



Renaissance
School of Medicine
Stony Brook University

Five-Year Research, Education and Diversity, Equity, Inclusion and Belonging

Strategic Plan 2023-2028



RESEARCH	EDUCATION	DIVERSITY, EQUITY, INCLUSION & BELONGING
MAJOR THEMES	PRIORITY AREAS	PRIORITY AREAS
Infectious Diseases and Immunology 8	Curriculum 44	Education 60
Cancer 12	Evaluation 48	Student Affairs 64
Neurosciences 16	Innovation 49	Healthcare 66
Cardiovascular and Kidney Diseases 20	Data Management/ Dashboard of Educational Metrics Well-Being 51	Research 68
		Faculty/Staff Affairs 69
		Community Outreach 70
ENHANCING INFRASTRUCTURE	OTHER KEY AREAS	
Investing in the Basic Sciences 24	Interprofessional Education and Interprofessional Collaborative Practice 52	
Investing in the Clinical Sciences 26	Graduate Studies at the RSOM 54	
Research Cores 28		
INSTITUTIONAL THEMES		
Center for Healthy Aging 32		
Long Island Network for Clinical and Translational Science (LINCATS) 36		
Technology and Medicine 38		

I am delighted to welcome you to the 2023-2028 Strategic Plan for the Renaissance School of Medicine at Stony Brook University. Since its inception more than 50 years ago, the Renaissance School of Medicine has excelled in training the next generation of physicians and scientists, made impactful discoveries in biomedicine, and provided high-quality clinical care to the residents of New York State and beyond. Throughout, we have been mindful of our mission to serve the underserved in Suffolk County and advance opportunities for all in our diverse communities. Our next Five-Year Strategic Plan builds on this legacy and comes at a propitious time for the Renaissance School of Medicine. Stony Brook University, the #1 public university in New York State, was recently designated a flagship university in the SUNY System, won an international competition to be the anchor institution for the New York Climate Exchange on Governor’s Island and received a \$500 million gift from the Simons Foundation, the largest unrestricted endowment gift in the history of U.S. higher education.

With the engagement of many faculty, staff and learners, we have designed the Strategic Plan to capitalize on the opportunities before us. Our clinical enterprise continues to rapidly grow and evolve, and the Renaissance School of Medicine’s role is incorporated into Stony Brook Medicine’s Five-Year Strategic Plan. Here, we focus on the academic components of the strategic plan, including research, education, and diversity, equity, inclusion and belonging (DEIB). Although described separately, it is at the intersections between domains where the magic happens that will lead to new insights, discoveries, treatments and cures of disease. One of our overarching goals is to integrate research, education, clinical medicine and DEIB to create and disseminate new knowledge that will benefit our learners, patients and communities. I welcome your participation as we launch the next exciting phase of the Renaissance School of Medicine’s journey.

Sincerely,

Peter Igarashi, MD
Knapp Dean, Renaissance School of Medicine
Stony Brook University



Renaissance School of Medicine Mission, Vision and Values

Mission

We are committed to recruiting and training diverse students, clinicians and physician-scientists in biomedical sciences to improve the health of all individuals and populations through education, outreach, compassionate care and research that discovers the biology of disease and informs novel preventive, diagnostic and therapeutic strategies.

Vision

As a premier medical institution, we set the benchmark for transformative biomedical research and for training the next generation of healthcare providers and students in delivering exceptional, inclusive and equitable patient care.

Values

INTEGRITY

We are honest and ethical in all our interactions.

COMPASSION

We provide empathic care with attentive listening and affirmation.

ACCOUNTABILITY

We hold ourselves accountable to our community, to our organization and to each other for our performance and behaviors.

