to the solution,”

Photographs by
Jörg Meyer





Mary Beth Terry

says Dr. Williams. “Who better is there than those who live within a community to help us identify problems; leverage the existing assets within that community; identify barriers, pitfalls, and cultural sensitivities; translate the science into a language that will make sense for that particular community; and help us not just find the right solutions, but implement and sustain those solutions in the community?”

A Different Approach

The center boasts a unique structure, says Dr. Terry, so that multiple diseases can be studied at the same time and interventions can be designed to account for the ways that disease comorbidities, lifestyle, environment, health care access, income, housing, and cultural traditions intersect to determine health outcomes.

“Many of the greatest health inequities are driven by social determinants of health and community factors,” says Dr. Terry, who is director of the Herbert Irving Comprehensive Cancer Center’s Community Outreach and Engagement Office. “In fact, our community partners have been telling us for years that we need to work across multiple conditions. But because of the way

the resources are structured at the national level, we have not always been able to work together across disciplines. The best thing that has happened through this funding is that it has allowed us to all work together across different disciplines.”

In addition to spanning disciplines, COMMUNITY tackles an ambitious geographic scope.

“The NIH said, *Okay, build a coalition that covers a whole region,*” says Dr. Terry. “We’ve come together across different institutions so that we can have a bigger impact and find scalable solutions that hopefully can change things at an institutional and regional level.”

Interconnected Investigations

The COMMUNITY Center’s research agenda has three main studies:

Community Health Workers United to Reduce Colorectal Cancer and Cardiovascular Diseases Among People at Higher Risk is a randomized intervention trial that will use community health workers based in Harlem churches to increase colorectal cancer screening rates and reduce dietary and cardiovascular disease risk factors linked to colorectal cancer. The study will address nutritional interventions for reducing colon cancer risk and investigate obesity, a risk factor for the disease. Dr. Williams is the principal investigator, along with his colleague Sidney Hankerson, MD.

Intervention to Improve Adherence Equitably, a Trial to Support Medication Management for People with Multiple Chronic Diseases is a randomized clinical trial that investigates cardiovascular risk for breast cancer survivors and the effectiveness of an intervention designed to boost adherence to taking prescribed medications in people who have risk factors for both diseases. The principal investigator is Dawn Hershman, MD, professor of medicine at VP&S and professor of epidemiology at the Mailman School. Ian Kronish, MD, associate director of the Center for Behavioral Cardiovascular Health at Columbia, co-leads the trial.

Addressing Sleep Duration, Regularity, and Efficiency is a multidimensional sleep health intervention for reducing disparities in cardiovascular disease. The study explores the effect of sleep on markers of systemic inflammation that are related to both cardiovascular disease and cancer risk and tests an intervention targeting Latino residents of Washington Heights to assess the intervention’s effect on blood pressure, glycemic control, and measures

“Communities of color are disproportionately impacted by chronic disease, so we want to ensure that the people who are living in and serving these communities have the resources needed to continue their great work and, ultimately, bring about system changes.”

of adiposity. The principal investigator is Nour Makarem, PhD, assistant professor of epidemiology at Mailman. Parisa Tehranifar, DrPH, associate professor of epidemiology at Mailman, co-leads the study.

A Trusted Messenger

“Colorectal cancer is one of the biggest killers of African Americans among all cancers in this country,” says Dr. Williams, citing the death of Chadwick Bozeman, the “Black Panther” actor, who was 43 when he died of colorectal cancer. “One of the reasons why colorectal cancer screening age guidelines were lowered from age 50 to 45 was because it’s creeping into younger and younger age groups. When you’re dealing with a population like the African American population, where cancer incidence is sky high, it’s even more important to make sure that people recognize that you need to get screened at earlier ages.”

Dr. Williams and his collaborators turned to faith communities as partners in the community health workers study because of their social influence. “The church is a bastion of African American society,” says Dr. Williams. “It’s a cultural beacon, a place of sanctuary and safety, and also a place of healing. Leveraging the church to promote health and healing in a more conventional sense makes absolute sense.”

Attracting a network of 52 New York-based faith institutions—including major Harlem churches such as First Corinthian Baptist Church—for participation in the study was relatively easy, says Dr. Williams, because the Columbia Wellness Center already had relationships with the organizations. “We have a faith-based community health worker training program in the Wellness Center in which we recruit individuals from health ministries within churches. We give them a small scholarship to participate and then we train them for eight weeks both in the classroom and in the field to become community health workers. Over the last five years we’ve trained about 150 people from these 52 churches.”

Cultural relevance will feature prominently in the intervention and learning

materials being adapted for the study. Dr. Williams, who founded Hip Hop Public Health with iconic rapper Dougie Fresh, has long promoted the value of culture to connect people with health messaging. Hip Hop Public Health has a colorectal cancer screening video by hip hop legend Chuck D. “We’re building a web-based platform that is going to be addressing colorectal cancer and screenings, as well as a dietary risk reduction,” says Dr. Williams. “Some of those assets, like the Chuck D video, are going to be embedded in the platform.”

Expanding the Investigator Pipeline

The COMMUNITY Center also has an investigator development core to train and promote a diverse group of early-career physician-scientists who are interested in addressing health care disparities in their research and want to ensure that their findings translate into effective interventions. Preventive cardiologist Daichi Shimbo, MD, professor of medicine, leads the core. He also leads recruiting, training, and support of clinical and translational investigators at the Irving Institute for Clinical and Translational Research.

“We fund researchers who do community-based participatory research or implementation science and we also provide training in health equity and other research disciplines,” says Dr. Shimbo. Each year, COMMUNITY will award \$50,000 grants to 10 investigators—health equity scholars—who have never received independent NIH grants and who are conducting work in health equity research of chronic diseases.

Of 27 eligible investigators who submitted applications for phase 1, 12 were selected to proceed with phase 2 of the application process and subsequently reviewed for funding selection. All of these 12 applicants received mentorship and grant-writing support for their final phase 2 applications. “Some early stage investigators don’t have much experience with writing grants. They have great ideas, but they don’t necessarily write grants,” says Dr. Shimbo. For the first cycle, eight applications were eventually selected for awards.



Daichi Shimbo

“The applications we received were highly significant, responsive to community needs, and covered areas of research that are too often neglected by funders—namely those that address two or more chronic diseases that co-occur; health disparities and equity; and the prevention, treatment, and management of these chronic diseases,” says Dr. Shimbo. “I’m excited to see how this first cohort of health equity scholars will advance the investigation of health disparities.”

Grant-writing assistance also extends to the community engagement core, which gives grants of \$25,000 per year to community health workers and community-based organizations engaged in addressing health disparities. More than 20 organizations had participated in the community engagement core grant application process by June 2022, and the program’s “Grant-Writing 101” virtual workshop has been viewed several hundred times.

Like community investigators, community health workers may not be experienced grant writers, says Nicole Bayne, administrative director for the COMMUNITY Center. “We know that communities of color are disproportionately impacted by chronic disease, so we want to ensure that the people who are living in and serving these communities have the resources needed to continue their great work and, ultimately, bring about system changes.” ❖



Olajide Williams



A SYSTEMIC RESPONSE TO SYSTEMIC RACISM

The death of George Floyd at the hands of police—combined with the disparities highlighted by the COVID-19 pandemic—spurred a racial awakening across the United States in 2020. The flurry of activity that started then at VP&S has not abated. VP&S students, faculty, and staff have initiated more than a dozen efforts to chip away at the massive undertaking of dismantling the effects of systemic racism in medical education.

Maya Jalbout Hastie, MD, associate professor of anesthesiology, and her fellow faculty in anesthesiology developed virtual improvisation sessions—inspired by true events—to help department members handle racist microaggressions in the workplace. Devon Rupley, MD, assistant professor of obstetrics & gynecology, along with two medical students, Stephanie Granada'21 and Cibel Quinteros-Baumgart'22, conducted one of the first studies to understand the birthing experiences of Spanish speakers during the early days of the pandemic in New York City. And medical student Jeremiah Douchee joined the Columbia chapter of White Coats for Black Lives, an organization run by medical trainees that aims to end racism and systems of oppression in health care.

Despite these efforts by members of the VP&S community, racism remains a systemic problem and demands a systemic solution. So in October 2021—as VP&S welcomed its most diverse medical student class in history—Dr. Hastie, Dr. Rupley, Mr. Douchee, and a dozen other stakeholders joined forces to form the executive coalition of the school's Anti-Racist Transformation (ART) in Medical Education project, perhaps the most comprehensive effort yet to undo systems of racism and bias in education at VP&S.

**BY CHRISTINA
HERNANDEZ
SHERWOOD**

“Gathering a group of individuals across the workplace spectrum has been instructive on what it means to be inclusive,” says Monica L. Lypson, MD, vice dean for education. “Having students, staff, and faculty working in a collaborative fashion to create an anti-racist educational environment is key to future success.”

ART in Medical Education is a framework developed by the Icahn School of Medicine at Mount Sinai that brings a three-year, systemic approach to the effort, charging medical schools with creating a transformative, ongoing anti-racism strategy. (As opposed

**COALITION MAKES
PROGRESS IN
TRANSFORMING
MEDICAL EDUCATION**

**PHOTOGRAPHS BY
JÖRG MEYER**

A SYSTEMIC RESPONSE TO SYSTEMIC RACISM

to being passively “not racist,” the term “anti-racist” refers to taking an active approach in countering systems of racial prejudice.) By participating in the project’s inaugural cohort of 11 schools in the United States and Canada, VP&S is building on the efforts of its anti-racism task force, which called for advances in curriculum, admissions, student support, and the learning environment.

The ART in Medical Education executive coalition at VP&S is led by Jean-Marie Alves-Bradford, MD, associate professor of psychiatry and inaugural director of the Department of Psychiatry’s Office of Equity, Diversity, and Inclusion, and Hetty Cunningham, MD, associate professor of pediatrics and director of equity and justice in curricular affairs at VP&S. The ART project continues the work they did together to develop workshops for medical students processing racial trauma.

“It does really help to be part of this team effort,” says Dr. Alves-Bradford. “We’re all coming from different disciplines, but with some similar experiences in those disciplines. Working together toward change, regardless of our area of expertise or particular focus, is not just bonding, it’s motivating and strengthening and reinforcing that commitment.”



Monica Lypson

When the project officially launched in October 2021, Dr. Cunningham says, the VP&S executive coalition began mapping out the disparate anti-racism efforts already taking place at Columbia to build a roadmap for organizational change. “What are the priorities of the institution that are documented, that have been expressed, that have been accepted? How can we work with those? Who are the main allies in this work? Who needs to be included? The idea is to come together and create a cohesive movement.”

Guided by those findings, the coalition narrowed its focus to three core areas: curriculum, faculty retention, and integrated care.

To address curriculum, the executive coalition developed anti-racist learning objectives using a framework drafted by the Association of American Medical Colleges. The objectives aim to help students and faculty understand the term “anti-racist,” Dr. Alves-Bradford says, and to define and operationalize what it means to create an anti-racist learning environment and health care system. Some of the objectives focus broadly on systems and practices, she says, while others drill down into specifics, such as how the medical school approaches the basic sciences.

“We think about how the objectives would evolve over time throughout the curriculum,” Dr. Alves-Bradford says, “to get deeper and more complex as students go from preclinical to clinical.”

The learning objectives include understanding how a physician’s personal biases and lived experience can influence clinical decision making—and their interactions with patients, patients’ families, and other members of the care team—and learning how to mitigate the effects of those biases. Another key element involves studying how societal structures might have played a role in a patient’s health care experience. For instance, a person might have an increased risk of diabetes and heart disease if they live in a neighborhood that lacks access to affordable, healthy food. “Bias can creep in in lots of different ways,” Dr. Alves-Bradford says, “even when we think it’s far removed from the actual individual patient.”

It’s important to include anti-racist learning objectives as part of the curriculum, Dr. Cunningham says, because it means those skills will be formally assessed. “If something isn’t assessed, then it’s not taken seriously,” she says. “We want our students to be able to be active in the space of anti-racism. Not only will they have the knowledge, but they’ll know how to advocate for changes in medicine. The faculty are in agreement that that’s something we want our students to be able to do, so we have to shift the curriculum.”

Work toward an anti-racist medical education system also has implications for recruitment and retention, says Dr. Alves-Bradford. As workers nationwide reconsider their professional aspirations and work-life balance in the wake of the pandemic, she notes, now is the time to consider systemwide structures that would help VP&S recruit and promote the best faculty, staff, and students.

Finally, while the idea of segregated health care might seem like a relic of the past, Dr. Alves-Bradford says a patient’s health insurance coverage often dictates whether that person is treated at a faculty practice or a public clinic. Different providers work in



Jean-Marie Alves-Bradford and Hetty Cunningham

these separate settings, and the differences don't end there. Faculty practices and public clinics have disparate resources, she notes, from technology to staffing ratios and even the ambience of the setting in which patients receive care.

The Center for Clinical Medical Ethics at VP&S hosted a symposium in May on segregated health care. The center's director, Lydia S. Dugdale, MD, the Dorothy L. and Daniel H. Silberberg Associate Professor of Medicine at VP&S, gave the open-

“BIAS CAN CREEP IN IN LOTS OF DIFFERENT WAYS, EVEN WHEN WE THINK IT'S FAR REMOVED FROM THE ACTUAL INDIVIDUAL PATIENT.”

ing remarks. After public health experts outlined the history and policy that shapes how people receive care, a panel of physicians discussed ongoing efforts to desegregate care. Panelists included Julia E. Iyasere, MD, assistant professor of medicine and executive director of the Dalio Center for Health Justice at NewYork-Presbyterian. Kamini Doobay, MD, assistant professor of emergency medicine, closed the event by providing the attendees with ways to advocate for individual patients and for systemic change.

The ART in Medical Education coalition at VP&S plans to use its platform to publicize the issue and educate the Columbia

community about segregated care. “What are some of the pitfalls when things are structured in that way?” Dr. Alves-Bradford asks. “What is the context? How did those systems evolve to be that way? There were regulations that led it to be one way or another: How does that happen?”

The coalition has joined ongoing efforts, including White Coats for Black Lives and the NYC Coalition to Dismantle Racism in the Health System, to push for an end to this divided system. “We're advocating for not having those systems segregated,” Dr. Alves-Bradford says, “to integrate and have people seen in similar settings, regardless of their insurance or payment.”

Beyond their work on curriculum, faculty retention, and integrated care, the VP&S coalition is considering ways to support and recognize students involved in anti-racism work. Also on the horizon: involving more participants from the greater VP&S community and the city at large.

As the ART in Medical Education project enters its second year, the VP&S coalition and the rest of the inaugural cohort of schools are moving into the next phase of the project: implementing and sustaining change at their various institutions. While each of the 11 medical schools aims to embed change, learn from feedback, and course correct to develop a transformative, ongoing anti-racism strategy, the cohort also plans to come together to learn from each other.

“The cohort allows us to partner with institutions around the country that are doing very exciting things,” Dr. Cunningham says. “We're sharing our challenges and solutions. That allows us all to move forward more quickly and adopt best practices.” ❖



DAVIDE BONAZZI

VP&S Welcomes New Faculty Who Bring Wide Range of Expertise

By Christine Yu

Photographs by
Jörg Meyer

Interests Cover
Lifespan, from
Preventing
Stillbirth to
Improving
Hospice Care

Women with endometriosis sometimes go seven to 10 years before their condition is diagnosed—a challenge one new member of the faculty of VP&S plans to confront. Other new faculty bring expertise in treating facial pain, using new therapeutic tools that target RNA, and generational care for hereditary colorectal cancer.

Jessica Opoku-Anane, MD, the endometriosis expert, plans to improve the understanding and management of the disorder through a new comprehensive endometriosis center. Dr. Opoku-Anane, assistant professor of obstetrics & gynecology, will serve as the center’s director. The center will promote early diagnosis, provide holistic multidisciplinary care, and advance minimally invasive treatment.

“Columbia’s location in the heart of the most diverse area of the country allows me to focus on improving the health of all—including those on the fringe of society who often do not have access to high quality care,” says Dr. Opoku-Anane.

