



COLUMBIA

VAGELOS COLLEGE OF  
PHYSICIANS AND SURGEONS



# INTRODUCTION



Welcome to the Columbia University Vagelos College of Physicians and Surgeons! We are training tomorrow's physicians to discover, educate, care, and lead. In 2018, we announced a new scholarship program that replaces student loans with scholarships for all students who qualify for financial aid—making medical education more accessible to prospective students.

For more than 250 years, our medical school has prepared leaders to shape the future and set standards of medicine in the United States and the world. Through guided exposure and training, our graduates exhibit humanism and professionalism in their responsibilities to their patients, to their community, and to society.

Design a personalized educational experience with research endeavors, electives in areas of your interest, and the P&S Club—the broadest student activities organization for the arts, athletics, and community outreach in American medical education.

Join a mix of students on our campus who are diverse in every way. Among our Class of 2022, nearly one-fifth are from groups underrepresented in medicine.

Find your place in the pulse of our campus—the Vagelos Education Center, a state-of-the-art medical education building opened in 2016 where our students learn, study, and socialize in the Washington Heights neighborhood of New York City. You'll find a home here while the buzz of the big city beckons, with sites such as Times Square, Central Park, and iconic museums in your backyard.

We are clinicians, scientists, and educators. We are creative and we are creators.

You belong here if you want to be a physician with compassion, have a sense of self, and are committed to excellence in medicine.

If you want to serve the underserved.

If you can imagine solutions to science's complex challenges.

If you are curious, driven, and ready to change medicine.

# 250+ YEARS OF PIONEERING MEDICAL FIRSTS

We Don't Just Practice Medicine. We Change It.



**1767**

Medical education begins at Columbia.

**1920s**

Alvan Barach'1919 develops the practical oxygen tent to treat asthma, dyspnea, and pulmonary edema.



**1938**

Dorothy Andersen, MD, professor of pathology, identifies cystic fibrosis.



**1935**

Allen O. Whipple'1908 invents the Whipple procedure to remove pancreatic tumors.

**1953**

Virginia Apgar'1933 develops the Apgar Score, the first evaluation of babies after birth.

**1956**

André F. Courmand, MD, and Dickinson W. Richards'1923 win the Nobel Prize in Physiology or Medicine for developing cardiac catheterization, laying the groundwork for open-heart surgery and interventional cardiology.

**1964**

Our researchers make a vaccine that eradicates Rh disease in fetuses and newborns.



**2000**

Eric Kandel, MD, receives a Nobel Prize for research on the physiological basis of memory storage in neurons.

**1984**

Columbia surgeon Eric Rose'1975 performs the first successful pediatric heart transplant.



**2017**

Joachim Frank, PhD, receives a Nobel Prize for developing cryo-electron microscopy.



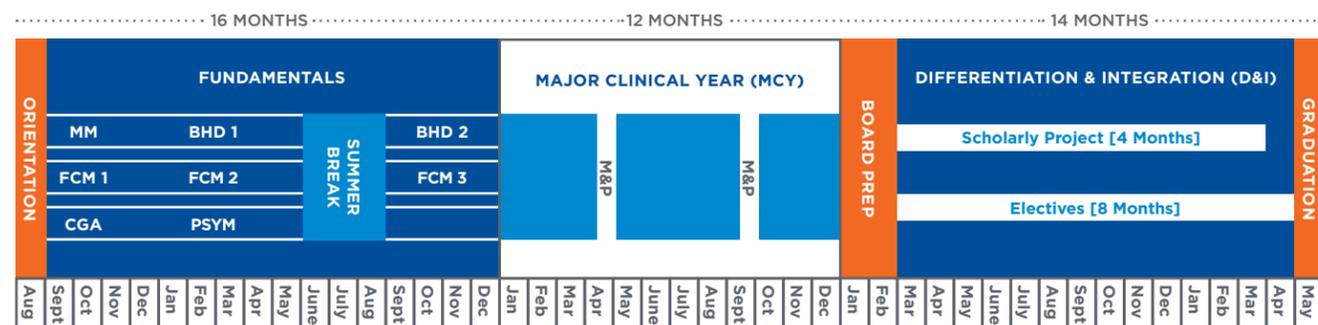
**2004**

Richard Axel, MD, receives a Nobel Prize for identifying genes for odor receptors.

**2018**

Columbia replaces medical school loans with scholarships for students with financial need, thanks to gifts from P. Roy Vagelos'1954 and his wife, Diana, and many other alumni, faculty, and friends.