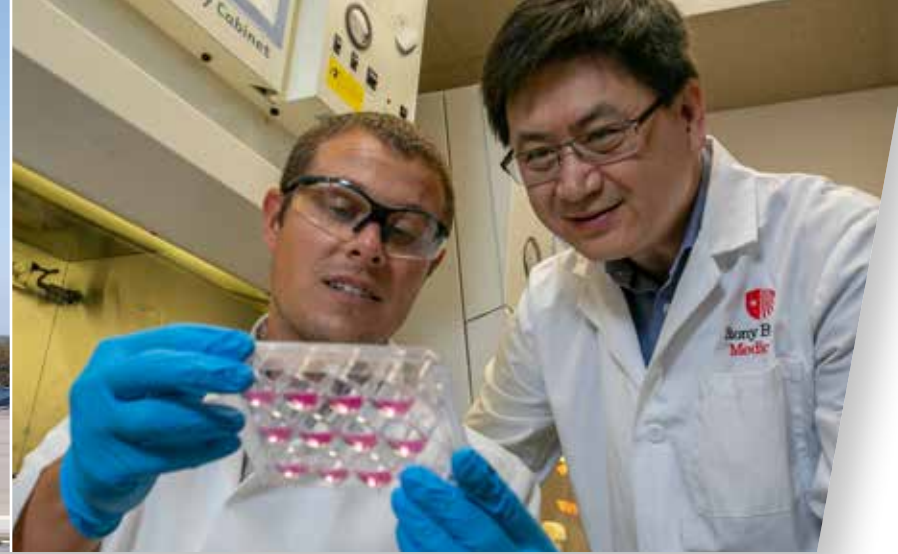
RESPECT

We foster an environment of mutual respect and trust, and embrace diverse perspectives and inclusivity.

EXCELLENCE

We set the highest possible standards for safety, clinical outcomes and service.





**In the next five years,
the Renaissance School of Medicine (RSOM)
will expand its standing as a
center of biomedical research excellence
in our state and in the nation.**

We expect to expand our academic presence in selected areas of research of national importance. Four major themes that have research strength at the RSOM have been selected for investments. A vigorous multipronged approach to the science of aging has been established through a newly created Center for Healthy Aging. This center is initially funded from philanthropic donations that will lead to obtaining robust external support. Our efforts in clinical-translational research through the Long Island Network for Clinical and Translational Science (LINCATS) will advance patient care and community-based research. The biomedical basic sciences will be enhanced through a novel model of funds flow to continue and expand their already significant research productivity. The overall research enterprise will be enhanced by newly developed formulas for incentivizing grant writing, with the goal of increasing our national percentile rank in funding from the National Institutes of Health by 40 percent. Overall, the foundations for a vibrant research enterprise have been laid to enable a vision of excellence in the biomedical sciences. The RSOM aspires to be recognized regionally and nationally for its innovative biomedical research enterprise.

The RSOM is both a regional and a national biomedical research academic center recognized for its innovative approaches to pressing unsolved problems. Its mission is to conduct biomedical research in areas of universal importance such as aging, infection, cancer and neurosciences. In the course of conducting research, the RSOM will train

a new generation of young scientists of diverse backgrounds who will excel in biomedical research. As a public state university, the RSOM requires the growth of its biomedical research portfolio through a concerted program of investing in the basic sciences, the clinical enterprise, and diversifying and raising the quality of its student body.

Two transformational university-wide achievements at the beginning of this Five-Year Research Strategic Plan will have a large impact on the mission of the RSOM. Stony Brook University was selected as the anchor institution for the development of a world-leading climate solutions center on Governors Island in New York Harbor. The New York Climate Exchange will be an international center for developing and deploying dynamic solutions to global climate change. Our leadership position in the New York Climate Exchange will provide significant opportunities for the RSOM to become involved in research on the impact of climate change on the public's health. This theme will be apparent throughout this Five-Year Research Strategic Plan.

The Simons Foundation announced a historic \$500 million endowment gift to Stony Brook University. This largest unrestricted donation in the nation's history will enhance the research productivity of the RSOM.

To accomplish its research mission, the RSOM has embarked in a comprehensive review of its strengths to compile a new research strategic plan. This five-year strategic plan for biomedical research (2023–2028) has been assembled by major research stakeholders of the RSOM with significant input from the faculty. The plan is organized and formatted in the same manner as its Five-Year Research Strategic Plan 2018–2023. However, some of the themes of the previous plan have been updated and new ones are now included to reflect our growth in new and cutting-edge biomedical research areas. Several major and institutional research themes, as well as infrastructure, are proposed for strategic development in the RSOM. The current status of each major and institutional theme is reviewed with an assessment of strengths and weaknesses. Specific recommendations regarding resource allocations are considered for fostering the success of each theme.