Dr. Opoku-Anane is one of more than 200 new faculty who joined 22 departments across VP&S this past year. Their expertise, which includes tumor microenvironments, molecular biophysics, neurosurgery, and outbreak response, will contribute in important ways to the intellectual community at Columbia, spurring advances in clinical care, health equity, research, and education.

“Every new cohort of faculty brings fresh perspectives and skills that enrich and energize our institution,” says Anne Taylor, MD, vice dean for academic affairs at VP&S. “I’m delighted that our faculty increasingly mirrors the richness of life experience and perspective of the people with whom we work, including patients, students, and research collaborators around the world.”

Like other newcomers to VP&S, Dr. Opoku-Anane brings multiple skills to her new post. She specializes in the treatment of uterine fibroids, menstrual disorders, and intrauterine scarring, including Asherman’s syndrome. She is also co-director of the Department of Obstetrics & Gynecology’s Office of Diversity, Equity, and Inclusion.

This year’s new hires also include the cofounder of a biotech devoted to leveraging RNA in drug discovery, founding chief of the new Division of Surgical Oncology, and a specialist in adolescent medicine.

Learn more about a few of the other new faculty members:

Gordon Baltuch, MD, PhD: Dr. Baltuch is a pioneer in the use of deep brain stimulation and focused ultrasound to treat motor symptoms of movement disorders. His research is at the forefront of testing new treatments, such as gene therapy for Parkinson's disease and stem cell therapy for stroke. "At Columbia, I can expand my practice and reach more patients, continue to perform pioneering and innovative research, and help train a new generation of neurosurgeons," he says. Dr. Baltuch joins VP&S as professor of neurological surgery and co-chief of the Division of Functional Neurosurgery.

Hashim Al-Hashimi, PhD: If you zoom down to the atomic level, biomolecules like DNA and RNA constantly change shape. At the vanguard of studying these dynamic structures is Dr. Al-Hashimi, professor of biochemistry & molecular biophysics. "Ultimately these changes in structure determine how biomolecules interact with one another, and every biological phenomenon and disease is the product of such molecular interactions," he says. Using nuclear magnetic resonance spectroscopy, he had made discoveries that have led to insights about cancer and other diseases and new therapeutic tools that target RNA. He received the National Academy of Sciences Award in Molecular Biology in 2020 for his work. He co-founded Nymirum in 2009 to leverage RNA dynamics in drug discovery efforts. "For many years, I have watched a growing and thriving community of stellar RNA scholars at Columbia from a distance, and I am thrilled to support their efforts," he says.

Gustavo Maegawa, MD, PhD: Dr. Maegawa joined the Department of Pediatrics as associate professor. He's a physician-scientist and scholar on inherited metabolic and other genetic disorders, specifically lysosomal storage diseases (LSDs), such as Gaucher disease. His research focuses on developing small molecule therapies that can cross the blood-brain barrier and tackle the neurodegenerative

processes commonly associated with these disorders. Dr. Maegawa discovered that ambroxol, an oral mucolytic and already approved drug, remarkably assists the folding of several mutants of the enzyme deficient in Gaucher disease. Ambroxol is now in clinical trials for the different types of Gaucher disease and a subset of Parkinson's disease, which, as he says, "illustrates the relevance and impact of studies in rare diseases." Currently, under funding from the National Institute of Neurological Disorders and Stroke, Dr. Maegawa is "fine tuning" small molecules that he identified for Krabbe disease, a devastating LSD, which is in the newborn screening programs in New York and other states. In addition, he is developing a program at Columbia to offer specialized care and clinical trial opportunities for patients with LSD and related disorders. "It's also equally important to address this problem from a social perspective for the families and the individuals suffering from these orphan diseases," he says.

Uma Reddy, MD: Dr. Reddy is known as an educator and mentor who conducts groundbreaking research on stillbirth, preterm birth, and labor management. She joined VP&S as professor of obstetrics & gynecology and the department's vice chair of research. "Columbia has a rich tradition in research in OB/GYN," she says. "My focus will be on promoting impactful research by our faculty and trainees and collaborative research across subspecialties, as well as tackling pressing public health problems that affect our patient population." Dr. Reddy serves as the principal investigator for the maternal-fetal medicine units network at Columbia and will continue to engage in NIH-funded clinical and translational research, such as looking at genomic predictors of recurrent pregnancy loss.

Raymond Sekula Jr., MD: The arrival of Dr. Sekula heralds a new era of facial pain treatment at VP&S. One of the world's foremost experts in minimally invasive brain surgery, he has performed more

than 2,000 microvascular decompression surgeries. Dr. Sekula is professor of neurological surgery and director of the trigeminal neuralgia and facial pain program at the Neurological Institute. He is dedicated to helping patients with cranial nerve disorders—such as trigeminal neuralgia, hemifacial spasm, glossopharyngeal neuralgia—for whom the pain can be excruciating.

Sandra Ryeom, PhD: Dr. Ryeom joined VP&S as associate professor of surgical sciences in the Department of Surgery and associate dean for postdoctoral affairs and new master's degree programs at VP&S. She also serves as associate director of diversity, equity, and inclusion at the Herbert Irving Comprehensive Cancer Center. Colleagues describe her as a skilled educator and prolific researcher. Her scholarship examines tumor microenvironments, such as endothelial and stromal cells, a breakthrough in understanding gastroesophageal cancers. "I am thrilled to join the Columbia community to support and enhance mentoring for postdoctoral fellows and excited to develop new master's degree programs that will offer alternative paths for careers in the biomedical sciences and provide opportunities to diversify the biomedical workforce," she says.

Sam Yoon, MD: As chief of the new division of surgical oncology and vice chair of surgical oncology research and education in the Department of Surgery, Dr. Yoon wants to increase clinical volume, ensure comprehensive multidisciplinary care, and build research and education programs. Most recently a professor of surgery at Weill Cornell Medicine and an attending surgeon at Memorial Sloan Kettering Cancer Center, Dr. Yoon specializes in gastric cancer, sarcoma/soft tissue tumors, and melanoma. His laboratory has been continuously funded by the NIH for 19 years and currently focuses on the role of cancer stem cells in chemotherapy resistance and metastasis. His goal is to translate these discoveries into the clinic through novel treatment strategies.



“Every new cohort of faculty brings fresh perspectives and skills that enrich and energize our institution.”

— Anne Taylor, MD

PICTURED FROM LEFT:

- 1. Raymond Sekula Jr., Hashim Al-Hashimi, and Jessica Opoku-Anane
- 2. Sarah Ann Anderson and Uma Reddy
- 3. Sandra Ryeom, Gordon Baltuch, Gustavo Maegawa, Sam Yoon, and Wilson Quezada
- 4. Lawrence Purpura, Claudia Lugo-Candelas, and Manuel Moya-Tapia

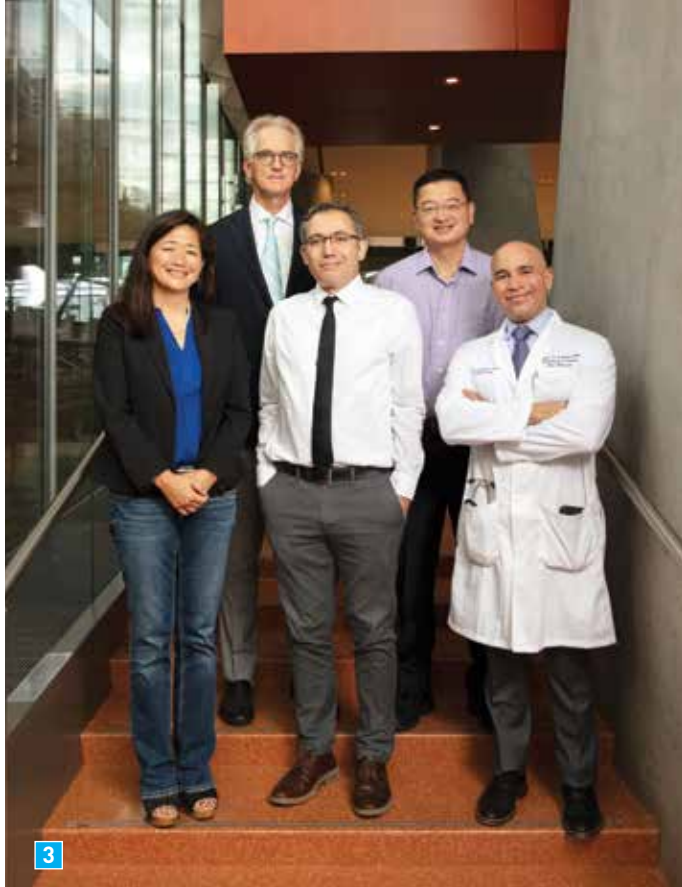
Not pictured: Asqual Getaneh and James Church

James Church, MD: Dr. Church was ready to retire in 2021. After over 30 years at the Cleveland Clinic, where he helped build one of the finest colorectal surgery departments in the world, he planned to return to his native New Zealand. That’s when Ravi Kiran, MD, chief of colorectal surgery at Columbia, called and persuaded him to come to New York. As professor of surgery and director of the Hereditary Colorectal Cancer Center, Dr. Church brings to VP&S his unique approach to generational care for hereditary colorectal cancer and familial adenomatous polyposis. His approach is rooted in empathy, prioritizes mental health, and is backed by surgical expertise. “I always enjoyed the academic side of my practice. I had always felt that thinking about diseases and their causes, and translating that into innovative care, was something not done very well and that I could make a contribution by an approach that was a little ‘outside the box,’” he says.

Asqual Getaneh, MD: Dr. Getaneh returned to VP&S as associate professor of medicine and medical director for quality and safety for Columbia Primary

Care. She had been on the VP&S faculty from 1999 to 2013. Before returning this year, she served as the medical director of the largest community health system in Washington, D.C., and as chief medical officer at International Community Health Services in Seattle, Washington. Her scholarship has addressed such topics as diabetes risk, management, and prevention among high-risk, diverse populations and health equity.

Sarah Ann Anderson, MD, PhD: As a specialist in adolescent medicine, Dr. Anderson brings a depth of expertise in substance use disorders, mental health, reproductive justice, and health equity to the Department of Pediatrics. “In our current climate where reproductive health, rights, and dignity are under attack, adolescents are more vulnerable than ever,” says Dr. Anderson, assistant professor of pediatrics. “Empowering adolescents to know that they have bodily autonomy, that their dignity matters, and that their voice matters is a core responsibility in my view of the profession.” She worked with the department to launch a dedicated clinical session to discuss strategies for priori-



tizing the values and goals of teen patients when providing their holistic reproductive and sexual health care. She also leads a group of providers in developing equitable clinical practices to address cannabinoid hyperemesis syndrome, a condition linked to excessive cannabis use. Previously an adolescent medicine fellow at VP&S, Dr. Anderson now serves as the associate program director for the fellowship.

Claudia Lugo-Candelas, PhD: A licensed clinical psychologist, Dr. Lugo-Candelas studies how early life shapes neurodevelopment. Her research explores the perinatal experiences—from maternal obesity, air pollution, sleep, and stress—that increase the risk of developing neurodevelopment disorders and what factors foster resilience. In 2022, she received the American Psychological Association’s Robins and Guze Award, given to an early career investigator. Previously, Dr. Lugo-Candelas was a postdoctoral research fellow in child and adolescent psychiatry at Columbia. She joins VP&S as assistant professor of medical psychology (in psychiatry) and is the Bender-Fishbein Scholar in Child and Adolescent Psychiatry.

Manuel Moya-Tapia, MD: Dr. Moya-Tapia is assistant professor of medicine with expertise in hospice and palliative medicine. He became interested in the needs of terminally ill patients and their families during his five years at Hartford Hospital, where he spent two years in the inpatient oncology unit and saw that certain populations were overlooked. This realization drives his current interest in caring for underserved populations in palliative care and providing culturally sensitive care for all patients and families.

Lawrence Purpura, MD: Dr. Purpura joined VP&S as assistant professor of medicine. He works at the intersection of clinical medicine and public health. His research combines applied epidemiology and outbreak response to infectious diseases that range from Ebola to HIV to COVID-19. He honed his expertise while serving as an Epidemic Intelligence Service officer at the Centers for Disease Control and Prevention, where he responded to several outbreaks, including the 2014-2016 West African Ebola outbreak, and worked with Ebola survivors. “I have called upon these experiences to inform the work I am doing with

post-COVID complications,” he says. At Columbia, Dr. Purpura is a co-investigator of the COVID-19 Persistence and Immunology Cohort (C-PIC) and runs a long COVID clinic. He was an infectious disease fellow with the Department of Medicine and a Global HIV Implementation Science Research Training Program fellow at ICAP at the Columbia Mailman School of Public Health before joining the VP&S faculty.

Wilson Quezada, MD: Dr. Quezada, a Washington Heights native and VP&S graduate, has re-joined the faculty after spending the past four years at Kaiser Permanente in Southern California. Before leaving for California, he was assistant professor of medicine in the Division of Pulmonary and Critical Care Medicine. Following medical school, he completed both internal medicine residency and pulmonary and critical care fellowship training at Columbia. His clinical and research interests include smoking cessation, COPD diagnosis and treatment, and asthma. “I am happy to be home again, with a focus on improving the health and access for our patients with acute and chronic lung diseases,” says Dr. Quezada. ❖

Generosity in Action

As we reflect on the past year, we would like to express our gratitude to the many benefactors, friends, and partners who stepped forward to support our faculty, students, and staff and our institution as a whole. This partnership has made it possible for VP&S to remain a force in science, medicine, and education, allowing us to uncover the knowledge that shapes new discoveries and the standard of care in medicine. Through this collaboration and the support of so many who care deeply about advancing science and training top-quality medical professionals, we are able to continue improving health outcomes that will alleviate suffering.

Guided by the noblest standards, our faculty, staff, and students continue to explore the latest frontiers in scientific

discovery while demonstrating the highest levels of compassionate care and service as they help lead our community to new heights. We are pleased to highlight just some of the achievements that marked the past year.

We were delighted to welcome Katrina Armstrong, MD, at our spring Board of Advisors meeting and celebratory dinner in May. Dr. Armstrong joined Columbia on March 1 as dean of the Vagelos College of Physicians and Surgeons. She expressed the strong commitment she shares with Columbia to advance health care and science while redoubling our efforts to eliminate disparities in health and health care and ensuring that advances made in medicine benefit everyone.

Also in March, VP&S attained its highest-ever ranking—No. 3—among

top medical schools by U.S. News and World Report. Our transformative scholarship program is thriving as are our initiatives in precision medicine, generously supported by Roy and Diana Vagelos and many other friends and partners. Our research and clinical departments continue to build on their foundational strengths, and our cancer programs are thriving thanks to the legacy of the late Florence and Herbert Irving.

Thanks to the generosity of these visionary partners and so many others, we are able to create new approaches to medicine and invest in our community and in the discoveries, treatments, and prevention that are improving health. On these pages are just some of the highlights of this support for VP&S.

Diana Vagelos Professorship of Women's Mental Health

Faculty and friends gathered April 12 at the home of Nan Swid to celebrate the establishment of the Diana Vagelos Professorship of Women's Mental Health in the Department of Obstetrics & Gynecology and the appointment of Catherine Monk, PhD, as the inaugural holder of the professorship. The professorship honors Diana for her generosity, leadership, and advocacy for women's health programs and celebrates the collective efforts of the Women's Health Care Council.



Mary D'Alton, Roy Vagelos, Catherine Monk, and Diana Vagelos

Scholarship Support

Thanks to the enduring and extraordinary generosity of **Roy and Diana Vagelos** and many friends, alumni, and faculty, our transformative scholarship endowment program continues to help Columbia medical students with financial need. Our efforts to replace loans with scholarships sparked a debt relief movement in medical education, putting a superior Columbia education within reach of talented students regardless of their financial resources. Over the past year, VP&S has launched a new scholarship donation matching program, providing an opportunity for donors to maximize the impact of their gift through a 1:2 match for qualified donations for endowed scholarships. Most recently, with a \$1 million contribution, **Victor M. Lopez-Balboa** established the Victor M. Lopez-Balboa Family Scholars Fund at VP&S in partnership with Goldman Sachs Gives. Additionally, through a bequest, the estate of **Avron J. Maletzky, MD**, gave \$1.1 million to establish the Avron J. Maletzky, MD'63 Scholarship Fund. Dr. Maletzky also included VP&S in his IRA to fund a second scholarship in his name.

