SCHOOL OF MEDICINE

Case Western Reserve University **School of Medicine** serves as a national leader in health care education, biomedical research, and commitment to its community since its founding 1843. The School of Medicine has created an intellectually sophisticated, service-oriented culture that enables bold ideas and new ways of thinking to take root and flourish.

Building on a stellar legacy, including praise in the seminal 1910 Flexner Report, today the School of Medicine is consistently ranked among the top-30 medical schools in the United States as well as earning distinction as the #1 medical school and largest biomedical research institution in Ohio. It also regularly places in the top tier of U.S. medical schools for NIH research funding.

Our educational offerings comprise nearly two dozen programs and degree options for prospective students, including one MD degree with three MD programs: the WR2/University Program, the Lerner College Program, and the Medical Training Scientist Program (MD/PhD), as well as numerous PhD programs, numerous MS programs, and our Physician Assistant program.

In 2019 the Health Education Campus (HEC) building opened. The 485,000 square foot high-tech facility takes our longstanding emphasis on interprofessional education to the next level by bringing together medical students from our various programs (described below), CWRU's School of Dental Medicine, the Frances Payne Bolton School of Nursing, and the Jack, Joseph and Morton Mandel School of Applied Social Sciences, as well as the School of Medicine's Physician Assistant Program.

Research

The School of Medicine has earned a sterling record of national leadership as a research institution, consistently ranking in the top tier of U. S. medical schools for federal research funding from the National Institutes of Health. A recent *Academic Medicine* study placed the School in the top 15 medical schools nationally based on the achievements of its graduates. Faculty and trainee research is routinely reported in the top journals of all fields.

Within a wide and interdisciplinary research portfolio, the School has strengths in the areas of cancer, big data, imaging, regenerative medicine. and brain health. We are home to more than 30 highly regarded research and teaching institutes and centers ranging from the Center for AIDS Research and **Center for Global Health and Diseases** to the **Digestive Health Research Institute** and the **Clinical Translation Research Center**.

The School is a foundational partner in the Case Comprehensive Cancer Center, which links the cancer research activities of CWRU, Cleveland Clinic, and University Hospitals. Our researchers are supported by eight core facilities such as translational research and clinical trials, computational analysis, and omics and sequencing. We house two highly competitive **Specialized Programs of Research Excellence (SPORE)** programs—gastrointestinal and cancer disparities—established by the National Cancer Institute.

Among numerous research-centered awards, we earned a highly competitive **Clinical Translational Service Award** in partnership with our hospital affiliates—testimony of our entrepreneurial and team-oriented view of science and scholarship.

On the international setting, our Center for *Global Health and Diseases* focuses on AIDS, tuberculosis, malaria, and other serious medical conditions that threaten world health and quality of life.

Our Uganda-CWRU Research Collaboration, begun in 1986 to assist with the HIV/AIDS epidemic, has expanded its remit to include building capacity and providing training through research on such topics as epidemiology, clinical trials, nursing, anthropology, bioethics, biomedical engineering, cancer, and cardiovascular disease.

Our collaboration with Taipei Medical University includes exchange programs and joint research efforts in the areas of cancer, brain science, biomedical engineering, medical device and drug development, geriatrics, and long-term care.

The School of Medicine also partners with the business community on technology development and transfer, helping our researchers develop ideas, secure funding, and commercialize their technology. A growing number of faculty-founded start-up companies have emerged from this effort—with more in the pipeline.

Commitment to Community

The School of Medicine demonstrates its commitment to the community in many ways. There are programs aimed at improving the health of the community, ranging from healthy-eating initiatives to partnered projects to beginning to look at population and urban health. Our **Prevention Research Center for Healthy Neighborhoods** fosters partnerships in Cleveland's urban neighborhoods to prevent and reduce rates of chronic diseases such as diabetes and cardiovascular problems—including culturally appropriate interventions as well as evaluating and strengthening existing community programs. The Office of Cancer Disparities Research in the Case Comprehensive Cancer Center works to reduce the disproportionate burden of cancer on populations by promoting health focused research and outreach. Our Youth Enjoy Science (YES) program brings students from Cleveland-area schools to campus to participate in cancer research by engaging in cancer investigation and study.

Brief History

Since our founding in 1843 Case Western Reserve University School of Medicine has been widely recognized for innovative, inclusive medical education and pioneering biomedical research.

We were one of the first medical schools in the country to employ instructors devoted to full-time teaching and research. Six of the first seven women to receive medical degrees from accredited American medical schools graduated from Western Reserve College (as it was then called) between 1850 and 1856.