MAJOR THEMES

INFECTIOUS
DISEASES AND
IMMUNOLOGY



OVERVIEW

RSOM faculty in microbiology and infectious diseases have consistently performed at high levels in terms of research productivity, scientific impact, and the acquisition of extramural funds. Previous accomplishments notable for their worldwide impact include the discovery of the etiologic agent of Lyme disease, the first sequence of the entire poliovirus genome and the subsequent assembly of a synthetic infectious viral particle, and a large clinical trial of integrase inhibitors against HIV infection. Pandemic-potential viruses such as SARS-CoV-2, emerging pathogens such as those transmitted by arthropod vectors, and multidrug-resistant bacteria represent serious threats to health worldwide. The Department of Microbiology and Immunology and the Center for Infectious Diseases have a history of excellence in this area, with outstanding scholarship focused on viral, bacterial, and fungal pathogens and the immune response of the host to infection. Clinical infectious disease research in the departments of Medicine and Pediatrics is a critical component of these efforts.

Immunology is a key discipline that ties together basic and clinical research and impacts multiple areas within the RSOM. Immunology is central to advancing understanding of the host-pathogen interface, sepsis, cancer biology and therapeutics, gastrointestinal illnesses, and many other facets of human health. Progress in these areas has been made in the strategic hiring of new immunology faculty in the Department of Microbiology and Immunology, the recruitment of clinical and translational investigators in the Department of Medicine, and the opening of the Laboratory for Comparative Medicine, a state-of-the-art animal biosafety level 3 laboratory. The RSOM must capitalize on this emerging critical mass of investigators and infrastructure to become a world-class program. The emergence of SARS-CoV-2 and subsequent COVID-19 pandemic have made abundantly clear the importance of infectious diseases to human health and medical research. Integration of the infectious diseases enterprise with new faculty who excel in immunology and related fields will create a nucleus of excellence that will positively impact multiple areas within the university.

CURRENT STATUS

The Department of Microbiology and Immunology, the Center for Infectious Diseases, and the departments of Medicine and Pediatrics have made major contributions to infectious disease research in the RSOM. Collectively, all four account for a very large share of NIH funds to the institution. In addition, the Laboratory for Comparative Medicine permits the study of highly virulent organisms in preclinical disease models coupled with unique resources for aerosol delivery of infectious agents and experimental therapeutics and the study of vector-borne diseases. This facility enables exciting new basic and translational research on highly virulent, emerging, and pandemic-potential agents and serves as an important regional resource.

The RSOM is well situated to address new challenges, but new investments are needed to maintain the critical mass of faculty expertise in infectious diseases and immunology necessary to ensure the continued success of our research and educational missions. New faculty hires will also be essential to build a diverse and representative faculty. In addition, support for infrastructure will be required to build our clinical and translational infectious diseases enterprise.

Adding faculty members in the outlined areas of infectious diseases and immunology will provide the foundation for a highly competitive, world-renowned center of excellence in these disciplines.

1. The recruitment of new immunologists will enhance synergy with the Cancer Center. It is important to stress that the largest share of therapeutic agents coming into the market for cancer are humanized monoclonal antibodies to tumor markers.
2. The study of invasive tick and other vector species from the south presents a perfect opportunity to interact with climate change scientists. The New York Climate Exchange on Governors Island will be a perfect venue for studies involving the spread of ticks and the diseases that they carry.
3. The Laboratory for Comparative Medicine will foster interaction among regional institutions and our public health and global medicine colleagues.
4. The COVID-19 pandemic illustrated the effect of aging on the morbidity and mortality of this infection. Likewise, elderly patients are more susceptible to tick-borne diseases. There are clear opportunities for interactions with the Center for Healthy Aging.

Infectious diseases and immunology have a prominent place in both medical and graduate student coursework.

The new expertise in immunology will facilitate updating of coursework in this fast-moving field. The Department of Microbiology and Immunology is home to an NIH T32 training as well as a successful campus-wide program for postdoctoral associates (NIH IRACDA).

Maintaining our historical strengths in infectious diseases, while recruiting faculty in immunology, will enhance ties between the basic and clinical sciences. New York City and Long Island serve as points of entry for established and emerging pathogens. The combination of a densely populated area and proximity to a major port of entry to the country provides the ideal setting for the introduction of new diseases and illustrates the vulnerability of this region for emerging infectious diseases. Community outreach and population-based studies in these and other areas of infection in collaboration with epidemiologists could provide additional opportunities that, in turn, would provide high scientific and community-wide visibility.