Pfizer Inc.

Pfizer Inc. provided a three-year, \$10 million grant to Columbia to help establish the Columbia-Pfizer Clinical Trials Diversity Initiative. The initiative is a partnership between Columbia and Pfizer and aims to reduce health disparities by increasing the participation of underrepresented minorities in clinical trials and increasing the diversity of clinical researchers. The initiative will examine the barriers that prevent participation by individuals from underserved groups while working to improve diversity among clinical research faculty and staff.



Laugh to Remember

The sixth annual Laugh to Remember event, led by Chris Haynes and Janine Schiavi of Broadacre Financial, was held June 8 at Gotham Comedy Club to benefit Columbia's Taub Institute for Research on Alzheimer's Disease and the Aging Brain. The event raised \$250,000 to support medical research for neurodegenerative disorders, such as Alzheimer's, Parkinson's, ALS, and frontotemporal dementia.

Mike and Maria Repole and Nonna's Garden Foundation

The Naomi Berrie Diabetes Center at Columbia received a \$20 million gift from Mike and Maria Repole and Nonna's Garden Foundation, which was established in 2006 in honor of Mike's Nonna ("nonna" means grandmother in Italian). The gift will help ensure that the Berrie Center has the financial support needed to continue its work as a family-centered resource for adults and children with diabetes. The new gift from Nonna's Garden Foundation will help fund treatment of patients with diabetes and sustain Berrie Center programs that offer comprehensive multidisciplinary care for patients and their families.

The Naomi Berrie Diabetes Center is an innovator of diabetes research and care and a resource for our community of patients in large part thanks to generous donors such as Mike and Maria Repole. Robin Goland, MD, co-director of the Berrie Center, says the Nonna's Garden Foundation gift will ensure that each patient receives the optimal individualized diabetes care possible. "Mike and Maria's extraordinary generosity allows us to be nimble and flexible as we respond to the ever-changing medical landscape. We are grateful for their vision and their understanding of the challenges of patient care for individuals with diabetes."



Plans for a Research Building

Plans are underway for a new research building. We extend our gratitude and special recognition to **Shoshana Shendelman'05 PhD** and her husband, **Vlad**, for their generous early support to help launch this project. Dr. Shendelman is a member of the Board of Advisors and founder and CEO of Applied Therapeutics. We also recognize brothers **Roger Wu, MD, and David Wu, MD**, who donated \$5 million for the research building project in honor of their parents, the late Clyde'56 and Helen Wu, including \$1 million to establish the Clyde'56 and Helen Wu Precision Oncology Fund to support novel cancer research. Roger and David provided an additional \$1 million to support research, education, patient care, and other institutional priorities in honor of Dr. Katrina Armstrong.

Velocity

Velocity: Columbia's Ride to End Cancer continued to raise funds to support patient care and the team of innovative scientists at the Herbert Irving Comprehensive Cancer Center. While still virtual in 2021, Velocity participants had the option to pick any physical activity to demonstrate their support. This approach resulted in an overwhelming virtual turnout, with participants doing a range of activities—from outdoor and indoor cycling to walking, running, hiking, and dancing—to benefit our cancer care and research programs.





Judith Joseph



Adrienne Warren

Crown Awards

The 2021 Crown Awards, held virtually, highlighted Columbia's efforts to address the effects of the pandemic on mental health, as well as the paths for healing in its aftermath. The event was emceed by VP&S alum Judith Joseph'07 and featured a performance by Tony Award winner Adrienne Warren.



Elizabeth Diller, Katrina Armstrong, and Lawrence Neubauer

Columbia Children's Gala

Friends, donors, and supporters of the Children's Board at Columbia gathered June 6 at the Shed in Manhattan to celebrate Columbia Children's Health. The event was emceed by **John Avlon** and **Margaret Hoover** and celebrated the accomplishments of Columbia Children's Health under the leadership of Department of Pediatrics Chair **Jordan S. Orange, MD, PhD**. Attendees heard from the chair of the Children's Board, **Lawrence Neubauer**, and met **Katrina Armstrong, MD**, dean of VP&S. The evening included a special performance by **Shawn Colvin** and a presentation by **Elizabeth Diller**, the architect of the Shed and the Vagelos Education Center.

Good Ventures Foundation

The Good Ventures Foundation awarded \$3.2 million to the Columbia University Center for Radiological Research. The gift will help support efficacy studies on far-UVC sterilization technology, led by David Brenner, PhD, to maximize the technology's benefit to public health.

Edward P. Evans Foundation

The Herbert Irving Comprehensive Cancer Center received a grant from the Edward P. Evans Foundation to establish the Edward P. Evans Center for MDS, dedicated to the study and treatment of myelodysplastic syndromes (MDS). The center will build upon the dedicated MDS program at VP&S, a longstanding, renowned program that is unrivaled in MDS research, and establish an endowed professorship, fellowship program, and an annual retreat dedicated to the study of MDS. Under the leadership of Stavroula Kousteni, PhD, professor of physiology & cellular biophysics and the Edward P. Evans Professor of MDS Research, the center is poised to accelerate the Evans Foundation's mission to discover novel ways to treat MDS. Azra Raza, MD, professor of medicine and director of the MDS clinical program at VP&S, will act as the clinical director of the Edward P. Evans Center for MDS.

Avanessians Foundation

With a gift of \$1.5 million to the Department of Medicine's Division of Infectious Diseases, the Avanessians Foundation established the Avanessians Assistant/Associate Professorship of Infectious Diseases Fund. The faculty member who holds the professorship will help ensure the continued success and innovation of the Division of Infectious Diseases. The professorship will provide the opportunity for the faculty member to pursue cutting-edge research in areas of need, including emerging pathogens and COVID.

Goldstein Family

The Arlene & Arnold Goldstein Charitable Trust made a \$1 million gift to fund the Arlene & Arnold Goldstein Cardiac Amyloidosis Research Fund. This gift provides resources to advance cardiac amyloidosis research directed by Mathew Maurer, MD, the Arnold and Arlene Goldstein Professor of Cardiology and one of the world's leading experts in the disease. He is also director of the Clinical Cardiovascular Research Laboratory for the Elderly at VP&S. Through the gift, the Goldstein family hopes to inspire additional support for Dr. Maurer's pioneering research.

Richard and Lisa Witten

Richard and Lisa Witten pledged \$2.5 million to establish the Witten Family Professorship in the Herbert Irving Comprehensive Cancer Center. The professorship will be held by a VP&S clinician-scientist who is a member of the cancer center and is focused on breast cancer or work related to research and treatment of breast cancer.

Pierson Family

The Pierson Family has established the Pierson Family Clinical Trials Fund, a current-use fund that will support a clinical trial to study the efficacy of a novel drug, sipilizumab, in inducing tolerance in liver transplant patients with autoimmune liver diseases. The clinical trial, directed by Elizabeth Verna, MD, and Jean Emond, MD, builds on a 2019 Pierson Family gift that expanded access to, and awareness of, living donor liver transplantation for patients and families.

Henry R. Liss, MD

Through a \$6 million bequest, the estate of Henry Liss, MD, made a donation to the VP&S Department of Neurological Surgery to establish the Amy and Henry R. Liss Research Assistance Fund, which will support resident research travel and guest speakers. Dr. Liss was an innovator in neurosurgery and an alum of Columbia's Neurological Institute of New York.

Tushar Shah and Sara Zion

Tushar Shah and Sara Zion have continued their generous support with a \$1.5 million gift to establish the Tushar Shah and Sara Zion Assistant/Associate Professorship of Emergency Medicine Fund. The professorship's first incumbent is Bernard Chang, MD, PhD, vice chair of research in the Department of Emergency Medicine. Tushar Shah and Sara Zion also gave \$500,000 to support the work of faculty members Evan Johnson, DPT, in the Department of Orthopedic Surgery, and Christopher Visco, MD, in the Department of Rehabilitation & Regenerative Medicine.

Dean's Basic Science Discovery Fund

An anonymous donor gave \$1 million to establish the Dean's Basic Science Discovery Fund to foster innovative science at VP&S by supporting faculty research projects. The gift includes funding for research faculty and scientists, lab equipment, fellows and trainees, and other expenses to advance priority efforts in basic science.

Jonas Philanthropies

Jonas Philanthropies made a generous gift of \$1.25 million to the Department of Ophthalmology to support the direct clinical care of children and the recruitment of an orthoptist, an eye care professional who is an expert in diagnosing and treating defects in eye movements. This five-year renewal grant helps continue the work of the Jonas Children's Vision Care program, which Jonas Philanthropies established in 2017 for families and children with vision issues.

Professorship in Honor of Lee Goldman, MD

To honor Lee Goldman's leadership as dean of the Vagelos College of Physicians and Surgeons and his tremendous impact on the field of cardiology medicine, a number of board members and longtime benefactors contributed funds to establish the endowed Cournand and Richards Profes-

sorship, named for the Nobel Prize winners who developed cardiac catheterization. Upon Dr. Goldman's retirement, the professorship will become the Lee Goldman, MD, Professorship of Cardiology.

Leonard A. Lauder

Leonard A. Lauder gave \$1.5 million to establish a new assistant/associate professorship to support rising faculty in the Department of Ophthalmology. This assistant/associate professorship is unique in that it is a rotating professorship and each incumbent will serve a limited five-year term. The candidates for this role will be talented young clinician-scientists, who will receive financial support to launch their academic careers. At the end of their five-year incumbency, the faculty members will have established a significant research record, which will permit them to secure grant funding from the National Institutes of Health or other sources to further their work. This rotation concept will provide an incentive to young faculty members to strive toward a permanent endowed position at the next level, while giving them a measure of prestige in the academic community.

Adolescent Dialectical Behavior Therapy Program

The Department of Psychiatry received a gift of \$3 million to launch and support an adolescent dialectical behavior therapy (DBT) program to serve struggling adolescents and their families. The goal of the program is to respond to the tremendous need for treatment for teens who are experiencing suicidal thinking, self-harm behaviors, and significant emotion dysregulation and the limited services in this critical area by building on Columbia Psychiatry's expertise in DBT and leadership in patient care. With this gift, Columbia is significantly expanding adolescent DBT outpatient services, launching an intensive outpatient program, and evaluating the best practices and the feasibility of options to establish a complementary residential program.

VP&S Research Highlights

Changing Focus on Alzheimer's Research

In the 1990s, the solution to Alzheimer's disease seemed clear, as new genetic studies all pointed to one culprit—hard clumps of protein, called amyloid, that litter the brains of most people with the disease.

Pharmaceutical companies jumped in to develop drugs that clear amyloid from the brain. Results from animal studies looked promising, and the drugs appeared to improve memory.

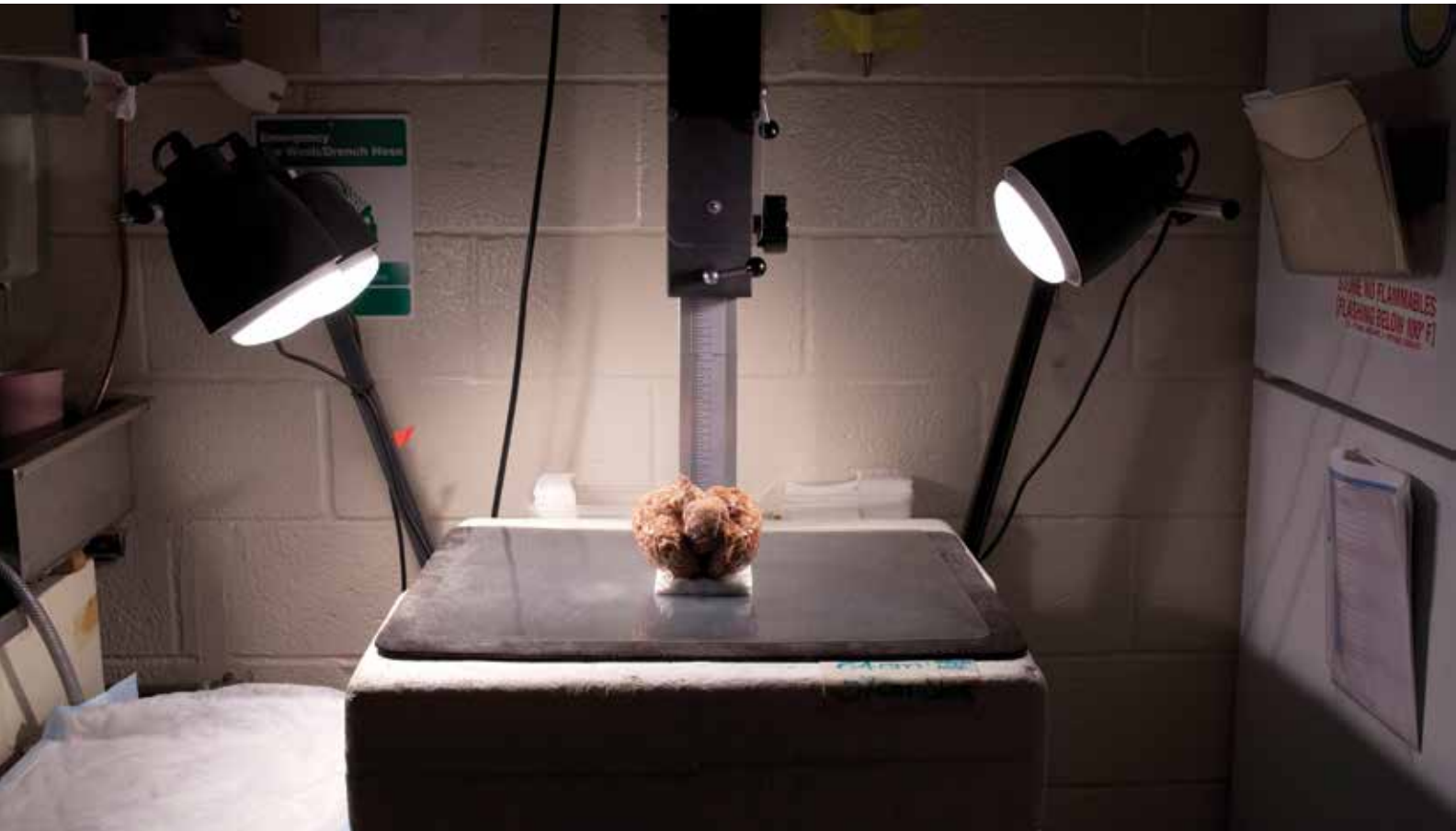
In people, though, the results have been disheartening. Over the past several years, as results from clinical trials have come in,

researchers have seen that drugs designed to eliminate amyloid have failed to slow the disease. Last year, the FDA approved one amyloid-based drug, but the decision was controversial and many physicians and researchers argue that the drug does not provide any benefit to patients.

Scott Small, MD, the Boris and Rose Katz Professor of Neurology and director of the Alzheimer's Disease Research Center at Columbia, has been one of many Alzheimer's researchers who say it is time to abandon amyloid-based therapies. "In the 90s, the idea that amyloid is the trig-

ger of Alzheimer's was extremely exciting, and there was a sense that we were on the cusp of curing this devastating, horrible disease," he says. "It was the right idea based on the available evidence, but the evidence has changed."

The changed evidence—to which Dr. Small and other Columbia researchers have contributed over the past 20 years—points to an alternative theory of Alzheimer's. The theory proposes that Alzheimer's is essentially an internal shipping problem. To stay healthy, a cell must ship cargo—mostly proteins—from one site in the cell to another.



JÖRG MEYER

“The health of neurons, more so than other cells, depends on shipping cargo in and out of one particular site: the endosome,” says Dr. Small.

About 20 years ago, Dr. Small found the first signs that traffic jams of cargo in the endosome might be initiating the disease. The study was one of the earliest in-depth studies of the neurons first affected by Alzheimer’s.