# MEDICAL EDUCATION AT COLUMBIA



## CURRICULUM KEY

**BHD:** The Body: In Health & In Disease

**CGA:** Clinical Gross Anatomy

**D&I:** Differentiation & Integration

**FCM:** Foundations of Clinical Medicine (includes seminars and tutorials)

**MCY:** Major Clinical Year

**MM:** Molecular Mechanisms & Disease

**M&P:** Mechanisms & Practice (intersessions during MCY)

**PSYM:** Psychiatric Medicine

**R4R:** Ready 4 Residency

**Threads:** Courses in the four-year curriculum include longitudinal exposure to the thematic threads in Biomedical Informatics; Medical Decision-Making; Public Health; and Systems, Leadership, Integration, and Management (SLIM).

## MAJOR CLINICAL YEAR (MCY)

- There are two weeks of vacation during MCY, and timing depends on rotation schedules.
- Core clerkships are offered in the major medical disciplines.

## Board Prep

- Students have two months of protected time to study for boards.

## Differentiation & Integration (D&I)

- **Scholarly Projects** occur over four months in D&I, with an option to extend to 10 months, ending no later than March prior to graduation.
- **Electives:**
  - All students complete one month of Ready 4 Residency (R4R) advanced clinical training to prepare for residency.
  - All students must complete a one-month sub-internship during D&I.

Your path to becoming the best physician you can be starts with the MD. We also offer an array of dual-degree and special programs to expand your expertise.

## MD Program

Our MD curriculum combines basic science and clinical medicine with humanism and professionalism taught by award-winning faculty members.

## Columbia-Bassett Program

Gain exposure to health care management and help patients in a large, mostly rural population through this selective MD degree track open to 10 medical students per class year. You will complete a longitudinal clerkship year at Bassett Healthcare in Cooperstown, New York.

## MD-PhD Program

Immerse yourself in clinical and scientific education, conduct research, and learn to translate scientific findings to clinical practice. More than 60 percent of our MD-PhD program graduates who have completed residency and fellowship training are full-time faculty members in academic medical centers worldwide.

## PhD-to-MD Program

Bring science from the lab bench to the hospital bedside for the

betterment of humankind. PhD scientists in the biological sciences earn an MD degree and train for a career in biomedical investigation in three years.

## MD-MS in Biomedical Sciences

Develop a research interest and perform a year of original research in a medically relevant field. Areas of focus are basic and translational science, clinical research, precision medicine, global health, medical education, narrative and social medicine, population health, and biomedical informatics. This dual-degree may be completed in four or five years.

## MD-MPH

Gain the expertise needed to tackle today's complex public health challenges. Select an area of public health concentration, such as biostatistics, epidemiology, general public health, health policy and management, population and family health, or sociomedical sciences.

## MD-MBA

Join the ranks of the next generation of health care system leaders. This path leads to a career as a hospital executive, health care system CEO, pharmaceutical industry executive, or dean or chair of a department at a medical school.

## MD-OMFS

Combine dental and medical training to care for patients with conditions related to the hard and soft tissues of the face, mouth, and jaws. Two dental school graduates per year are selected to earn an MD degree and complete training in the Oral and Maxillofacial Surgery Residency Program at NewYork-Presbyterian Hospital.

## MD-MA in Biomedical Informatics

Bridge the divide between medicine and technology by using biomedical informatics to improve patient care outcomes and safety. Areas of focus are the science of information and empirical discovery, computational techniques, and applying these techniques to medicine, biology, and public health.

## MD-MS in Biomedical Engineering

Learn to solve problems in biology, medicine, and the understanding of living systems and their behavior, and expand your skills in developing biomedical systems and devices. This track leads to a career in the medical device industry or at an engineering consulting firm, or to starting a medical technology company for those driven by an entrepreneurial edge.

## STUDENT EXPERIENCES



### MD Student

“As an immigrant from a very under-resourced country, I saw the impact that access to health care had from watching my dad visit family members in rural areas of Sudan and helping out. At the same time, in Michigan I watched the city I grew up next to go from being another struggling city in the Rust Belt to a regular topic in the national news with the Flint water crisis. I believe in the idea of health equity and that played a big role in influencing my decision to pursue medicine. Additionally, the narrative of black males in America and the dearth of black males in medicine further motivated me in wanting to become a doctor.”