MAJOR THEMES

INFECTIOUS DISEASES AND IMMUNOLOGY

CONTINUED

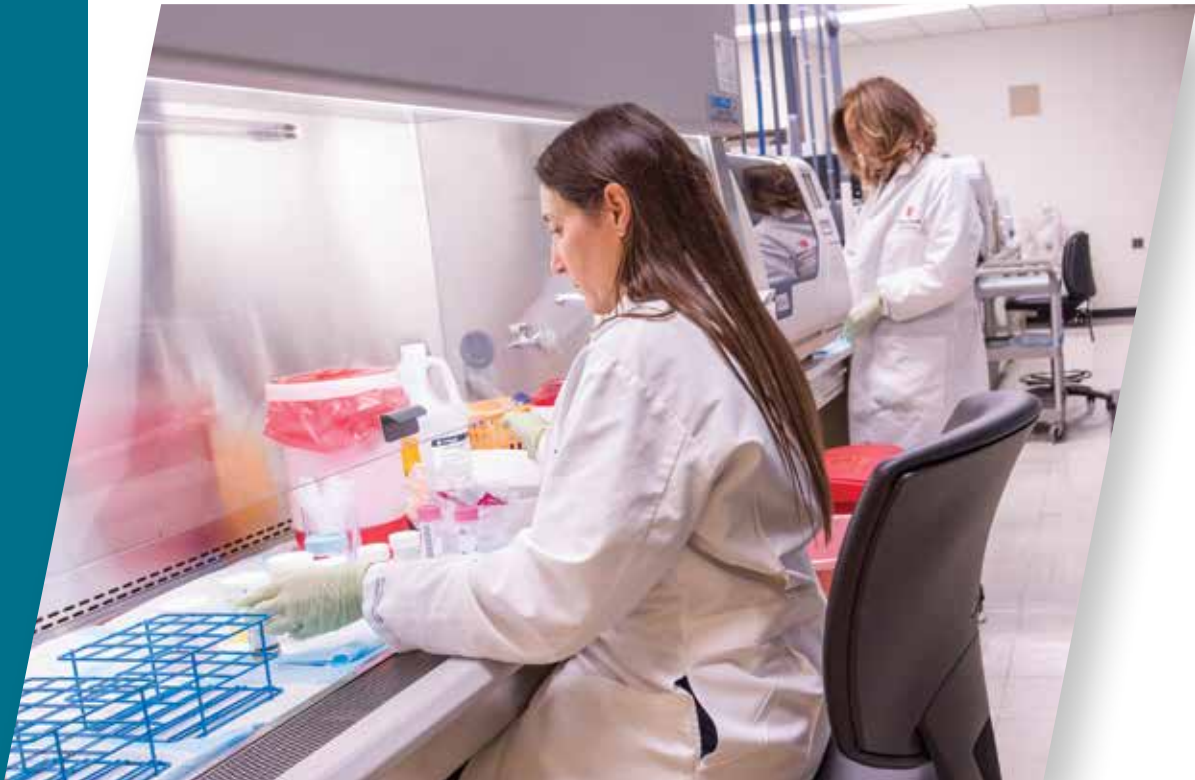
RECOMMENDATIONS

- 1. The recruitment of new faculty members is an urgent need and essential to the continued success of infectious diseases and immunology research at Stony Brook. New hires are needed to grow in thematic areas, address departmental contraction due to faculty retirements, and build a diverse and representative faculty. Strategic recruitment of faculty should be targeted to maintain current expertise in viral, bacterial, and fungal pathogenesis across the RSOM. Importantly, new hires should bolster immunology while building on and complementing the current areas of strength within the departments that adopt this theme.
- 2. Climate change has been a major driver in the proliferation of worldwide arthropod-borne infections. In the United States, New York bears a disproportionate burden of these infections as the site of the introduction of West Nile virus and the epidemic of tick-borne diseases. Moreover, Suffolk County bears a disproportionate burden of tick-borne diseases in New York. Research on tick-borne diseases is of worldwide importance but it is also uniquely important to our region. It is recommended that the RSOM develop an interdisciplinary basic-translational Center for Tick-Borne Diseases involving our allied health facilities in eastern Long Island. As mentioned, these diseases are a unique problem in our area and present an outstanding opportunity for research at the national and regional levels, while performing significant community service. Importantly, invasive tick species in our area present an outstanding opportunity for our involvement in the newly created New York Climate Exchange.