A few years later, a genetic study led by Richard Mayeux, MD, chair of neurology at VP&S, and others revealed that endosomal genes are linked to Alzheimer’s, providing more support for the theory.

Since then, Dr. Small and researchers around the world have gathered more evidence for the endosomal traffic jam theory, connecting shipping problems in the endosome with amyloid and other signs of Alzheimer’s.

“In Alzheimer’s, the flow of cargo coming out of the endosome is blocked, and we think that causes the other problems we see in the disease: the amyloid, the tau tangles also common in the Alzheimer’s brain, and the neurodegeneration,” says Dr. Small.

It’s not that amyloid has nothing to do with Alzheimer’s, he adds, but that its role has been misunderstood. “Amyloid is the smoke, not the fire. Clearing smoke can do some good, but it will not extinguish the fire.”

Two studies by Dr. Small that were published over this past year, both in *Cell Reports*, have strengthened the theory that this part of the endosome—retromer—is broken in Alzheimer’s but can be fixed to alleviate the traffic jams.

Accumulating evidence helped launch a new company, Retromer Therapeutics, to

try to develop a retromer drug to slow or stop the destructive path Alzheimer’s takes through the brain. “Sometimes we can’t fix things that we know are broken,” says Dr. Small, “but we’ve shown that retromer is druggable. In principle, there are drugs that can fix it.”

With funding from venture capitalists, Retromer Therapeutics is researching a potential drug that could be packaged in a pill and a gene therapy as ways to fix retromer and relieve the traffic jams in the endosome.

For Dr. Small, scientific co-founder of Retromer Therapeutics, the company offers hope that Alzheimer’s will eventually become a treatable condition. “The only way we’ll know we’re right is by testing our drugs in clinical trials in patients, but I wouldn’t be in this line of work if I wasn’t an optimist.”

Lyme Disease and Mental Disorders, Suicidality

Brian Fallon, MD, and collaborators from the Copenhagen Research Centre for Mental Health reported that patients who received a hospital diagnosis of Lyme disease had a 28% higher rate of mental disorders and were twice as likely to have attempted suicide post-infection. The study, reported in the *American Journal of Psychiatry*, is the first population-based study examining the relationship between Lyme disease and suicidality and the largest study of psychiatric outcomes after Lyme disease.

Intermittent Fasting Makes Fruit Flies Live Longer

A study led by Mimi Shirasu-Hiza, PhD, revealed how intermittent fasting works inside cells to slow the aging process in fruit flies and points to potential ways to get the health benefits of fasting without the hunger

pangs. The researchers found that the lifespan increased only for flies that skipped dinner, fasted at night, and broke their fast the next morning, while the lifespans of flies that instead fasted all day, eating only at night, did not change. They also found that a cell-cleaning process (autophagy) kicks in after fasting, but again only when fasting occurs during the night as these effects depend on circadian rhythms. The findings raise the possibility that behavioral changes or drugs that stimulate the cleaning process or circadian rhythms could provide people with similar health benefits, delaying age-related diseases and extending the lifespan. The study was published in *Nature*.

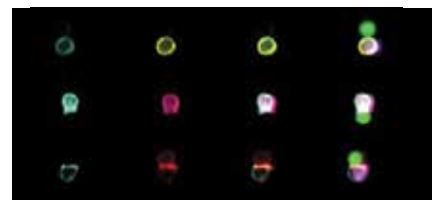
Excess Risk of Self-Injury Linked to Autism

People with autism spectrum disorder are at substantially increased risk of self-injury and suicide, reported a study

by Ashley Blanchard, MD, and Guohua Li, MD, DrPH. Researchers found that odds of self-harm in people with autism spectrum disorder were over three times that of people without the diagnosis. Elevated odds of self-harm existed in both children and adults with ASD, though there were slightly higher odds in adults. The findings were published in *JAMA Network Open*.

Infant Immune Systems

The infant immune system is stronger than most people think and beats adults at fighting off new pathogens. Babies do get a lot of respiratory illnesses from viruses, but unlike adults, babies are seeing viruses for the first time. Adults have recorded memories of the virus, which protects them. Donna Farber, PhD, and colleagues tested the immune system’s ability to respond to a new pathogen, essentially eliminating any con-



Watching T cells react to flu antigens helped the researchers identify why naive T cells from infant mice (shown above) responded faster and more robustly to the pathogen than the same cells from adult mice. The colors in the images represent different molecules involved in T cell activation.

tribution from immunological memories. For a head-to-head comparison, researchers collected naive T cells—immune cells that have never encountered a pathogen—from both infant and adult mice. The cells were placed into an adult mouse infected with a virus. In the competition to eradicate the virus, the infant T cells won handily: Naive T cells from infant mice detect lower levels of the virus than adult cells

and the infant cells proliferated faster and traveled in greater numbers to the site of infection, rapidly building a strong defense against the virus. A laboratory comparison found similar enhancements among human infant cells compared to adult T cells. The findings help explain why vaccines are particularly effective in childhood, when T cells are very robust. The research was reported in *Science Immunology*.

Disparities in Cervical Cancer

The rate of cervical cancer among women living in New York City neighborhoods with the lowest socioeconomic indices is nearly two times higher than the rate among New Yorkers who live in neighborhoods with the highest socioeconomic indices. The magnitude of the disparity exceeds those previously reported for Black race and Hispanic ethnicity compared with whites and that associated with rural residents compared with urban residents. The study was published in *JAMA Oncology*.

How Premature Birth Affects Respiratory Health

A study from Wellington Cardoso, MD, PhD, found

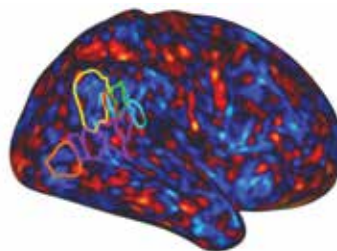
that premature birth impairs the function of stem cells in a baby's upper airways, which may contribute to further respiratory complications. The researchers developed a method that allowed them to examine these cells in discarded fluid collected from the upper air passages of babies at birth. Cells from premature infants, the researchers discovered, are defective in their quality control systems and are unable to ramp up oxygen consumption and adequately protect the upper respiratory tract when under stress. The study, published in *Scientific Reports*, highlights the importance of carefully weighing the benefits and risks of life-supporting measures in neonatal intensive care units.

Talk Therapy Declines

According to a study coauthored by Mark Olfson, MD, only 21.6% of patient visits to psychiatric practices now involve psychotherapy. Researchers analyzed 21 years of data across the United States and found that the number of visits for psychotherapy declined by half from 1996 to 2016. The study was published in the *American Journal of Psychiatry*.

Clint Eastwood and Understanding Schizophrenia

Gaurav Patel, MD, PhD, uses a clip from the 1966 spaghetti western, "The Good, the Bad, and the Ugly," plus eye-tracking technology and brain imaging to better understand why people with schizophrenia have difficulty interpreting even the simplest of human interactions. The studies identified a brain pathway—unique to humans—that may be involved in the social deficits that occur



The new brain imaging study shows that parts of the TPJ—involvement in the understanding of complex social scenes—are less active in people with schizophrenia.

in people with schizophrenia and may lead to new ways to reduce the deficits. In the study, a part of the brain called the temporoparietal junction lit up in brain scans when people scanned film scenes for the social information needed for understanding, but the same part of the brain in volunteers with schizophrenia did not light up. This resulted in this entire human-unique pathway from being used in schizophrenia, forcing reliance on less-effective alternate pathways and strategies. The findings were published in the journal *Brain*.

Loss of Placental Hormone and Brain Development

Researchers in the laboratory of Anna Penn, MD, PhD, found that reduced amounts of a single hormone, called allopregnanolone, in the placenta caused brain and behavior changes in male offspring that resemble changes seen in some people with autism spectrum disorder. The study, published in *Nature Neuroscience*, is the first to provide direct evidence that loss of a placental hormone alters long-term brain development.

Pain Measurement

In ongoing research, Caroline Arout, PhD, uses quantitative

sensory testing, or QST, for assessing the effectiveness of cannabis for therapeutic uses. Two projects aim to develop a model of cannabis-induced changes in pain perception over time by applying heat stimulation to measure effects of CBD and THC. Using the QST neurosensory analyzer, one study uses cannabis with high levels of CBD to examine its effects on the pain induced by the technology itself. The other, designed similarly, is investigating how repeated administration of high-THC cannabis affects pain over time. Data from QST could be predictive for identifying patients at higher risk for developing opioid use disorder due to higher pain sensitivity and greater likelihood of using drugs to quell that pain. It also may have potential for predicting drug use outcomes.

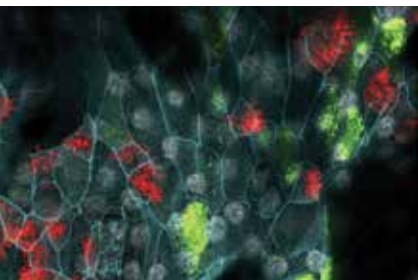
Map for Food-Caching Birds

A study from Hannah Payne, PhD, and Dmitriy Aronov, PhD, investigated the brain region that allows birds to



Cells from two different parts of the hippocampus of a titmouse color-coded by their response as the bird explores its environment

remember thousands of food hiding spots during the winter, offering a new way to study memory. Collaborating with the Zuckerman Institute's Advanced Instrumentation team, the researchers monitored the hippocampus of birds while they collected seeds. The

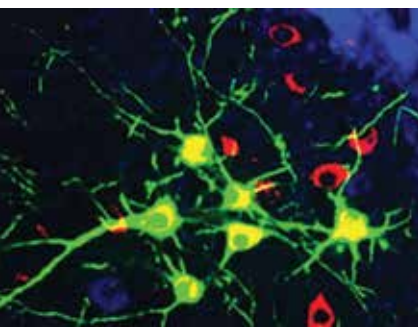


Secretory (green) and ciliated cells (red) differentiated from stem cells of the upper respiratory tract epithelium from newborn babies

study found that place cells, used to form mental maps in the brain, fired in the birds' hippocampus when the birds were searching in certain locations. The study is the first to show evidence of place cells in birds, opposing previous research suggesting that bird and mammal brains did not function similarly and paving the way for further research in birds to contribute to knowledge of the human brain.

How We Coordinate Our Steps

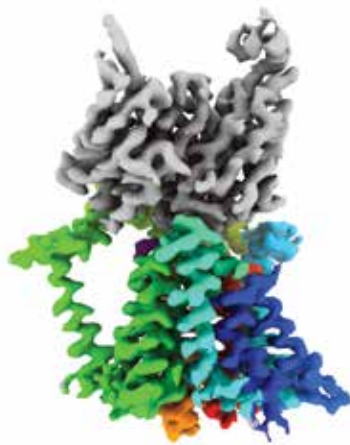
Research from George Mentis, PhD, reveals that just a single type of neuron within the assembly of circuits known as the central pattern generator is responsible for keeping our legs in lockstep. Researchers found that when these cells were chemically silenced in freely moving adult mice, the animals could no longer move properly; normal movement returned after the drugs wore off. The team also found that the cells are highly interconnected, a property that likely contributes to their ability to generate the complex rhythmic patterns necessary for locomotion. The research was reported in *Cell*.



Tiny Drill Sergeants. On their own, ventral spinocerebellar tract neurons (green) are completely responsible for keeping our legs in lockstep while walking.

Drug-Resistant Bacteria

Research led by Filippo Mancina, PhD, discovered how gram-negative bacteria, which cause drug-resistant pneumonia, bloodstream infections, and surgical site infections in hospitalized patients, finish



Model of O-antigen ligase enzyme from gram-negative bacteria

building a crucial component of their outer membrane that shields these pathogens from attacks by the immune system and antibiotics. Using single-particle cryo-electron microscopy, researchers were able to determine the structures of the enzyme that links together the lipids and sugars in two functional configurations. Combining genetic, biochemical, and molecular dynamics experiments, the researchers learned how the enzyme positions the lipids and sugars so that they can combine to form the protective membrane. The study was published in *Nature*.

Gene Variants Linked to Schizophrenia

A study conducted in collaboration with the New York State Office of Mental Health and led by Anthony W. Zoghbi, MD, and Jeffrey Lieberman,

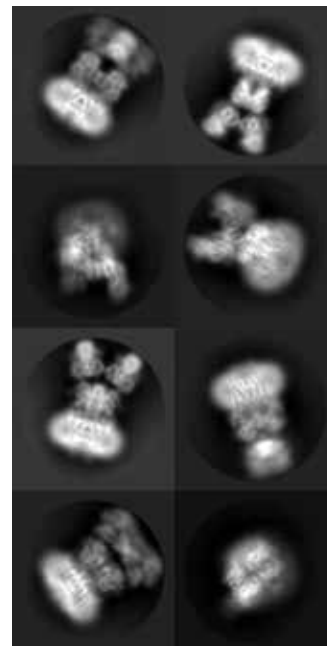
MD, determined that individuals with an extreme phenotype of schizophrenia characterized by severe symptoms that are unresponsive to standard treatments have a significantly higher number of rare mutations in genes that are relevant to neuropsychiatric disorders than more typical forms of the illness. The researchers used whole genome sequencing to study 112 individuals with severe, extremely treatment-resistant schizophrenia and 218 individuals with more typical presentations of schizophrenia and compared the results to nearly 5,000 healthy controls. The findings that were published in *PNAS* add important new information to our understanding of the genetic architecture of schizophrenia.

Thalamus Inhibition in Adolescence

A research team led by Christoph Kellendonk, PhD, has reported new evidence that cognitive abnormalities seen in neuropsychiatric disorders such as schizophrenia may be traceable to altered activity in the thalamus during adolescence, a time window of heightened vulnerability for schizophrenia. The study suggests boosting thalamic activity could help treat cognitive symptoms in schizophrenia related to altered prefrontal cortex function. The research was published in *Nature Neuroscience*.

Detailed Look at a Brain Receptor

In a study of glutamate, the most prevalent neurotransmitter in the brain, Alexander Sobolevsky, PhD, and researchers at Carnegie Mellon University combined cryo-



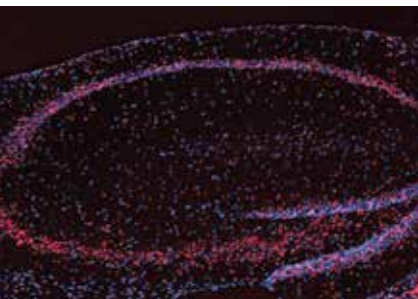
Images of individual glutamate receptors as seen with cryo-electron microscopy. Such images are helping researchers understand how the receptors—which play a role in many psychiatric and neurological conditions—work.

electron microscopy with sophisticated data analysis to reveal the first detailed pictures of the neurotransmitter binding to glutamate's receptors. The images reveal that glutamate binds to the subunits of its receptor only in specific patterns, overturning the prevailing view that each subunit binds glutamate independently and pointing to the possibility of new levels of complexity in neuronal signaling and drug responses. The results were published in *Nature*.

Turbocharger for Memory

Scientists have long known that learning requires the flow of calcium into and out of brain cells, but Attila Losonczy, MD, PhD, Franck Polleux, PhD, and Justin O'Hare, PhD, have now discovered that floods of calcium originating from within

neurons also can boost learning. The findings emerged from studies of how mice remember new places they explore. Published in *Science*, the study



A mouse hippocampus showing the nuclei of neurons (blue) and RNA (red) derived from the Pdzb gene that researchers used to investigate the role of intracellular calcium in learning.

provides a better understanding of the mechanisms that underlie learning and memory, knowledge that could help shed light on Alzheimer's disease and other disorders.

Mechanism of Common Drug Target

An interdisciplinary team of researchers led by Jonathan A. Javitch, MD, PhD, has gained new insight into the way G protein-coupled receptors (GPCRs) operate. In a study published in *Cell*, researchers used single-molecule fluorescence resonance energy transfer imaging to observe the process of β -arrestin activation by a beta-adrenergic receptor. The study uncovered new details about how β -arrestins interact with, and are activated by, GPCRs, processes that require release of autoinhibition of both the receptor and the β -arrestin. The findings could help to identify improved drugs that, by modulating the binding and/or activation of β -arrestin to GPCRs, affect specific pathways and not others.