—**AHMED OWDA**, who was born in the United Kingdom to Sudanese parents and spent most of his childhood in Grand Blanc, Michigan



### Columbia-Bassett Student

“In the Columbia-Bassett Program, you follow patients through, like my first OB patient. I saw her throughout her pregnancy, got to see her child born, and eventually saw her child in the pediatric clinic. Since I was interested in urology, I also followed prostate cancer patients from the clinic to their procedure to post-op recovery and learned about the breadth of a disease in this way.”

—**WILSON SUI’2017**, a resident in urology at Vanderbilt University Medical Center



### MD-PhD Student

“Science has always been an outlet for creativity and discovery for me. Columbia was definitely the right fit. Everything—from the diversity of the students, the amazing culture of New York City, and the supportive MD-PhD program—made this the perfect institution for training as a physician-scientist.”

—**TOLU AKINADE**, an MD-PhD student from High Point, North Carolina, and Doha, Qatar



### MD Student

“My undergraduate major was in viticulture and enology, with a minor in managerial economics. After working in a winery for two years, I felt that my heart wasn’t in it, and I was looking for a different purpose in my work. I considered multiple careers and shadowed physicians, one of whom was an ophthalmologist. I was awestruck watching my first cataract surgery and really enjoyed clinic and helping patients. After a Google search, I learned about the NIH and received a summer internship at the National Eye Institute studying induced pluripotent stem cells. The research opportunities and fulfillment of clinical ophthalmology inspired me to pursue medicine.”

—**JULIET HARTFORD’2018**, who matched to a transitional year internship at Colorado Health Foundation and an ophthalmology residency at Baylor College of Medicine–Houston

Prepare to learn, care, discover, and lead—all while having fun and building lifelong friendships with future colleagues.

ARE YOU  
READY  
FOR THE  
EXPERIENCE  
OF A  
LIFETIME?