- 3. Basic science and physician-scientist faculty members should be recruited to build in areas of virology, vector-borne diseases, multidrug-resistant bacteria and therapeutic development, including small molecule drugs (antibiotics, antibiotic alternatives, and antifungals) and novel vaccine approaches. Fungal research is a strength at the RSOM and strategic hires in this area will be additive to our current expertise. Likewise, mucosal immunology is well represented in our areas of study. The hiring of new faculty should be coordinated between the relevant departments and centers as appropriate; the background of successful candidates should determine their appropriate departmental homes and secondary affiliations. Hiring should also be done with an eye toward enhancing utilization of the Laboratory for Comparative Medicine, including the recruitment of faculty working on pandemic-potential viruses and other biosafety level 3 pathogens such as tick-borne agents and tuberculosis. Finally, efforts should be made to build our junior faculty ranks and improve diversity among our faculty.

DELIVERABLES

- If the recommendations are enacted, the expectations will be:
- Increased extramural funding measured as increases in NIH funding, program project grants, multiple principal investigator grants, and a diversification of funding sources.
 - Increased basic-clinical collaborations, including joint faculty recruitment, geographic clustering of physician-scientists and basic scientists, and collaborative research projects and grants.
 - A well-recognized community involvement in areas that are unique to our region with strengthening of research ties to our associated hospitals and health facilities.
 - A visible program of research collaborations with the Cancer Center and Center for Healthy Aging.
 - Establishment of a research program in climate change and tick-borne diseases in collaboration with the New York Climate Exchange.
 - Growth of educational efforts involving additional T32 and other research training grants and increased training of physician-scientists in basic science laboratories.



MAJOR THEMES

CANCER



OVERVIEW

Cancer is emerging as the leading cause of death in the U.S., due in part to the success of the national healthcare enterprise in combating cardiovascular disease. Laboratory-based cancer research has helped elucidate fundamental principles in cell biology and is leading to the development of more effective approaches for cancer patient care. From a financial perspective, cancer has become one of the most important consumers of healthcare resources.



CURRENT STATUS

The RSOM highlighted expansion of the Stony Brook Cancer Center as a major theme in the previous strategic plan. Many of the objectives that were set have been achieved, including:

- 1. Development of large-scale integrated programs in cancer research** that span the entire campus, with emphasis on cutting-edge research and collaboration with science, technology, engineering and mathematics (STEM) disciplines. Examples include a P01 Program Project Grant to support multidisciplinary research programs and core resources focused on sphingolipids in cancer biology and therapy, novel imaging technologies, machine learning approaches to diagnostics, and many others. Cancer Center faculty members are also developing a U01 team-based, cooperative NCI proposal to uncover mechanisms that link diet and lipid metabolism to tumor growth and progression. Cancer Center investigators hold more than 100 peer-reviewed, individual-research awards, approaching \$25 million a year, and contribute ~250 distinct peer-reviewed scholarly publications each year.
- 2. Establishment of three research programs:**
 - a. Oncogenic Drivers and Mechanisms of Carcinogenesis (ODMC);
 - b. Imaging, Bioinformatics and Engineering Sciences (IBES); and
 - c. Lipid Signaling & Metabolism in Cancer (LSMC).
- 3. Enhancement of four major shared resource facilities:**
 - a. Tissue Analytics, which includes tissue biobanking and the histologic analysis;
 - b. Biological Mass Spectrometry;
 - c. Biostatistics; and
 - d. Bioinformatics.

In addition, we are developing a fifth shared resource, Advanced Imaging, contingent upon the recruitment of a leader for this shared resource.
- 4. Development of a Cancer Clinical Trials Office** that includes an array of investigator-initiated trials and also participates in national cooperative trials.
- 5. Organization of numerous scientific meetings** to promote scientific collaboration, including an annual Research Retreat, several cancer site-specific retreats, and the annual Gloria & Mark Snyder Cancer Symposium. The Cancer Center also sponsors Oncology Cancer Grand Rounds and partners with the Department of Pathology to support Pathology/Cancer Center Grand Rounds, which have highlighted 70 local, regional and national seminar speakers over the past four years.

Stony Brook University (SBU) co-manages **Brookhaven National Laboratory (BNL)**, a national laboratory of the **United States Department of Energy**. Members of the Cancer Center collaborate with investigators at BNL and with research scientists at the Cold Spring Harbor Laboratory (CSHL).

The Cancer Center research programs overlap with efforts in clinical and biomedical informatics, computer sciences, metabolism, inflammation, molecular biology, genetics and genomics, pathology, structural biochemistry, pharmacology, physiology, dentistry, nursing, mathematics, physics, chemistry, and several other areas.