Brain's Pleasure Chemical Triggered by Pain Too

A research team led by Bradley Miller, MD, PhD, may have discovered a clue to what drives neurons to release serotonin. In the study, published in *Neuron*, the researchers studied brain patterns in mice by using a miniature microscope to monitor the activity of serotonergic neurons as mice underwent a variety of tasks, ranging from rewarding to stressful. The more intense the situation, the more serotonin was released. Although serotonin is thought to encode pleasure, the serotonin neurons also responded to stressful stimuli, reacting to the intensity of both positive and negative events.

Telling Faces Apart

An international team of researchers that included Nikolaus Kriegeskorte, PhD, tested object-recognition models to uncover clues about the kinds of computations brains



Comparing how different facial-modeling programs measure facial similarity can offer hints to how people make those judgments.

might be making when assessing the similarity of faces. The research was published in *PNAS*. The researchers identified a "surprisingly simple" computer model that proved to be good at gauging facial differences. The researchers found that two types of models were best at replicating similarity rankings. One type,

deep neural networks, is used on our mobile phones to recognize faces in photos and is often depicted in movies and TV shows whose storylines include artificial intelligence. The other type of model that was good at replicating the facial similarity judgments was derived from the Basel face model, which was as good as more computationally intense deep neural network models in replicating the facial similarity perceptions of the participants.

Why Many Cancer Cells Need to Import Fat

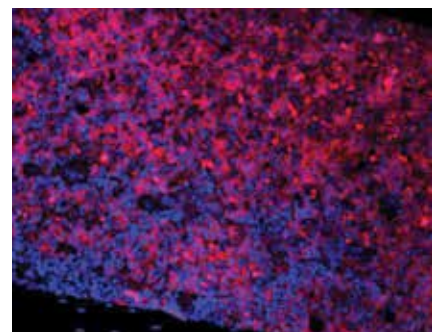
Columbia and MIT researchers have revealed surprising reasons why cancer cells are often forced to rely on fat imports from the environment. The research, led at Columbia by Dennis Vitkup, PhD, was published in *Nature Metabolism*. The study found that hypoxic cancer cells usually have enough energy for growth, but their biosynthetic pathways are often inhibited. When the researchers provided cancer cells with extra nutrients for energy generation, the cells did not respond, but when researchers used various methods to unclog biosynthetic pathways inhibited by lack of oxygen, cancer cells robustly increased proliferation. The researchers found that while various biosynthetic pathways are sensitive to oxygen availability, synthesis of fats was among the most affected. Researchers are now trying to identify the receptors that cancer cells use to import fats in different tumors and how the receptors could be targeted by drugs. The study also suggests that changing the composition of fats in the diet may play a vital role in influencing cancer growth.

DNA Gaps in Breast and Ovarian Cancer Cells

A paper in *Molecular Cell* highlighted the work of Alberto Ciccia, PhD, and Angelo Tagliabatella, PhD, and demonstrated a novel vulnerability in certain breast and ovarian cancer cells. Scientists discovered that human cancer cells deficient in the key DNA repair genes BRCA1 and BRCA2, mutations of which are common in familial breast and ovarian cancer, accumulate single-strand DNA gaps during normal DNA replication, a vulnerability that could be exploited if new treatment options are developed.

To Stop Blood Cancer, Target the Bone

Treating myelodysplasia and acute myeloid leukemia, one of the deadliest blood cancers, typically involves directly targeting the cells that give rise to the disease. Although it's possible to achieve remission with drugs that target and destroy the stem cells that give rise to leukemia, the disease usually returns with deadly consequences. Patients relapse when new types of leukemic



Targeting osteoblasts, cells that make bone, could turn a friendly environment for leukemia cells into a hostile one. Here, leukemia cells (red) are shown in the bone marrow (blue) of mice with acute myeloid leukemia.



Members of the Herbert Irving Comprehensive Cancer Center in front of the Irving Cancer Research Center building, which opened in 2005.

Cancer Center Turns 50

The National Cancer Act, signed into law Dec. 23, 1971, funded the expansion of cancer research and care at Columbia. Columbia's cancer research program began in earnest more than a century ago when the millionaire son of a railroad magnate, after losing his wife to stomach cancer, died in his mid-50s of the same disease. Despite the tragic beginning, the program now known as the Herbert Irving Comprehensive Cancer Center has developed into the source of some of the most important cancer research of our time.

stem cells that elude all existing treatments surface. Targeting neighboring bone cells may be a strategy that overcomes malignant cell resistance and prevents relapse, suggests a study led by Stavroula Kousteni, PhD. The study was published in *Cancer Discovery*.

Is Intermittent Fasting Sustainable?

An ongoing clinical trial led by endocrinologist Blandine Laferrère, MD, PhD, is hoping to inform the trendy dietary strategy of intermittent fasting. In a three-month preliminary study, the research team learned that aligning eating

time with the body's internal clock improves metabolism, and participants who restricted daily eating time lost weight and had decreases in blood pressure. Participants used a smartphone application to upload photos and data documenting food and sleep, also demonstrating the feasibility of self-monitoring via smartphone.

Making Motor Memories

James Heald, PhD, and Daniel M. Wolpert, PhD, have developed and experimentally verified a mathematical theory that explains how the human brain learns new skills without forgetting old ones. Called the

COntextual INference (COIN) model, it suggests that identifying the current context is key to learning how to move our bodies. The model describes a mechanism in the brain that is constantly trying to figure out the current context. The theory suggests that these continuously changing beliefs about context determine how to use existing memories and whether to form new ones. The research appeared in *Nature*.

Memory Filters

Satoshi Terada, PhD, and Attila Losonczy, MD, PhD, have discovered ways the brain remembers useful details and

discards insignificant ones. In a study in mice, these researchers found that the hippocampus region CA3 axons were active during experiments that included reliable and unreliable cues for information, responding to both types of sensory cues. However, only informative cues reactivated during memory consolidation. The findings show that the hippocampus has a filtering mechanism that focuses on what we selectively pay attention to in the moment and excludes insignificant details as our experiences are later transferred to long-term storage. The study appeared in *Nature*.

VP&S COVID-19 Highlights

While research efforts at the start of the pandemic were focused on the origins and spread of COVID-19, VP&S researchers have since turned their attention to the wide-reaching effects of the virus. Highlights of some of the research findings and other COVID-19 programs:

Understanding Omicron

Multiple studies led by David Ho, MD, suggest that the omicron variant and its subvariants BA.4 and BA.5 are better at eluding vaccines and antibody treatments than previous COVID-19 variants. The first study found that the omicron variant can evade the immune protection conferred by vaccines and natural infection, with the efficacy of two doses of the vaccines against symptomatic disease shown to be significantly reduced against the variant. The second study found that only one of 21 currently authorized antibody treatments tested retains its activity against all omicron subvariants. The study also showed that the effectiveness of mRNA vaccines was reduced against all subvariants of omicron. A more recent study revealed that the variant BA.2.12.1 was only modestly more resistant than BA.2 in individuals who were vaccinated and boosted, and BA.4 and BA.5 were at least four times more resistant than their predecessor. All three studies were published in *Nature*.



Outreach and Vaccination Rates

Community outreach and restricting COVID-19 vaccine appointments by zip code helped New York-Presbyterian reach Black and Hispanic patients and reduce health disparities in COVID-19 vaccine uptake, according to a study by Daniela C. Diaz, MD, and colleagues. More than 100,000 people were vaccinated at the Armory from Jan. 14, 2021, to May 14, 2021, in a collaboration that included Columbia University and Weill Cornell Medicine. In late January, NYP digitally redesigned the scheduling system to restrict it to residents from zip codes with high racial and ethnic minority populations. That was combined with a direct outreach to local Spanish-speaking and underserved communities through community-based organizations such as senior centers, faith-based organizations, and local primary care practices. Before these two interventions, Black patients represented only 2% of the self-scheduled appointments for a first COVID-19 vaccine dose, and Hispanic patients represented 4%. Following the digital redesign, those numbers increased to 10% and 31%, respectively. Black patients accounted for 12% of appointments made through community outreach, and Hispanic patients represented 58% of appointments. The study was published in *JAMA Open Network*.

Heart Problems in Kids

Heart problems in children hospitalized with multisystem inflammatory syndrome, an inflammatory condition triggered by COVID—were mostly gone within a few months, a study by Kanwal M. Farooqi, MD, found. Doctors treated the children with steroids, and most received intravenous immunoglobulin. One-third received respiratory support, and more than half received therapies to increase and maintain blood pressure. After six months most children's heart abnormalities resolved and they returned to normal. The study was published in *Pediatrics*.

COVID Deaths and Kidney Transplantation

In a nationwide study of kidney transplant recipients and waitlisted candidates, research found that COVID increased mortality in both groups in 2020—20% among recipients and 24% among candidates—compared with 2019. Patients from racial and ethnic minorities were disproportionately affected. Black and Hispanic waitlisted patients together accounted for 50% of all non-COVID deaths but 72% of all COVID deaths. Among transplant recipients, these groups accounted for 62% of COVID deaths and 39% of

non-COVID deaths. The study, led by Sumit Mohan, MD, was published in the *Clinical Journal of the American Society of Nephrology*.

Lung Maintains Long-Term Memory of COVID

Though numerous studies have examined blood to track immune responses to SARS-CoV-2, a new study of COVID survivors shows that the memory of the infection is primarily stored in T and B cells within the lung and the lymph nodes surrounding the lung. The study, led by Donna Farber, PhD, was published in *Science*.

Immunology. Identifying the source of immunological memory of SARS-CoV-2 infection could lead to improved vaccines or boosters. Researchers also found evidence that specialized sites, called germinal centers—where antibody-producing B cells and memory B cells are generated—were present within the lung-associated lymph nodes for up to six months after infection, even in elderly individuals. The study provided the first direct evidence that germinal centers persist after SARS-CoV-2 infection.

Comorbidities Don't Tell the Full Story

Several types of preexisting health conditions have been associated with poor outcomes among hospitalized patients with COVID, but a study suggests that other biological factors may be more important in determining prognosis and survival factors. An analysis led by Soojin Park, MD, identified four unique groups of patients who had vastly different outcomes not based on classic risk factors such as age, sex, and preexisting conditions. The group with the highest number of comorbidities, for example, did not have the worst outcomes and had a relatively low mortality rate, indicating that comorbidities alone are not responsible for variable COVID clinical courses. The study was published in *Frontiers in Medicine*.

Study Reveals Toll of Poor Sleep Among Health Care Workers

In a pair of papers, Marwah Abdalla, MD, and collaborators quantified the effect of the COVID pandemic on health care workers' sleep patterns

and the potentially damaging consequences of sleep disturbance on mental health. The first paper, published in the *International Journal of Environmental Research and Public Health*, summarized the sleep data showing that over 70% of health care workers had at least moderate insomnia symptoms during the pandemic's first peak. A later paper, published in the *Journal of Affective Disorders*, found that health care workers who reported poor sleep also reported higher levels of stress, anxiety, and depression than health care workers who slept better.

Pandemic Babies and Developmental Screening

Dani Dumitriu, MD, PhD, found that babies born during the pandemic's first year scored slightly lower on a developmental screening test of social and motor skills at 6 months—regardless of whether their mothers had COVID during pregnancy—compared with babies born just before the pandemic. The study of 255 babies born at Morgan Stanley Children's Hospital or Allen Hospital between March and December 2020 and 62 infants born at the same hospitals in the three years preceding the pandemic was published in *JAMA Pediatrics*. No differences were found in scores between infants who were exposed to COVID in utero and those born during the pandemic whose mothers did not contract COVID during pregnancy. However, average scores for infants born during the pandemic were slightly lower than for pre-pandemic born infants on gross motor, fine motor, and social skills.

Multisystem Inflammatory Syndrome (MIS-C) in Children

A study has identified unique features of a rare but potentially deadly complication of COVID in children, suggesting how the syndrome gets started. Mark Gorelik, MD, and Robert Winchester, MD, found that some immune cells, called "dendritic cells" in responding to the virus mistakenly direct the immune system to attack blood vessels in the body that were damaged by the virus. The study was published in the *Journal of Allergy and Clinical Immunology*.

Alzheimer's-like Changes in Some COVID Patients

A study from Andrew Marks, MD, reports that the brains of a small sample of patients who died of COVID display some of the same molecular changes found in the brains of people with Alzheimer's disease. Investigators theorize that the immune response characteristic of severe COVID causes inflammation in the brain, which in turn leads to dysfunctional ryanodine receptors followed by increases in phosphorylated tau. The findings could help explain the memory problems reported by sufferers of "long COVID," though the researchers caution that the study is small—with data from only 10 patients—and needs to be replicated. The study was published in *Alzheimer's & Dementia: The Journal of the Alzheimer's Association*.

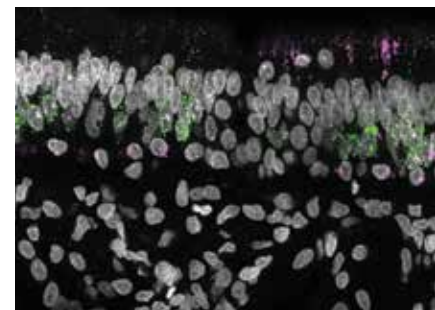
COVID and Delayed Recovery of Consciousness

Most COVID patients who are put on ventilators regain consciousness after the removal of respiratory support and sedation, but some patients

may take weeks to regain consciousness, according to a study led by Jan Claassen, MD. The study found that patients took longer to recover consciousness the more they experienced episodes of low blood oxygen levels during treatment. The study was published in *Annals of Neurology*.

Loss of Smell Begins in the Nuclear Hearts of the Nose's Sensory Cells

The loss of smell was a signature symptom for many people infected by SARS-CoV-2, but how the virus causes this symptom has been a mystery. Researchers led by Stavros Lomvardas, PhD, and Marianna Zazhytska, PhD, found



Micrograph of human olfactory epithelium from COVID-19 patient labeling SARS-CoV-2 in magenta and olfactory neurons in green. SARS-CoV-2 is detected in the apical layer and does not colocalize with olfactory neurons.

that the virus can rearrange chromosomes in the cells that connect the nose to the brain, olfactory sensory neurons. The research by a collaboration of 19 scientists was published in *Cell*. The key finding centers on dramatic disruptions in the ways chromosomes self-organize and form interconnections inside olfactory neurons, with SARS-CoV-2 infections disrupting the must-have chromosomal organizations.

VP&S Clinical Highlights

A Breakthrough That Led to Hair Loss Treatment

For over a decade, Columbia geneticist Angela Christiano, PhD, has attended the annual meeting of the National Alopecia Areata Foundation, where hundreds of individuals affected by alopecia areata gather to support one another and learn about the latest scientific research. A recent meeting was a bit different: Dr. Christiano had trouble recognizing conference attendees she's known and worked with for years, because many of them now have full heads of hair. For people with alopecia areata, an autoimmune

disease that can cause hair loss so complete that people even lose their eyebrows, the change in appearance was dramatic.

It was also a direct result of Dr. Christiano's groundbreaking research on the condition, which led the FDA in June 2022 to approve the first systemic treatment specifically developed for severe alopecia areata.

Unlike hormone-driven male pattern baldness, alopecia areata is an autoimmune disease in which the body's own immune system mistakenly attacks the hair follicle and shuts down hair produc-

tion. When Dr. Christiano, the Richard and Mildred Rhodebeck Professor of Dermatology, vice chair of research in the Department of Dermatology, and professor of genetics & development, began working on alopecia nobody knew exactly what caused the problem.

Starting with a series of basic research studies on the genetics and cell biology of hair growth, Dr. Christiano and a multidisciplinary team of collaborators produced a steady stream of advances, first in the lab and then in the clinic.

The first major clue came in 2010, from a study led by Dr. Christiano's team that looked through the genomes of a thousand patients. The study, published in *Nature*, uncovered a gene that, when abnormally expressed, produces a known danger signal that causes the body to recognize the hair follicle as foreign.

The genome study led the team to focus on investigating a particular kind of killer T cell recruited by the danger signal, which became central to understanding the mechanism of hair follicle destruction.