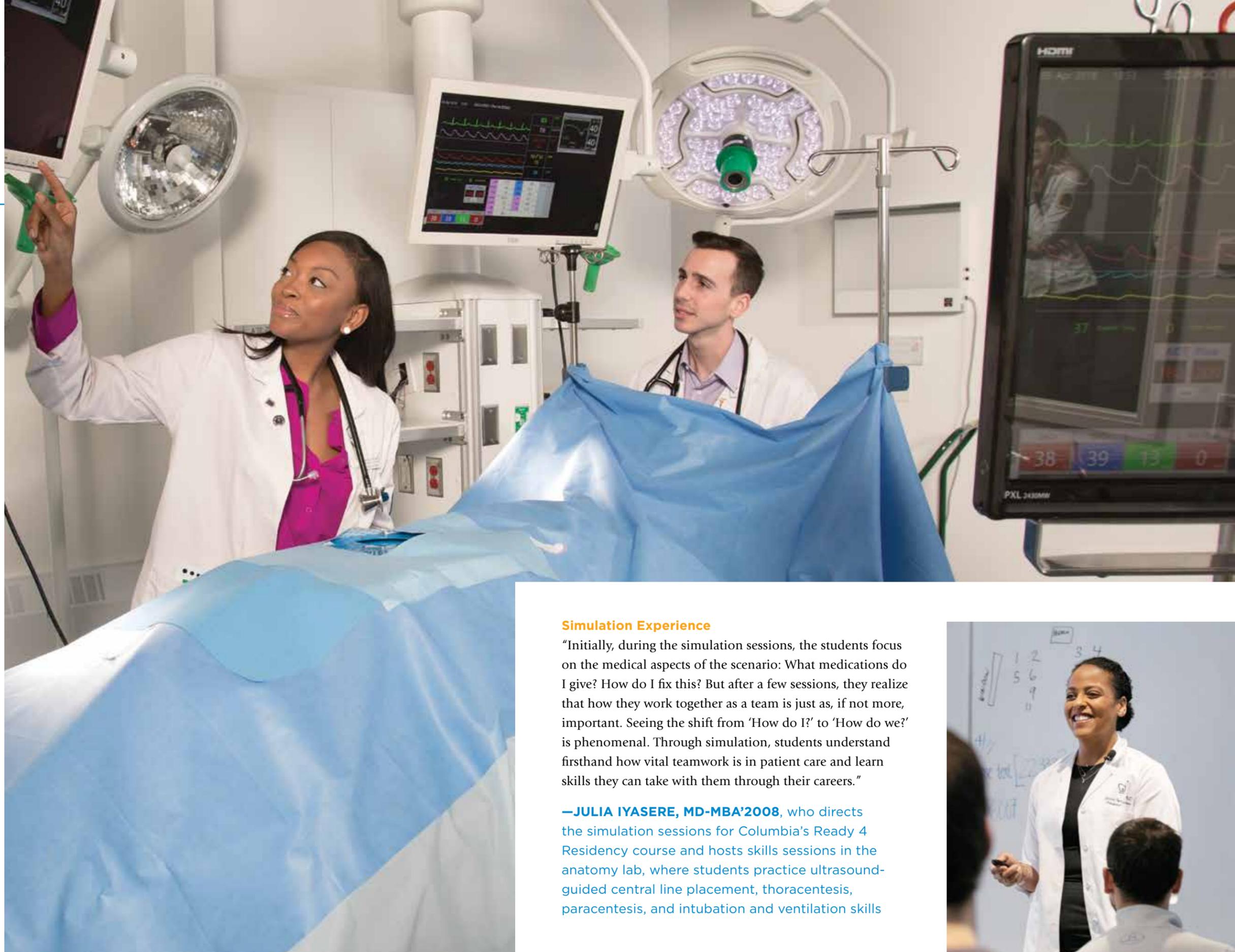
## EXPLORE MEDICAL EDUCATION AT THE CUTTING EDGE

Learn from our physicians in the Vagelos Education Center, which houses the Mary and Michael Jaharis Simulation Center, anatomy labs, and classrooms.

Our simulation center is at the core of our hands-on, high-tech curriculum and offers a standardized patient program, mannequin-based simulations, and procedural skills training. From the first year of medical school, simulation experiences are part of our curriculum. You will do physical examinations, advanced medical interviews, and case write-ups as part of the tutorials in our foundations courses.

As you transition to the Major Clinical Year and work in hospitals, you will continue to use the simulation center as a resource. By your final year of medical school, one of our most popular courses—Ready 4 Residency—will allow you to participate in simulations to practice skills you will use in your residency.

Your classmates are your teammates. Whether working in the simulation center, lab, or classroom, you will be learning team-based care of patients.



### Simulation Experience

“Initially, during the simulation sessions, the students focus on the medical aspects of the scenario: What medications do I give? How do I fix this? But after a few sessions, they realize that how they work together as a team is just as, if not more, important. Seeing the shift from ‘How do I?’ to ‘How do we?’ is phenomenal. Through simulation, students understand firsthand how vital teamwork is in patient care and learn skills they can take with them through their careers.”

—**JULIA IYASERE, MD-MBA’2008**, who directs the simulation sessions for Columbia’s Ready 4 Residency course and hosts skills sessions in the anatomy lab, where students practice ultrasound-guided central line placement, thoracentesis, paracentesis, and intubation and ventilation skills



## LEARN COMPASSIONATE PATIENT CARE

At the heart of every great educational experience is a great person. Our accomplished physicians are your mentors. Their goal is to guide you to be the most competent, humane, and professional physician you can be. They understand you because they have been in the same place—in fact, many VP&S graduates return to Columbia to teach, conduct research, and care for patients.

Your journey through medical school starts from the moment you receive your white coat on your first day. You will continue to apply the wisdom of your mentors to caring for patients while in medical school, especially during the Major Clinical Year, when you complete a series of rotations in medical specialties at one of our affiliated hospitals and institutions in urban, suburban, or rural areas.

Global health opportunities abound. We have exchange programs with nearly 20 international universities and hospitals throughout the world and opportunities to work in health systems in developing countries.

Our approach yields excellent results as noted by residency assignments—look no further than where Columbia graduates start their careers in medicine.



### Affiliated Hospitals and Institutions: Clinical Rotations

NewYork-Presbyterian Hospital

New York State Psychiatric Institute

Bassett Healthcare

Creedmoor Psychiatric Center

Harlem Hospital Center

Indian Health Services in Arizona  
and New Mexico

James J. Peters VA Medical Center

Lawrence Hospital

Stamford Hospital

### Meet Your Match: Class of 2018 Residency Outcomes

Your medical education culminates in “The Match,” a day in March when graduating medical students learn which residency program they will attend for training.

156

COLUMBIA  
STUDENTS

#### MOST POPULAR RESIDENCIES:

34

Internal medicine

18

Psychiatry

10

Pediatrics

9

Emergency medicine

9

Obstetrics and gynecology

9

Orthopedic surgery

8

Dermatology

8

Neurology

## DISCOVER COLLABORATIVE RESEARCH



You will find a plethora of opportunities for discovery at Columbia, with labs led by pioneers in their fields. Our faculty's collaborative approach to scientific inquiry links you to scholarly exchange among the health sciences faculties at the medical center and other parts of Columbia University.