Members of the Cancer Center represent the majority of the basic and clinical cancer faculty and are transforming clinical oncology into an academically anchored clinical investigative workforce. New clinical faculty hires into oncology disciplines (including Medicine, Surgery, Pediatrics, Gynecology, Radiation Oncology and Pathology) should have significant protected time for impactful engagement in scholarly activity and research.

Cancer Center members teach medical students in Phases 1 and 2 of the core curriculum of the RSOM, train clinical residents in cancer biomarker discovery and validation, and serve as mentors and thesis advisors to undergraduate students, postdoctoral research fellows, and graduate students in RSOM programs. Members of the Cancer Center are also leveraging SBU's great strengths in STEM, to educate the next generation of leaders that will transform cancer care for our region and enhance our national and international reputation.

MAJOR THEMES

CANCER

CONTINUED

RECOMMENDATIONS

As our region's largest academic cancer center, the RSOM is the major site for cancer care on Long Island and we are committed to the advancement of basic and translational cancer research that will provide more effective therapeutic opportunities for our patients. While the Cancer Center has made significant strides in the past five years, there remain major goals and hurdles to overcome for us to achieve one of the center's top priorities, NCI designation.

The goals and vision of the leadership of the Cancer Center are to:

1. **Continue to promote basic and translational research**, uncover novel therapeutic opportunities for more effective treatment of cancer, and elevate the regional and national impact of the RSOM by achieving NCI designation.
2. **Increase cancer-focused NIH funding to reach \$12 million to \$14 million in annual direct costs** (as measured by the NIH RCDC parameter), consistent with that of other academic health centers that have been recently approved for NCI Cancer Center designation. There should be the expectation that Cancer Center members will double their NIH grant portfolio by the end of this Five-Year Research Strategic Plan (2028). Strategic recruitment of more NCI-funded cancer investigators should continue in areas of existing strengths to promote collaborations leading to larger grants. Other mechanisms should include the expansion of pilot funding for investigator-initiated projects, particularly collaborative studies that will lead to the submission of large grants.
3. **Expand the clinical and research programs** in immuno-oncology and cancer immunotherapeutics, including CAR-T cells and related cellular and molecular therapies. Such a program would take advantage of campus strengths in immunology, pharmacology, drug discovery, computational biology, and medicinal chemistry.



4. **Increase institutional enrollment of patients on therapeutic clinical trials**, including investigator-initiated trials and industry-sponsored trials. Enrollment of 200 to 300 patients/year is expected by the NCI for a center of our size. Achieving this goal will require recruitment of experienced trialists, engaging clinician-educators to recruit patients and implement trials, and creating a culture where every patient is potentially a trial subject. An opt-out program embedded in the electronic health record would also help. Robust cancer bioinformatics, data management and support are needed.
5. **Enhance the resources of the Office of Community Outreach and Engagement (COE).** In recent years, the NCI has put an increasing emphasis on enhancing the COE as a key metric of success for Cancer Center designation. Thus, enhancement of the resources of our COE, including staff and office space, is important for NCI designation. Additional work also needs to be done to bridge the COE to basic and clinical researchers, using community health care data collected from our catchment areas.
6. **Create an independent Program of Population Health.** While population health research has been integrated into each of the existing research programs, future growth of the Cancer Center and the long-term goal of achieving "comprehensive" status require an independent Program of Population Health, as part of a competitive application for NCI designation. To accomplish this, 3-4 additional faculty recruitments in cancer population sciences are needed, which, coupled with existing faculty, would provide a robust foundation for this program. Additionally, faculty offices and space for students and postdoctoral fellows will need to be identified for this growing program.
7. **Consider expanding cyclotron/tracer development and PET imaging** to cancer research. The current facility is primarily utilized in neuroscience and psychiatry. Cancer research would increase utilization.

DELIVERABLES

- Conduct cutting-edge research that will advance our understanding of the origins and underlying biologic mechanisms of cancer, reveal more effective avenues for prevention, and uncover better ways to treat cancer. Increased research productivity should be measurable by doubling the number of grants in five years.
- Educate the next generation of cancer researchers and clinical care providers. Write a T32 application for graduate students in cancer research and promote K award applications.
- Increase institutional enrollment of patients on therapeutic clinical trials to 200 to 300 patients/year. Increase accruals to investigator-initiated clinical trials.
- Promote community outreach and engagement to reduce cancer burden and disparities in the local communities of our region as measured by the number of proposals on population health.
- Deliver world-class comprehensive care designed to prevent, cure or minimize the effects of cancer for our patients as measured by an increased enrollment in clinical trials.
- Promote diversity, equity and inclusion across all domains of the Cancer Center.
- Become an NCI-designated Cancer Center within the timeframe of the strategic plan.