Dr. Christiano is not an immunologist, so she enlisted Raphael Clynes, MD, PhD, then a faculty member in the Department of Medicine, who was an expert in studying the same kinds of killer T cells in type 1 diabetes and cancer. Dr. Clynes looked at the list of genes from the genome study and images of the "swarm" of killer T cells surrounding the hair follicle and suggested that inhibiting enzymes known as JAK kinases might be one way to treat the disease.

The team showed that small molecule drugs called JAK inhibitors could shut down signaling inside the killer T cells. By inhibiting the JAK pathway, the team



GETTY IMAGES

found they could reverse alopecia areata in a mouse model of the disease.

Armed with photos of mice with alopecia that had regrown all their hair, Dr. Christiano approached Julian Mackay-Wiggan, MD, then a Columbia dermatologist who specializes in hair disorders and had an interest in early-stage clinical research.

Dr. Mackay-Wiggan began treating a few patients with alopecia areata using JAK inhibitors that were already FDA-approved for other disorders. The first few patients experienced dramatic regrowth of their hair, just as the researchers had observed in the mice. Dr. Christiano's team reported these groundbreaking studies in 2014.

Additional Columbia clinical studies showed that 75% of patients experienced significant hair regrowth after treatment with two different JAK inhibitors.

Soon after the Columbia team reported its findings, additional case reports began

appearing in the published literature that replicated the results in alopecia patients around the world. It didn't take long for pharmaceutical companies to turn their attention to developing JAK inhibitors specifically for alopecia treatment. These efforts led to newly approved Olumiant from Eli Lilly, Incyte (previously approved for rheumatoid arthritis and hospitalized patients with COVID-19), and two additional JAK inhibitors being developed by Pfizer and Concert Pharmaceuticals and now in late-stage clinical trials.

While JAK inhibitors can be life-changing for patients who respond well to them, the treatments are far from perfect. "These are potent immunosuppressive drugs, so there are safety considerations to be taken into account when assessing the risk/benefit ratio for individual patients," says Dr. Christiano. After treatment ends, some patients' alopecia relapses for reasons the researchers don't fully

understand. In addition, about a third of patients do not respond to the drugs.

The Christiano lab continues its work to understand what causes the condition to relapse, and the team is also developing new biological insights and more potential ways to attack the disease process. The team hopes to extend these insights and apply the same approaches to treat other types of hair loss. Hair follicles are dormant in male and female pattern baldness, and a recent study by Dr. Christiano's team found that JAK inhibitors can reawaken dormant follicles.

They discovered a previously unknown type of immune cell that puts hair follicles into a dormant state by secreting a substance called oncostatin M and that the hair cycle can be reactivated by blocking this pathway.

Translating research results into effective treatment may take years, but it provides hope for patients with all types of hair loss.

Tackling Resistance to Immunotherapy in Colon Cancer

A study by Piero Dalerba, MD, and William J. Raab, PhD, found that some people with colon cancer have certain mutations that render cancer cells "less visible" to the immune system. The finding, published in *Gastroenterology*, may help physicians identify patients who are most likely to benefit from immunotherapies and those who should receive other treatments.

Promising Treatments for Deadly Brain Cancer

A pair of clinical trials from Andrew B. Lassman, MD, addressed the efficacy of two new treatments for patients with recurrent glioblastoma and related tumors. The first trial tested the use of infigratinib in fibroblast growth factor

receptor (FGFR)-targeted therapies. The trial found that the therapy had limited efficacy in patients with recurrent gliomas and a wide range of different FGFR genetic alterations. However, activating point mutations in FGFR1, FGFR3, or FGFR3-TACC3 fusion in tumor tissue, present in a subset of patients, predicted durable disease control from treatment with infigratinib. The second clinical trial found that selinexor, the first of a new class of anti-cancer drugs, was able to shrink tumors in almost a third of patients with recurrent glioblastoma. Both studies were reported in *Clinical Cancer Research*.

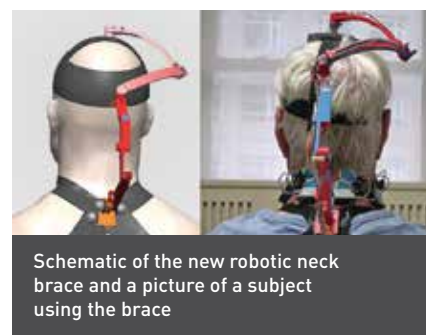
Promising ALS Therapy

An experimental drug first tried at Columbia in an effort to help a 25-year-old woman with

juvenile ALS is now being tested in ALS patients in a global, phase 3 clinical trial, based on promising results from a new study. The latest study, led by Neil Schneider, MD, PhD, and published in *Nature Medicine*, found that the drug—informally named jacifusen—lowered levels of FUS, a toxic protein found in the 25-year-old's neurons and in mice with the disease. The clinical trial will be pivotal in determining if the drug can slow the progression of the disease.

Robotic Neck Brace and Impact of Cancer Treatment

A robotic neck brace developed by Columbia Engineering and the VP&S Department of Otolaryngology/Head and Neck Surgery may help doctors analyze the impact of cancer treatments on the neck



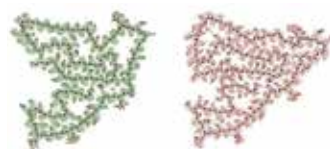
Schematic of the new robotic neck brace and a picture of a subject using the brace

mobility of patients and guide their recovery. Teams led by Sunil K. Agrawal, PhD, and Scott H. Troob, MD, designed a new wearable robotic neck brace, adapting a robotic neck brace previously developed to analyze head and neck motions in patients with amyotrophic lateral sclerosis. The new brace, developed to more reliably and portably detect a full range of neck motions, was found to precisely detect changes in patient neck movements dur-

ing routine clinical visits. They published their work in the journal *Wearable Technologies*.

Possible Common Thread in Neurodegenerative Diseases

Ever since the 1980s, when neuroscientists began identifying protein tangles in brains afflicted by Alzheimer's disease, researchers have discovered that other brain diseases have their own tangled-protein signatures. In a study led by Anthony Fitzpatrick, PhD, and published in *Cell*, an international team of collaborators identified a new fibril in brains



A key fragment of the protein TMEM106B, several atomic models of which are shown here, can stack into single or twinned types of fibrils.

affected by several different diseases. The researchers speculate that the fibril may promote the formation of fibrils specific to each neurodegenerative disease, ultimately leading to dementia, movement problems, speech pathologies and other symptoms of brain diseases that have protein tangles. Evidence of a common thread linking a range of neurodegenerative diseases could open the way to new interventions.

Promising Drug Target in Recurrent Lung Cancer

A new study led by Swarnali Acharyya, PhD, has identified a novel combination therapy that has the potential to stop metastatic tumor growth in lung cancer patients whose cancer has relapsed in the brain after

targeted therapy. In a paper published in *Cancer Discovery*, researchers uncovered a signaling pathway in EGFR-mutant lung cancer responsible for driving recurrence and metastases, spreading to the brain. Specifically, the researchers investigated disease recurrence after treatment with osimertinib, a highly successful targeted therapy for EGFR-positive lung cancer. The work revealed that the signaling pathway, called S100A9-ALDH1A1-RA, is responsible for driving osimertinib-refractory lethal brain relapse and identified an inhibitor to shut down that pathway and prevent cancer progression in preclinical models.

Missing Links in Alzheimer's Research

A study by Richard Mayeux, MD, published in *Acta Neuropathologica*, uncovered a gene called FMNL2 linking cerebrovascular disease and Alzheimer's. The finding could lead to a way to prevent Alzheimer's in people with hypertension, diabetes, obesity, or heart disease. Another study from Francesca Bartolini, PhD, suggests that a common protein within cells—which acts as microscopic railroad tracks—known as “microtubules” become too stable during early stages of Alzheimer's disease, altering neuronal activity and impairing memory. The study, published in *Brain*, suggests a novel strategy for treating Alzheimer's disease and other neurodegenerative disorders.

Can a Beta Blocker Prevent Bone Loss?

A clinical trial led by Elizabeth Shane, MD, tests a promising drug candidate for osteopo-

rosis, a low-cost beta blocker drug called atenolol that is often prescribed to reduce high blood pressure. The phase 3 trial will determine whether a phase 3 trial will determine whether two years of atenolol can safely prevent bone loss in postmenopausal women.

Opioid Vaccine Being Tested

The first experimental vaccine to be tested in the United States for treatment of opioid use disorder is being studied in a phase 1a/1b clinical trial led by Sandra Comer, PhD. The experimental vaccine is designed to prevent oxycodone from getting into the brain, where it causes a euphoric feeling, or “high,” and can impair the brain's breathing centers and cause death if a user overdoses.

New Drug for Malaria?

A new antimalarial drug candidate has the potential to be a single-dose treatment, according to a new report from David Fidock, PhD, and James M. Murithi, PhD, who conducted the research while a graduate student at VP&S. The study, reported with colleagues at Medicines for Malaria Venture, was published in *Science Translational Medicine*. Laboratory experiments suggest *Plasmodium falciparum* parasites cannot easily develop resistance to the drug, as has happened to current antimalarial agents. The new compound also appears to be effective against all strains of the parasite. The compound is in clinical trials in Australia.

Clinical Trials Diversity

Columbia has joined with Pfizer to establish the Columbia-Pfizer Clinical Trials Diversity Initiative to reduce health disparities

by increasing the participation of underrepresented minorities in clinical trials and enhancing the diversity of clinical researchers. Pfizer will provide a three-year, \$10 million grant to Columbia to help establish and expand the Initiative.

Improving Outcomes in Advanced Ovarian Cancer

Despite clinical guidelines that advocate surgery as a first step, many patients with advanced ovarian cancer should be treated first with chemotherapy, a study by Alexander Melamed, MD, suggests. The study, published in *JAMA Oncology*, took advantage of the fact that some, but not all, cancer centers changed their approach for treating advanced ovarian cancer to include more frequent use of upfront chemotherapy to conduct a natural experiment. The study found that women treated at cancer centers that increased the use of upfront chemotherapy had greater gains in short-term survival compared with women treated at centers that continued to use upfront chemotherapy rarely. Women had similar improvements in long-term survival at both categories of centers.

Mobile Depression App

Psychiatry faculty in partnership with a next-gen clinical decision support platform developed an interactive smartphone application that provides point-of-care treatment algorithms for major depression. The app—known as Columbia Psychiatry Pathways—supports and strengthens the ability of clinicians to provide critical mental health services in an outpatient setting.

Ketamine and Cognitive Function

Ketamine, a drug used to treat mood disorders and severe depression, improved the thinking and reasoning of those who expressed thoughts of killing themselves within 24 hours. A study led by Michael F. Grunebaum, MD, and J. John Mann, MD, and published in the *Journal of Clinical Psychiatry* found that one dose of ketamine not only reduced the severity of depression in people with suicide ideation, many of whom had not responded to other antidepressants, but also made them feel safer and less likely to harm themselves because it rapidly diminished their suicidal ideation.

Cough Suppressant Knocks Some Hearts Back into Rhythm

An over-the-counter cough suppressant can knock some

heart cells back into rhythm, a finding that may lead to a new way to treat long QT syndrome. Masayuki Yazawa, PhD, found that the cough suppressant, when added to heart cells, successfully prepared the heart cells for the next beat and soothed the cells' irregular rhythm. The study was published in *Nature Cardiovascular Research*.

Statins for Young Adults

A mathematical modeling study led by Andrew Moran, MD, suggests that statins would provide lifetime health benefits for young adults with untreated high cholesterol by preventing or delaying many heart attacks and strokes. Earlier statin treatment would be cost-effective, particularly for young adult men. Clinical guidelines recommend that statins only be used for cholesterol-lowering in young adults

with extremely high levels of LDL cholesterol, but initiating cholesterol-lowering treatment at LDL cholesterol thresholds lower than currently recommended could prevent three cardiovascular disease events for every 1,000 young adults with high cholesterol initiated on lifetime treatment. The study was published in the *Journal of the American College of Cardiology*.

Personalized Therapies for Rare Genetic Forms of ALS

A new initiative, Silence ALS, will develop experimental personalized therapies to treat patients with rare genetic forms of ALS. The initiative focuses on patients with the rarest of gene mutations. Each mutation is thought to affect between 1 and 30 people worldwide. Focusing on individuals identified through Columbia's ALS Families Project—a study of pre-symptomatic carriers of ALS-associated gene mutations—the Silence ALS program aims to treat patients early in the course of their disease, ideally before onset of symptoms, with drugs called antisense oligonucleotides.

Using Patient-Derived Organoids to Predict Tumor Response

In pioneering new tools to treat head and neck cancers, researchers used 3D representations of a patient's tumor, known as organoids, to mimic a tumor's biological activity in vitro. Clinicians obtain tissue from a patient at the same time a biopsy is taken for pathologic diagnosis. A tissue specimen is used to rapidly grow a patient's original tumor into a 3D structure, or organoid, in test tubes. The structure

mimics the original tumor and can allow analyses, molecular-level sequencing, or treatment. "One key aspect of this is our ability to test, identify, and potentially predict the drugs that will work best for each cancer patient," says Hiroshi Nakagawa, MD, PhD.

Gaps in Emergency Care for Youth in Crisis

A study led by Megan M. Mroczkowski, MD, and Madelyn Gould, PhD, suggests



that directors of pediatric emergency departments in North America voice the need for increased mental health resources for youth. The findings are based on a survey of chiefs of pediatric emergency medicine who were asked about their standard practices and needs. The paper was published in *Psychiatric Services*.

Horse Therapy for Veterans

New research shows that equine assisted therapy, an experiential treatment method that uses the connection between people and horses to enhance emotional healing, can jump start the healing process for veterans who suffer from PTSD. The research, published in the *Journal of Clinical Psychiatry*, was conducted by Yuval Neria, PhD, and Prudence Fisher, PhD, principal investigators of the Man



On-site behavioral health therapists are available at all ColumbiaDoctors Primary Care locations. This photo shows the primary care team at ColumbiaDoctors Midtown.

Pairing Primary Care with Mental Health

A program started in Fall 2021 embeds behavioral health specialists alongside primary care providers at all ColumbiaDoctors Primary Care locations to care for patients' new or previously diagnosed depression. Primary providers regularly screen their patients for signs of depression and, when needed, consult with psychiatrists and psychologists on treatment plans.

O'War Project. The investigators developed a protocol and manual for implementing group equine assisted therapy—the first manual of its kind—and tested it with 63 veterans with PTSD. Groups met weekly for eight 90-minute sessions co-led by a mental health professional and an equine specialist. All but five veterans completed the protocol, and posttreatment assessment revealed marked reductions in both PTSD and depression symptoms that persisted at a three-month follow-up. The manual is now being made available to other equine assisted therapy providers.

Psilocybin and Depressive Symptoms

Columbia Psychiatry was one of 26 sites throughout the United States and Europe—

and the largest recruiting site—to investigate the use of a psychedelic for treatment-resistant depression. The study, the first to investigate a classical psychedelic for FDA approval, found that a single dose of psilocybin, combined with psychological support, generated a rapid response and significant reduction in depressive symptoms after three weeks and a rapid and durable response that lasted for up to 12 weeks. The Columbia Psychiatry site was led by David J. Hellerstein, MD, in partnership with Compass Pathways, a London-based biotech company. The phase 2 clinical trial evaluated COMP360—a psychedelic compound in magic mushrooms—in the largest study of psilocybin to

treat depression in people not helped by existing therapies. The results were presented at the American Psychiatric Association annual meeting. The Depression Evaluation Service at Columbia Psychiatry and the New York State Psychiatric Institute plans to participate in phase 3 studies, which will enroll over 700 subjects to provide evidence for FDA approval of psilocybin. The Depression Evaluation Service has received funding for additional studies of psilocybin and other psychedelic compounds for depression and related disorders.