Our faculty are among the best-funded researchers in American medical schools. For nine consecutive years, our grant funding from the National Institutes of Health (NIH) has outpaced the growth of the NIH budget.

Nearly 20 percent of each graduating medical school class pursues an extra year (or more) for research, and many more students participate in research throughout their years at Columbia. Summer research fellowships through the NIH or departmental funding provide a learning environment for more than 30 percent of rising second-year students.



### Research Experience

Medical student Laura Goetz studied endometriosis, an inflammatory gynecological disorder that affects 10 percent of reproductive-aged women and causes pain and infertility. Goetz used a transgenic mouse model to investigate a gene implicated in human endometriosis to try to identify novel therapeutic targets.

## Student Research

Every student must complete a scholarly project to graduate from medical school, and some choose to do it in another country. Research projects by our students seek to make a positive impact:

- MD-PhD student Holly Wobma launched a company with her colleagues to bring a stem cell therapy to market, in an effort to help patients with graft-versus-host disease, a potentially severe condition that can occur in recipients of a bone marrow transplant.
- Christopher Grubb studied the use of electromechanical wave imaging in 28 patients and found this ultrasound technique can noninvasively localize a diverse set of arrhythmias and could be a useful tool in their diagnosis and treatment.
- Gabrielle Loeb'2018 and Shirin Sadri (*below, right*) applied augmented reality to cerebral angiography system development and pilot-tested their study in nine patients.



## VP&S Research Highlights

813

NIH awards (FY18)

\$501.0

NIH research support (FY18, in millions)

26

American Academy of Arts & Sciences members

7

Howard Hughes Medical Institute current investigators

50

National Academy of Medicine members

22

National Academy of Sciences members

3

Nobel Laureates



### Meet Nobelist Joachim Frank

In 2017, Joachim Frank, PhD, was among the three researchers awarded the Nobel Prize in Chemistry for helping to pioneer the development of cryo-electron microscopy, a technique used to reveal the structures of large biological molecules at atomic resolution. Dr. Frank is professor of biochemistry and molecular biophysics at Vagelos College of Physicians and Surgeons and professor of biological sciences on Columbia's Morningside campus.

### Global Health Opportunities

- **Program for Education in Global and Population Health:** Partner with an international organization to complete a research project or clinical rotation in another country, from the Dominican Republic to Uganda to China and elsewhere.
- **International Center for AIDS Care and Treatment Program:** Complete an elective to gain on-site experience in the design, implementation, and evaluation of HIV/AIDS prevention, care, and treatment programs in sub-Saharan Africa.
- **Medical School for International Health at Ben Gurion University of the Negev:** Participate in a summer internship in Israel; a scholarly project; or a senior clinical elective in Israel, Peru, India, or Sri Lanka.

### Research Experience

"In Kenya, I saw the impact of the lack of safe surgery on the population. I see myself creating a career in academic global surgery. After training, I hope to live abroad in a lower-middle-income country where I can see patients, train future surgeons, and lead research that will improve practice in resource-limited settings."

—**NATHAN BRAND '2018**, who through a research-year project analyzed the efficacy of sentinel lymph node biopsies at a hospital in Nairobi; he matched in general surgery at University of California, San Francisco



## CAMPUS LIFE

We know that art and medicine go together, that athleticism is good for both the body and mind, and that advocacy is often honed outside of the classroom by way of conversations with classmates. Nourish your talents in music, theater, and more while in medical school; they will only make you a more compassionate, collaborative physician in the long run.

### P&S Club

The P&S Club, founded by Nobel Peace Laureate John Mott in 1894, houses nearly 70 clubs and organizations. They represent vast interests and talents, including athletics, performing arts, advocacy, cultural and spiritual activities, and volunteer work in our student-run clinics.

### Student Well-Being

The caring community at Columbia offers many resources to help students work through their challenges and thrive in the classroom, the clinic, and their personal lives.

- **Student Health Service:** Provides primary care medical services, mental health services, and health promotion and wellness services.
- **Center for Student Wellness:** As part of the Student Health Service, this center helps students to de-stress and relax with yoga classes, crafters, and pet therapy activities.