Already a leading educational institution for more than a century, in 1952 the School of Medicine initiated the most advanced medical curriculum in the country, pioneering integrated education, a focus on organ systems, and team teaching in the preclinical curriculum. This curriculum instituted a pass/fail grading system for the first two years of medical school to promote cooperation among students instead of competitiveness, introduced students to clinical work and patients almost as soon as they arrived on campus, and provided free, unscheduled time for our students in an era when doing so seemed unthinkable. Many other medical schools followed suit on all of these fronts, and these components remain at the core of medical school curriculums everywhere.

In 1971 the Health Sciences Center was completed to house the

university's medical, dental, and nursing schools, as well as the Health Center Library. The proximity of these research and educational centers to other university departments, including the sciences, engineering, and social sciences, stimulates creative interaction between researchers and educators. We expand on this emphasis on intellectual cross-fertilization in our Health Education Campus described above.

Another leap in research capabilities came in the early 1990s with the Richard F. Celeste Biomedical Research Building, which added 154,000 square feet of cutting-edge research space. In 2002 the University and Cleveland Clinic entered into an agreement to form the Cleveland Clinic Lerner College of Medicine of Case Western Reserve University within the CWRU School of Medicine, with the first class matriculating in 2004. The subsequent years saw additional new research space added, resulting in a complex of facilities on par with the best anywhere.

In 2006 the School of Medicine launched Western Reserve2, the latest evolution in our medical school curriculum and we partnered with the Cleveland Municipal School District to create the School of Science and Medicine at John Hay High School, the first such school in the nation. That partnership lives on today in the form of numerous initiatives aimed at exposing Cleveland's young people to careers in science and healing. Our medical and graduate students play vital roles in these initiatives, including mentoring, teaching, and providing shadowing opportunities. In 2007 the first female dean was appointed to the school of medicine, Pamela B. Davis. She served in this role until 2020 when she retired.

Curricular advancements continued throughout the next decade. In 2015 CWRU and Cleveland Clinic partnered with Microsoft to develop medical and engineering platforms as part of the new **HoloAnatomy** curriculum—a revolutionary way of learning the intricacies and cross-connections of the human body and its workings. HoloAnatomy plays a central role in the interprofessional education featured at our HEC. In 2016, our Physician Assistant Program began, and continues to grow.

A Rich Legacy

Eleven Nobel Prize holders have had ties to Case Western Reserve University School of Medicine:

- John J.R. Macleod, a Physiology Professor, shared the 1923 Nobel Prize in Physiology or Medicine for the discovery of insulin. Dr. Macleod completed much of his groundwork on diabetes in Cleveland.
- Corneille J.F. Heymans, a Visiting Scientist in the Department of Physiology, received the Nobel Prize in Physiology or Medicine in 1938 for work on carotid sinus reflexes.
- Frederick C. Robbins, a Pediatrics and Virology Professor, shared the 1954 Nobel Prize in Physiology or Medicine for his pioneering work on the polio virus, which led to the development of polio vaccines.
- Earl W. Sutherland Jr., Professor of Pharmacology, won the 1971 Nobel Prize in Physiology or Medicine for establishing the identity and importance of cyclic adenosine monophosphate (AMP) in the regulation of cell metabolism.
- Paul Berg, who earned his Biochemistry degree from CWRU, received the 1980 Nobel Prize in Chemistry for groundbreaking research in recombinant DNA technology.
- H. Jack Geiger, an alumnus of the medical school, is a founding member and past President of Physicians for Social Responsibility, which shared the 1985 Nobel Peace Prize as part of the international campaign to ban landmines.
- George H. Hitchings, an Oncology Professor, shared the 1988 Nobel Prize in Physiology or Medicine for pathbreaking research leading to the development of drugs to treat leukemia, organ transplant rejection, gout, herpes virus, and AIDS-related bacterial and pulmonary infections.
- Alfred G. Gilman, a graduate of the medical school, shared the 1994 Nobel Prize for Physiology or Medicine for identifying the role of G proteins in cell communication.
- Ferid Murad, a graduate of the medical school, shared the 1998 Nobel Prize in Physiology or Medicine for novel discoveries concerning nitric oxide as a signaling molecule in the cardiovascular system.
- Paul C. Lauterbur, PhD, a Visiting Professor of Radiology, shared the 2003 Nobel Prize in Physiology or Medicine for pioneering work in the development of magnetic resonance imaging.
- Peter C. Agre, who completed a Fellowship in Hematology at CWRU, shared the 2003 Nobel Prize in Chemistry for major discoveries that clarified how salts and water are transported out of and into the cells of the body, leading to a better understanding of diseases of the kidneys, heart, muscles, and nervous system.

Two of our distinguished alumni have served as U.S. Surgeon General: Jesse Steinfeld, from 1969 to 1973, and David Satcher, from 1998 to 2002. Dr. Satcher also served as Director of the Centers for Disease Control and Prevention from 1993 to 1998. Another medical school graduate, Julie Gerberding, MD, MPH, followed in his footsteps in 2002, becoming the first woman to be named CDC director.