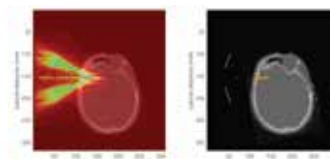
Screening for Genetic Heart Disease

A screening program that combines genetic and lab testing could identify 1 million Americans who are at risk of early death from heart disease because they carry a gene that causes high cholesterol, researchers found. A study estimated how different screening programs for adults age 20 and older would perform in the U.S. population. When used alone, clinical screening (cholesterol tests plus personal or family history of heart attack or stroke) and genetic screening could each identify about 650,000 cases of familial hypercholesterolemia. The combination of clinical and genetic testing could identify 1.1 million Americans with the disease. Screening for the disease is not standard practice, says study leader Brandon Bellows, PharmD. The study was reported in the Journal of the American Heart Association.

Opening the Blood-Brain Barrier

In a clinical trial, Stergios Zacharoulis, MD, and Cheng-

Chia Wu, MD, PhD, are using a focused ultrasound technique developed by Elisa Konofagos, PhD, to temporarily open the natural barrier in the brain to more effectively and safely deliver chemotherapy for pediatric patients with an aggressive type of brain can-



Prediction of transcranial wave propagation and formation of focal spot in the brain before focused ultrasound application using CT scans of the subject: wave intensity map overlaid onto the CT scan, left, and thresholded map showing the focal spot in the brain, right.

cer, diffuse intrinsic pontine glioma. This is the first study in the world to use focused ultrasound to open the blood-brain barrier in children, and the team was the first to successfully open the barrier in children. The trial was developed through the Initiative for Drug Delivery Innovation in Childhood Brain Tumors in the Department of Pediatrics in collaboration with the Department of Radiation Oncology and the Department of Biomedical Engineering.

Iron Deficiency

Current thresholds for detecting iron deficiency in women and children may be too low, found a study led by Gary M. Brittenham, MD. The study found that physiological changes occur at test levels higher than the current thresholds, and about 30% of both women and children in the United States would be consid-



Columbia Fertility Clinic Opens in White Plains

The Columbia University Fertility Center has expanded into Westchester County and opened a new clinic in White Plains, New York. The site offers a full suite of fertility services, including fertility screening and diagnosis, semen analysis, intrauterine insemination, oncofertility services, preimplantation genetic testing, daily monitoring for IUI and IVF cycles, and referrals to obstetric and gynecologic care at Columbia University Irving Medical Center.

ered iron-deficient under the new thresholds proposed by the investigators. About 17% of premenopausal women and 10% of children in the U.S. population are now considered iron-deficient under the current thresholds.

New Life for Conjoined Twins

Alusine and Isatu Jalloh traveled 4,300 miles to give their daughters, conjoined twins, a chance for a better life. Columbia surgical teams led by Thomas Imahiyerobo, MD,



"We went through a lot before the separation," says the twins' father, Alusine Jalloh. "We give thanks to each and every one in this hospital."

Tomoaki Kato, MD, Steven Stylianios, MD, Emile Bacha, MD, and Mercedes Martinez, MD, successfully separated the twins who shared a significant portion of their liver and abdominal wall.

Common Virus May Cause Serious Disease in Transplant Patients

A common virus that causes no harm in most people may be a danger to organ transplant recipients and other immunocompromised people, say researchers led by Stephanie Gallitano, MD, and Nischay Mishra, PhD. A human polyomavirus—HPyV9—was associated with the deaths of three solid organ transplant recipients who developed a severe skin rash and died about a year later from pulmo-

nary and multiorgan failure. The study was published in *JAMA Dermatology*.

Combination Therapy for Gastric Adenocarcinoma

In a phase 2 clinical trial testing perioperative chemioimmunotherapy and maintenance immunotherapy for resectable gastric cancer or gastroesophageal junction cancer, Gulam Manji, MD, PhD, found that perioperative therapy resulted in a complete pathological response—no viable cancer cells—in 20.6% of patients and a near-complete response—single or rare small groups of cancer cells—in 17.6% of patients. The study is ongoing, but researchers estimate that 60% of patients will have no sign of their cancer at two years after treatment. Patients over the age of 70 also demonstrated impressive complete pathological responses. The findings were presented at this year's American Association for Cancer Research annual conference.

Genetic Screening for Kidney Disease Risk

A new algorithm developed by Columbia researchers can analyze thousands of variants across the genome and estimate a person's risk of developing chronic kidney disease, and the algorithm works in people of African, Asian, European, and Latino descent. In a study published in *Nature Medicine*, Krzysztof Kiryluk, MD, and his team described their method and tested it on 15 different groups of people. The algorithm analyzes variants of a gene called *APOL1*—known to be a common cause of kidney disease in people of African

descent—and thousands of other kidney disease variants found in people of all ancestries. More testing of the new prediction method is needed before it can be used in clinical settings, and the method is being tested in a large national study, called eMERGE-IV, that screens participants and offers additional follow-up and lab testing for people at high genetic risk. The study will determine if genetic testing for the new risk score affects clinical outcomes, including lifestyle changes and rates of new kidney disease diagnoses.

Center for Excellence for Pancreatic Cancer

The Pancreas Center at Columbia and NewYork-Presbyterian has been nationally recognized as an approved National Pancreas Foundation Center by the National Pancreas Foundation. Centers are approved after a rigorous audit review to determine that an institution's focus is on multidisciplinary treatment of pancreatic cancer, treating the whole patient with a focus on the best possible outcomes and an improved quality of life.

Promising Combination Therapy for Non-Small Cell Lung Cancer

New results from a phase 1/1b clinical trial have shown promise in a subset of patients with non-small cell lung cancer whose disease progressed after standard-of-care therapies. The updated results of the CHRYSA-LIS-2 study were presented at this year's American Society of Clinical Oncology meeting by Catherine Shu, MD. Results demonstrated encouraging early activity of amivantamab,

an epidermal growth factor receptor (EGFR)-MET bispecific antibody, combined with the third-generation tyrosine kinase inhibitor lazertinib in patients with EGFR-mutant non-small cell lung cancer who have progressed on standard of care osimertinib and platinum-based chemotherapy.

Smarter Radiation Therapy for Cancer

The latest advance in radiation therapy—using artificial intelligence to adjust treatments as needed without delay—is available for select cancer patients at Columbia. The new advance resolves a long-standing issue in radiation oncology: the difficulty of adapting treatment to anatomical changes in the patient or the tumor that can occur during many weeks of therapy. With the new system, known as adaptive online radiation therapy, patients undergoing weeks of radiation treatment may have their treatment plan reassessed and optimized before every session, allowing the maximal radiation dose to be delivered to the tumor while reducing the risk of irradiating nearby healthy tissues. "The benefits to the patient are potentially substantial," says Michael Price, PhD. "With conventional radiotherapy, if a tumor shrinks after several weeks of treatment, the patient still receives radiation designed for the full-sized tumor. We can create a new plan based on these changes, but it frequently leads to a pause in a patient's course of treatment since it requires an additional CT scan and time to create a new plan from scratch." The new system automatically recalculates the treatment plan based on the patient's condition during each treatment.

Opioid Misuse in Cancer Pain Management

Two studies published in *Cancer* highlighted the increased risk that cancer patients face for persistent opioid use. The first study measured rates of new and prolonged opioid use in adolescents and young adults with cancer, while the other tested an intervention to reduce the risk for prolonged opioid use following cancer-related surgery and treatment. The first study, led by Dawn L. Hershman, MD, and Melissa Beauchemin, PhD, examined insurance claims data across the United States and found that more than half of adolescents and young adults with sarcoma were prescribed opioids dur-

ing their treatment, and nearly one-quarter of the patients continued to use opioids after treatment was completed. The second study, led by Dr. Hershman and Jacob Cogan, MD, demonstrated that use of an inexpensive pill-dispensing device that could be easily returned by mail increased rates of disposal of unused opioids after cancer surgery.

Far-UVC Light and Indoor Air

A type of ultraviolet light that is safe for people took less than five minutes to reduce the level of indoor airborne microbes by more than 98%, reported a study conducted by several groups. The results suggest that far-UVC light from

lamps installed in the ceiling could be a highly effective passive technology for reducing person-to-person transmission of airborne-mediated diseases such as COVID and influenza. The study, published in *Scientific Reports*, was co-authored by David Brenner, PhD.

Hypertension Center Certified

The Columbia Hypertension Center has been certified as an American Heart Association Comprehensive Hypertension Center, an official recognition that Columbia is a leader in the care of patients with high blood pressure. The center is one of only 15 centers in the country to receive the AHA Comprehensive Hypertension Center certification and the only one in the New York City metropolitan area. The center offers patients who are uncertain whether they have high blood pressure and those with complex or difficult-to-treat cases of hypertension the most up-to-date diagnostic and treatment strategies based on the latest proven scientific research.

Best Weight Loss Option for Patients with Diabetes

Using data from previous studies and databases, Chin Hur, MD, created a model to investigate the effectiveness, quality of life gains, costs, and complications of gastric bypass, sleeve gastrectomy, and medical therapy among patients with diabetes over a five-year period. The study, published in *JAMA Network Open*, is the first to consider diabetes severity in a comparison of gastric bypass and sleeve gastrectomy, which are the two most popular forms of bariatric surgery in the United States.

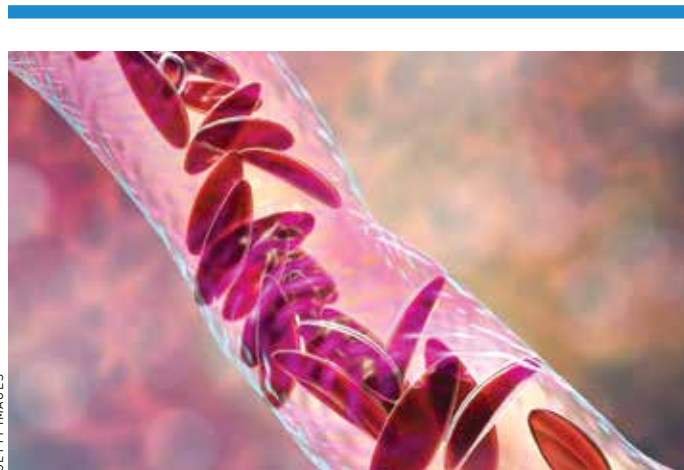
The new analysis showed that gastric bypass leads to greater weight loss and a greater rate of remission of diabetes than sleeve gastrectomy or medical therapy, which involves lifestyle counseling and medication. Gastric bypass surgery also produces the best results regardless of diabetes severity.

Smoking and Drinking During Pregnancy

A study published in *JAMA Network Open* and co-authored by Lauren Shuffrey, PhD, and William Fifer, PhD, suggests the combination of smoking and drinking during pregnancy nearly triples the risk of late stillbirth. Another study, reported in *JAMA Psychiatry* by Claudia Lugo-Candelas, PhD, found that the proportion of hospitalized pregnant patients identified with cannabis use disorder—defined as cannabis use with clinically significant impairment or distress—rose 150% from 2010 to 2018.

Antihypertensive Drugs

A multinational observational study led by George Hripsak, MD, found that two types of drugs that are recommended as a first treatment for patients with high blood pressure were found equally effective in improving cardiovascular outcomes, but the more popular type causes slightly more side effects. The study, which analyzed claims and electronic health data from millions of patients worldwide, is the largest to compare the safety and efficacy of angiotensin-converting enzyme inhibitors and angiotensin receptor blockers, two commonly prescribed antihypertensive drugs. The study was published in *Hypertension*.



Reversing Sickle Cell Disease

Administration of autologous gene-modified hematopoietic stem cells following high dose chemotherapy in patients with sickle cell disease restored blood cells to their normal shape and eliminated the most serious complication of the disease for at least three years in some patients. Four patients at Columbia participated in the multicenter study, the first to report on such long-term outcomes of a sickle cell gene therapy. The single-dose therapy, tested on 35 adults and adolescents with sickle cell disease, essentially corrected the patients' red blood cells and also eliminated episodes of severe pain, caused when rigid, crescent-shaped red blood cells clump together and block blood vessels. The study was published in the *New England Journal of Medicine* with Markus Y. Mapara, MD, PhD, the site principal investigator, as co-author.

VP&S Education Highlights

New Pipeline Program Connects HBCU Students to Columbia Labs

Nearly three dozen students from historically Black colleges and universities (HBCUs) joined Columbia biomedical research laboratories for summer experiences in 2021 and 2022, as part of Columbia's newest pipeline program, the Ernest E. Just Biomedical Research Scholars @ Columbia.

The E.E. Just program, a collaboration between Columbia and the United Negro College Fund, aims to increase the number of Black researchers at top-tier biomedical research institutions and expand the diversity of voices and experiences in the life sciences.

As part of the program, Mikelley Baptiste, a college student at Spelman College, got her first hands-on training in biomedical research in the laboratory of Amy Rumora, PhD, assistant professor of neurological sciences in the Department of Neurology.

"Working closely with the principal investigator has been the most valuable aspect of the program for me," says Ms. Baptiste, whose summer project explored how nerves in the hands and feet are damaged by diabetes. "And learning more



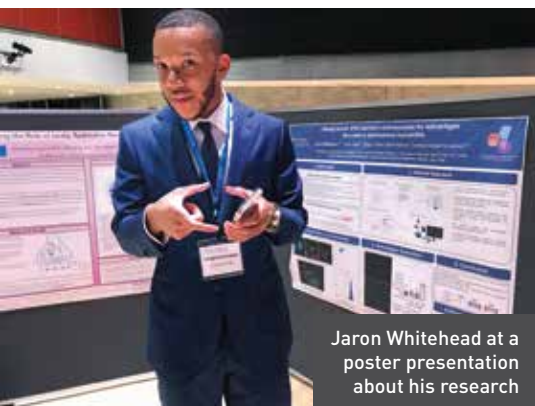
As an E.E. Just Scholar at Columbia, Mikelley Baptiste of Spelman College spent the summer conducting research on peripheral neuropathy in a neurology laboratory.

in-depth about how diabetes affects people has reinforced my plans to become a physician and go into public health to help reduce those impacts, especially in minority populations, which are disproportionately affected."

Chase Braithwaite, a student at Morehouse College, worked in the Zuckerman Institute laboratory of Stavros Lomvardas, PhD, professor of biochemistry & molecular biophysics and neuroscience. "Being a part of this program helped me understand that science is not as intimidating as I thought and that there are opportunities for creativity and innovation within the field of medicine," says Mr. Braithwaite.

The E.E. Just program began in 2021 with 12 students from Morehouse School of Medicine who worked remotely on research projects because of COVID restrictions. This year students worked on campus, and the program was expanded to include students from other HBCUs.

For Jaron Whitehead, a student at Morehouse School of Medicine, his time as an E.E. Just Scholar in the laboratory of Gordana Vunjak-Novakovic, PhD, University Professor with appointments in medicine and biomedical engineering, was transformative: "This experience has fueled my drive to become a physician because it showed me what's possible."



Jaron Whitehead at a poster presentation about his research

Match Day 2022

On Match Day in March, 146 VP&S students discovered where they will start their medical training after graduation and celebrated their residencies with family and friends—in person for the first time since before the pandemic. The most popular residency match was internal medicine (33 students).



Members of the VP&S Class of 2022 celebrate their residencies on Match Day.

Diversity in Medical Education

The Class of 2025, which entered VP&S in August 2021, is the most diverse in the school's history: 28% belongs to groups underrepresented in medicine. That's an increase



EILEEN BARROSO

An Oath of Their Own

When the Class of 2025 was welcomed into the profession of medicine at the school's annual White Coat Ceremony in August 2021, the 140 members of the class recited an oath they wrote themselves, updating the Hippocratic Oath to better reflect the values the students wish to uphold as they enter their medical training.

from 22% in the Class of 2024. The 140 members of the Class of 2025 were chosen from a field of 8,080 applicants.

Highest Ranking Ever

In the U.S. News & World Report rankings announced in March, VP&S ranked No. 3 among research medical schools, its highest ranking

ever, in a tie with Johns Hopkins and the University of California, San Francisco. The VP&S ranking was up from the previous year's No. 4 ranking.

Ob/Gyn's Health Justice-focused Medical Education

The Department of Obstetrics & Gynecology launched a pilot curriculum for Ob/Gyn residents and medical students that focuses on health justice and equity. The curriculum educates trainees in recognizing and addressing health injustices that impact the patient population and fosters stronger relationships with community-based resources that serve these patients. Along with other department initiatives, the curriculum will help to build dialogue around justice, diversity, equity, and inclusion among all faculty, staff, and trainees.