### Advisory Dean Program

Advisory deans provide comprehensive advising and career counseling to students throughout their time in medical school. They meet regularly with students to discuss curriculum, professional development, career advising, and other topics related to becoming a doctor.



### Student-Run Clinics

- **Five clinics** that offer free care to patients
- **Run by Columbia medical students** supervised by faculty
- **Serving uninsured and underserved** populations in New York City, including the homeless, LGBTQI individuals, and asylum seekers
- **Students opened their first clinic** in March 2004, Columbia Student Medical Outreach, to serve the Washington Heights community
- **1,400+ patients** served by Columbia-Harlem Homeless Medical Partnership from 2007 to 2017



Pictured above are students from the Human Rights Initiative / Asylum Clinic.

# MEDICAL SCHOOL IN NYC

## LOCATION, LOCATION, LOCATION

Medical school in New York City has endless options for learning and fun. Our 100,000-square-foot, 14-floor Vagelos Education Center is the heart of campus for our medical students. The building offers breathtaking views of the city, the Hudson River, and the nearby George Washington Bridge.

Medical students also share our campus with Columbia's Mailman School of Public Health, College of Dental Medicine, and School of Nursing and have access to all that Columbia University has to offer.

The surrounding Washington Heights neighborhood is one of New York's most interesting areas. It was made famous on Broadway by "In the Heights"—music and lyrics by Lin-Manuel Miranda, a neighborhood resident also responsible for "Hamilton"—and has the vibe of a small community within the bigger city.

Beyond campus, there is something for everyone in New York City. Explore new music; dine out at restaurants and open-air food markets; view art; cheer on your favorite sports team; or relax at one of the city's many parks, gardens, and beaches.



## COLUMBIA COMMUNITY AROUND THE WORLD

You will be a part of our network of more than 320,000 alumni—for life. The Columbia Alumni Association is a global network of leaders, creators, and change-makers bound by a shared passion, intellect, and drive to make meaningful change for our university and the world.

### Our alumni have made medical history.

Their achievements range from the discovery of hepatitis B and a vaccine to treat it by Nobel Laureate Baruch Blumberg'1951, to the identification of Huntington's disease by George Huntington'1871, to the elucidation of the genetic basis of sickle cell disease by Helen Ranney'1947.

### Our alumni have made history in nontraditional ways.

Walker Percy'1941 wrote the novel "The Moviegoer," which won a U.S. National Book Award. Story Musgrave'1964 is the only astronaut to have flown on all five space shuttles. Matt Iseman'1998 is a comedian, "American Ninja Warrior" cohost, and the 2017 "New Celebrity Apprentice" winner against Boy George.

### Our alumni are Olympians, too.

Four alumni have competed in Summer Olympics, including swimmer Jennifer Thompson'2006, one of the most decorated Olympians in history, with 12 medals (of which eight are gold) in four Olympics. In 2018, medical student Caroline Park competed in the PyeongChang Winter Olympics on the Korean women's ice hockey team.



### One Class, Two Nobels

Harold Varmus'1966 and Robert J. Lefkowitz'1966 were classmates who went on to earn Nobel Prizes. Dr. Varmus shared the Nobel Prize in Physiology or Medicine in 1989 for discovering that normal human and animal cells have genes that can mutate to cancer genes. Dr. Lefkowitz shared the Nobel Prize in Chemistry in 2012 for discovering G-protein-coupled receptors embedded in cell membranes.



# ADMISSIONS **TIMELINE**

- May** ○ Primary Application becomes available via the American Medical College Application Service (AMCAS).
- July–October** ○ Secondary Application invitations are sent to all applicants who selected Columbia.
- Late August–January** ○ Interview invitations are sent.
- October 15** ○ AMCAS Primary Application deadline.
- October 29** ○ Columbia’s deadline for Secondary Application.
- November 12** ○ Columbia’s deadline for supporting documents, i.e., Secondary Application fee, MCAT score, and letters of recommendation.
- Late February–Early March** ○ Admission offers are sent and waitlist opens.
- April** ○ Revisit Day occurs for accepted students.
- April 15** ○ Drop date for applicants to hold no more than three acceptances.
- April 30** ○ Drop date for applicants to withdraw from all but one school.
- May** ○ Admissions Committee begins to review waitlist applicants.
- Early August** ○ Waitlist closes.
- Mid–August** ○ Orientation and classes begin for the matriculating class.

For more information, visit our website at [ps.columbia.edu](https://ps.columbia.edu).



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