Office of Research on Women's Health. The award honors organizations whose actions have led to systemic change to improve gender diversity and equity among faculty members within their biomedical and behavioral science departments, centers, or divisions. At VP&S, 49% of full-time faculty are women. This is the first time the NIH has granted the award.

Student Research

After two years of virtual presentations, VP&S Student Research Day returned in 2022 to an in-person event as 67 students presented their



research to colleagues, fellow students, faculty, and medical center leaders. Top projects won awards in these categories: MD/PhD research, research year, scholarly projects, and summer research.



On April 4, 140 second-year medical students in the Class of 2024 marked their transition to patient-centered training.

In Transition

When second-year medical students celebrated their transition from classroom-based instruction to patient-centered training this year, students at the Steven Z. Miller Student Clinician's Ceremony recited a class oath they co-wrote to better represent their values and commitment to medicine and serving underserved populations.

VP&S Community Highlights

Improving Community Mental Health

The Department of Psychiatry in partnership with the New York Public Library and the National Black Leadership Commission on Health (Black Health), a nonprofit committed to achieving health equity, released a series of English and Spanish language videos to raise awareness and spark conversations about mental health in the city's racially and ethnically diverse communities most affected by the COVID-19 pandemic.

The videos were released as part of the Community Mental Health Project, an initiative to provide free education and resources to New Yorkers who lack access and face cultural barriers to behavioral health care. The initiative, funded by the Leon Levy Foundation, launched in November 2021.

The initiative produced 20 animated videos on 10 topics (videos were produced in both English and Spanish). The videos address mental health wellness, self-care, addiction, stigma in seeking treatment and care, the ways family members can help or hinder well-being, and other topics revealed in discussions with community members. Black Health facilitated five roundtable discussions with residents in neighborhoods from Harlem to the Bronx. The discussions brought adolescents, young adults, and seniors together to identify and discuss their community's mental health needs.

A priority for the project has been to create culturally responsible programming to address the challenges communities of color have faced during the pandemic, which has had a disproportionately higher impact on the city's Black and Latino residents.

The videos are designed to help people through the ups and downs of life, from feeling misunderstood to overcoming stigma individually and collectively as a community. The first two videos debuted



CENTER FOR PRACTICE INNOVATIONS AT COLUMBIA PSYCHIATRY

in November, and four more were added in February during Black History Month. They include a guide on how to find affordable support and resources in the community. One video offers resources for older adults and seniors, and another video helps adults listen to young people who feel misunderstood by elders. Other videos address such topics as overcoming stigma and the impact of COVID-19 on young adult lives.

“While everyone can use and benefit from these videos, we aim to use the content to educate and reduce the distress and trauma in the racially and ethnically diverse communities that have borne the brunt of the pandemic,” says Paul Margolies, PhD, associate professor of clinical medical psychology (in psychiatry) and associate director of practice innovation and implementation for

Columbia Psychiatry’s Center for Practice Innovations. “We see this as an opportunity not only to promote mental health but also to help normalize it and decrease the stigma of seeking help.”

The animated videos—all five minutes or shorter—were created in consultation with teens, young adults, and seniors in neighborhoods significantly impacted by health disparities and the pandemic.

The video series and books produced in both English and Spanish complement online programs that feature Columbia experts on topics identified by Black Health and the New York Public Library.

As part of the initiative, the New York Public Library expanded its mental health resources and outreach to communities through education forums and other events.

Columbia Primary Care Expands in Midtown

Columbia Primary Care opened a larger space with more providers at ColumbiaDoctors Midtown, located at 51 W. 51st St. in Manhattan. Four primary care providers now practice in the newly renovated third-floor space. Pictured at the ribbon cutting, from left, are David Buchholz, senior founding director, Columbia Primary Care; Nehal Galal, medical director, Columbia Primary Care Midtown; Donna Lynne, CEO, ColumbiaDoctors; Lauren Hill, COO, NewYork-Presbyterian/ Columbia Division; Erica DeMint, chief administrative officer, ColumbiaDoctors; and George (Jack) Cioffi, president, ColumbiaDoctors.



MICHAEL DIVITO

Project PossABILITY Recognized

The NYC Mayor’s Office for People with Disabilities and the Consortium for Customized Employment have recognized Project PossABILITY with a 2022 Customized Employment Award. Project PossABILITY, which launched in 2021, connects workers who have intellectual or developmental disabilities, such as autism, Down syndrome, and cerebral palsy, with employment oppor-

tunities at Columbia University Irving Medical Center. Project PossABILITY was created by the CUIMC Disability Employee Resource Group, led by faculty member Keith Diaz, PhD, and Tonya Richards, chief diversity, equity, and inclusion officer for staff at CUIMC.

Screening for Lung Cancer

A comprehensive lung cancer screening program in Upper Manhattan brought together physicians and nurse practitio-

ners from multiple disciplines to provide care for smokers and ex-smokers who are at high risk for lung cancer and other complications. The core of the comprehensive program is a 10-minute imaging exam with low-dose computed tomography, which detects lung cancer using a very small amount of radiation. The screening tool is effective at finding lung cancer before it causes symptoms and when it is still treatable. Research has shown a 20%

reduction in lung cancer deaths in screened patients. “It’s hard to overemphasize the importance of lung cancer screening,” says Bryan Stanifer, MD, one of the program participants. “This is the single most effective treatment we have for lung cancer right now.”

Glaucoma Screening Program

In partnership with the New York City Housing Authority and the city’s Department for the Aging, Lisa Hark, PhD, and colleagues offered free vision screening and eye exam sites in housing authority properties and senior centers. A high number of people screened were found to have glaucoma or pre-glaucoma.



A Columbia screening study is finding more people with glaucoma or pre-glaucoma than initially suspected. In the photo, a screener uses a portable camera to view the interior surface of the eyes of study participant Mary Dike.



RUDY DIAZ

Holding a symbolic check, from left, are Blair Simpson, Katrina Armstrong, Adriano Espallat, and Milton Wainberg.

Community Mental Wellness Corps

VP&S received \$750,000 in federal funding to support the Columbia COVID-19 Northern Manhattan Community Mental Wellness Corps, a new initiative to address mental health disparities in Northern Manhattan and parts of the Bronx. The COVID-19 pandemic caused higher rates of mental disorders that have worsened gaps in mental health services for vulnerable communities served by Columbia. The mental wellness corps will increase access to timely, effective, and culturally relevant mental health care. The corps will provide training and increase access to mental health services by partnering with churches and trusted community-based organizations to create a model of community-based mental health service delivery that can be replicated in other distressed communities in the United States.

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**Senior Administration,
Vagelos College of
Physicians & Surgeons**

Katrina Armstrong, MD
Dean

Academic Affairs

Anne Taylor, MD
Vice Dean

Finance and Administration

Rudina Odeh-Ramadan, PharmD
Vice Dean

Education

Monica Lypson, MD, MHPE
Vice Dean

Anne Armstrong-Coben, MD
Senior Associate Dean, Admissions

Nicholas Fiebach, MD
*Senior Associate Dean,
Stamford Hospital*

Joseph Giovannelli
*Senior Associate Dean,
Administration and Finance*

Hilda Hutcherson, MD
Senior Associate Dean, Diversity
and Multicultural Affairs

Rosa Lee, MD
Senior Associate Dean,
Curricular Affairs

Lisa Mellman, MD
Senior Associate Dean,
Student Affairs

Henry Weil, MD
Associate Dean,
Bassett Healthcare

Maurice Wright, MD
Senior Associate Dean,
Harlem Hospital Center

Anil Lalwani, MD
Associate Dean, Student Research

Arthur G. Palmer III, PhD
Associate Dean, Graduate Affairs

**Innovation in Health
Professions Education**

Jonathan Amiel, MD
Senior Associate Dean

Human Resources

Danielle Robbins
Associate Vice Dean for Faculty
Affairs and Human Resources

Research

Michael L. Shelanski, MD, PhD
Senior Vice Dean

Jennifer Williamson, MS, MPH
Associate Vice Dean, Research
Policy & Scientific Strategy

Muredach Reilly, MBBCh
Associate Dean, Clinical and
Translational Research

**Government and
Community Affairs**

Ross Frommer, JD
Associate Dean

**Executive Committee of the
Faculty Council, 2021-2022**

Cory Abate-Shen, PhD
Professor of Pharmacology,
Robert Sonneborn Professor of
Medicine, Professor of Urologic
Sciences (in Urology), Professor
of Pathology & Cell Biology (in
Systems Biology, Herbert Irving
Comprehensive Cancer Center, and
Institute for Cancer Genetics), and
Chair, Department of Molecular
Pharmacology & Therapeutics

Lourival Baptista-Neto, MD
Associate Professor of
Psychiatry at CUMC

Doreen Eleanor Chung, MD
Associate Professor of Urology
at CUMC

Mary E. D'Alton, MD
Willard C. Rappleye Professor
of Obstetrics & Gynecology
and Chair, Department of
Obstetrics & Gynecology

Beth Hochman, MD
Associate Professor of Surgery
(in Anesthesiology) at CUMC

George Hripcsak, MD
Vivian Beaumont Allen Professor
of Biomedical Informatics
and Chair, Department of
Biomedical Informatics

Manu Ben Johny, PhD
Assistant Professor of Physiology
& Cellular Biophysics

Angela Mills, MD
J.E. Beaumont Professor of
Emergency Medicine at CUMC
and Chair, Department of
Emergency Medicine

Mary S. Sciotto, MD
Associate Professor of
Psychiatry at CUMC

David Seres, MD
Associate Professor of Medicine
(in the Institute of Human
Nutrition) at CUMC

Michele Shirasu-Hiza, PhD
Associate Professor of
Genetics & Development

Wakenda Tyler, MD
Associate Professor of
Orthopedic Surgery at CUMC

Department Chairs

Anesthesiology
Ansgar Brambrink, MD, PhD

Biochemistry &
Molecular Biophysics
Arthur G. Palmer III, PhD (interim)

Biomedical Informatics
George M. Hripcsak, MD

Dermatology
**Faramarz Samie, MD, PhD
(interim)**

Emergency Medicine
Angela M. Mills, MD

Genetics & Development
Gerard Karsenty, MD, PhD

Medical Humanities & Ethics
Rita Charon, MD, PhD

Medicine
Donald W. Landry, MD, PhD

Microbiology & Immunology
Sankar Ghosh, PhD

Molecular Pharmacology
& Therapeutics
Cory Abate-Shen, PhD

Neurological Surgery
E. Sander Connolly, MD

Neurology
Richard Mayeux, MD

Neuroscience
Steven A. Siegelbaum, PhD

Obstetrics & Gynecology
Mary E. D'Alton, MD

Ophthalmology
George A. Cioffi, MD

Orthopedic Surgery
William N. Levine, MD

Otolaryngology/Head
& Neck Surgery
Lawrence Lustig, MD

Pathology & Cell Biology
Kevin Roth, MD, PhD

Pediatrics
Jordan Orange, MD, PhD

Physiology & Cellular Biophysics
Andrew R. Marks, MD

Psychiatry
**H. Blair Simpson, MD, PhD
(interim)**

Radiation Oncology
Lisa Kachnic, MD

Radiology
Lawrence H. Schwartz, MD

Rehabilitation &
Regenerative Medicine
Joel Stein, MD

– Programs in
Occupational Therapy
Glen Gillen, EdD, Director

– Programs in Physical Therapy
Debra Krasinski, PhD, Director

Surgery
Craig R. Smith, MD

Systems Biology
Andrea Califano, Dr

Urology
James M. McKiernan, MD

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Institutes and Centers

Aaron Diamond AIDS
Research Center
David Ho, MD

Naomi Berrie Diabetes Center
Robin S. Goland, MD
Anthony Ferrante, MD, PhD

Center for Family and
Community Medicine
Richard Younge, MD

Center for Radiological Research
David Brenner, PhD, DSc

Columbia Stem Cell Initiative
Emmanuelle Passegué, PhD

Institute for Cancer Genetics
Riccardo Dalla-Favera, MD

Institute for Genomic Medicine
Ali Gharavi, MD (*interim*)

Institute of Human Nutrition
Sabrina Diano, PhD

Herbert Irving Comprehensive
Cancer Center
Anil K. Rustgi, MD

Irving Institute for Clinical and
Translational Research
Muredach P. Reilly, MBBCh

Gertrude H. Sergievsky Center
Richard Mayeux, MD

Taub Institute for Research
on Alzheimer's Disease and
the Aging Brain
Richard Mayeux, MD
Michael L. Shelanski, MD, PhD

VP&S Hospital Affiliations
New York-Presbyterian Hospital
New York, NY

New York State
Psychiatric Institute
New York, NY

Harlem Hospital
New York, NY

James J. Peters Veterans
Administration Hospital
Bronx, NY

Mary Imogene Bassett Hospital
Cooperstown, NY

Stamford Hospital
Stamford, CT

Helen Hayes Hospital
West Haverstraw, NY

Lawrence Hospital
Bronxville, NY

FACTS & STATISTICS, FY22

MEDICAL SCHOOL ENROLLMENT, 2021-22

| | |
|--|-----|
| Total medical school enrollment | 577 |
| Enrollment of in-state residents | 355 |
| Enrollment of international/nonresident students | 7 |
| Enrollment of men | 296 |
| Enrollment of women | 281 |

ENROLLMENT BY YEAR

| | MALE | FEMALE |
|-------------------|------|--------|
| First-year class | 70 | 68 |
| Second-year class | 72 | 67 |
| Third-year class | 61 | 68 |
| Fourth-year class | 93 | 78 |
| Total enrollment | 296 | 281 |

MEDICAL SCHOOL ETHNICITIES

| | |
|--|-----|
| Hispanic/Latino | 57 |
| Black or African American, non-Hispanic/Latino | 67 |
| White, non-Hispanic/Latino | 273 |
| American Indian or Alaskan Native, non-Hispanic/Latino | 1 |
| Asian, non-Hispanic/Latino | 120 |
| Two or more races, non-Hispanic/Latino | 27 |
| Race and/or ethnicity unknown | 25 |

DEGREES GRANTED, FY22

| | |
|-------------------------------------|-----|
| MD | 174 |
| PhD | 100 |
| Doctor of physical therapy | 62 |
| MS in nutrition | 63 |
| MS in occupational therapy | 62 |
| MS in genetic counseling | 13 |
| Certificate in psychoanalysis | 6 |

FACULTY, 2021-22 ACADEMIC YEAR

| | |
|-------------------------|-------|
| Full-time faculty | 2,381 |
|-------------------------|-------|

FINANCIALS, FY22 (EXCEPT WHERE NOTED)

| | |
|--|-----------------|
| Budget | \$2.6 billion |
| Philanthropic support | \$204.5 million |
| Endowment | \$2.56 billion |
| Endowed chairs/professorships | 319 |
| NIH research support (Federal FY 2021) | \$497 million |



CHARLES MANLEY

Celebrating In-Person Graduation

The VP&S Class of 2022 celebrated graduation with friends and families at the first in-person graduation ceremony since 2019. The ceremony celebrated 148 students who received MD degrees and 77 students who received PhD degrees in biomedical sciences. Mary T. Bassett '79, commissioner of the New York State Department of Health, delivered the graduation address.

"Throughout your training, you have not seen hospitals in a 'normal' state," Dr. Bassett told the graduates. "But that's not necessarily a bad thing. The lens through which you see your medical career unfold is forever altered in a way that must question what, exactly, does normal mean. Because when you do that—when you keep questioning,

rather than accepting the status quo—that's when you can start to trigger real change. Change that leads to better health care and better health beyond the hospital walls."

"You now embody our aspirations for our future," said Katrina Armstrong, MD, who presided over her first graduation since becoming dean in March 2022. "Aspirations that as you move forward in these sacred professions, you will forever lead us in compassion, in honest reckoning with our failures and our history, and, perhaps most importantly, in hope. In hope for a better and more equitable world where every child has the opportunity for a long and healthy life and every patient receives the health care they deserve."