MAJOR THEMES

NEUROSCIENCES



OVERVIEW

An estimated 60 percent of the U.S. population is affected by one or more neurological conditions. Between 1990 and 2017, the burden of neurological and psychiatric disease increased, contributing to more than \$765 billion in healthcare costs. And, with the number of people in the U.S. ages 65 and older expected to double by 2060, the need for new treatments, rehabilitation interventions, and preventive measures has never been greater.

Neuroscience is a cross-disciplinary field whose broad goal is to uncover the mechanisms of brain function in health and disease. It combines many approaches to advance our fundamental understanding of the nervous system and use this knowledge to develop new diagnostics and therapeutics. Neuroscience is a priority area for basic and translational research worldwide. In the United States, public and private entities have committed to substantially supporting the field. The National Institutes of Health (NIH) and the National Science Foundation (NSF) have developed a series of initiatives targeted at basic and clinical neurosciences. Private foundations and the pharmaceutical/biotech industry recognize the transformative potential of neuroscience, making significant investments in this sector.

Despite the excitement and potential for growth, the field presents universities seeking to become national leaders with challenges that must be overcome. Competition with other well-resourced institutions, speed and costs of technological advancements, thematic breadth, and the need for cross-disciplinary collaboration are the main challenges facing the development and execution of a successful strategic plan. The RSOM is ideally positioned to overcome these challenges and establish itself as a regional and national leader in the neurosciences.

CURRENT STATUS

The RSOM has significant strengths in the neurosciences. A large and cross-disciplinary community of neuroscientists works across four departments (Neurobiology and Behavior, Neurology, Neurosurgery, and Psychiatry) with additional faculty affiliated with the departments in the RSOM. The Neurosciences Institute — a consortium formed by the departments of Neurobiology and Behavior, Neurology, Neurosurgery, and Psychiatry — supports many high-priority, integrated research programs. Neuroscience researchers at the RSOM cluster across strategically fundamental themes, including brain development/aging and neurodegeneration (Alzheimer’s disease and related dementias, Parkinson’s disease), neuroinflammation, neurovascular function and brain ischemia, limbic function in addiction and neuropsychiatric disorders, neuropharmacology, and disorders of consciousness.

Neuroscience is an interdisciplinary field, and as such, it easily interfaces with other strategic themes at the RSOM and within the university. More specifically, there are significant areas of integration with major themes such as: a) aging, b) technological innovation in medicine, and c) therapeutic pathways and drug discovery. The Neurosciences Institute will be critical to the success of the Center for Healthy Aging.

The complexity of data on neuronal diversity, brain connectivity, neural dynamics, behavioral phenotyping, biomarkers and population statistics is ideally suited for developing novel analytical and modeling technologies. Basic and translational neuroscientists at the RSOM are generating novel therapeutic targets for various disorders. Developing assays and animal models can help screening for novel compounds integrate with ongoing efforts on campus.

The RSOM neuroscience faculty are engaged in educational and training activities at multiple levels: undergraduate, graduate and postgraduate. The Department of Neurobiology and Behavior is responsible for the neuroscience track in the undergraduate biology major administered within the College of Arts and Sciences (CAS). The departments of Neurobiology and Behavior and Neurology administer the Mind, Brain and Behavior course offered in Phase 1 of the medical school curriculum. The MS and PhD programs in Neuroscience, together with the graduate program in Pharmacology, are home to a cross-disciplinary group of trainees engaged in neuroscience research. The departments of Neurology, Neurosurgery and Psychiatry oversee a wide range of clinical training through their residency and fellowship programs.

The Neurosciences Institute hosts signature clinical programs that nucleate interactions between clinicians, clinician-scientists and basic scientists. Mature programs and several new, emerging models provide opportunities to blend systems of clinical care with research discovery. These include:

- 1. The Center of Excellence for Alzheimer’s Disease (CEAD)
- 2. Level 4 Comprehensive Epilepsy Center (CEP)
- 3. Neuromodulation Center
- 4. Cerebrovascular & Comprehensive Stroke Center

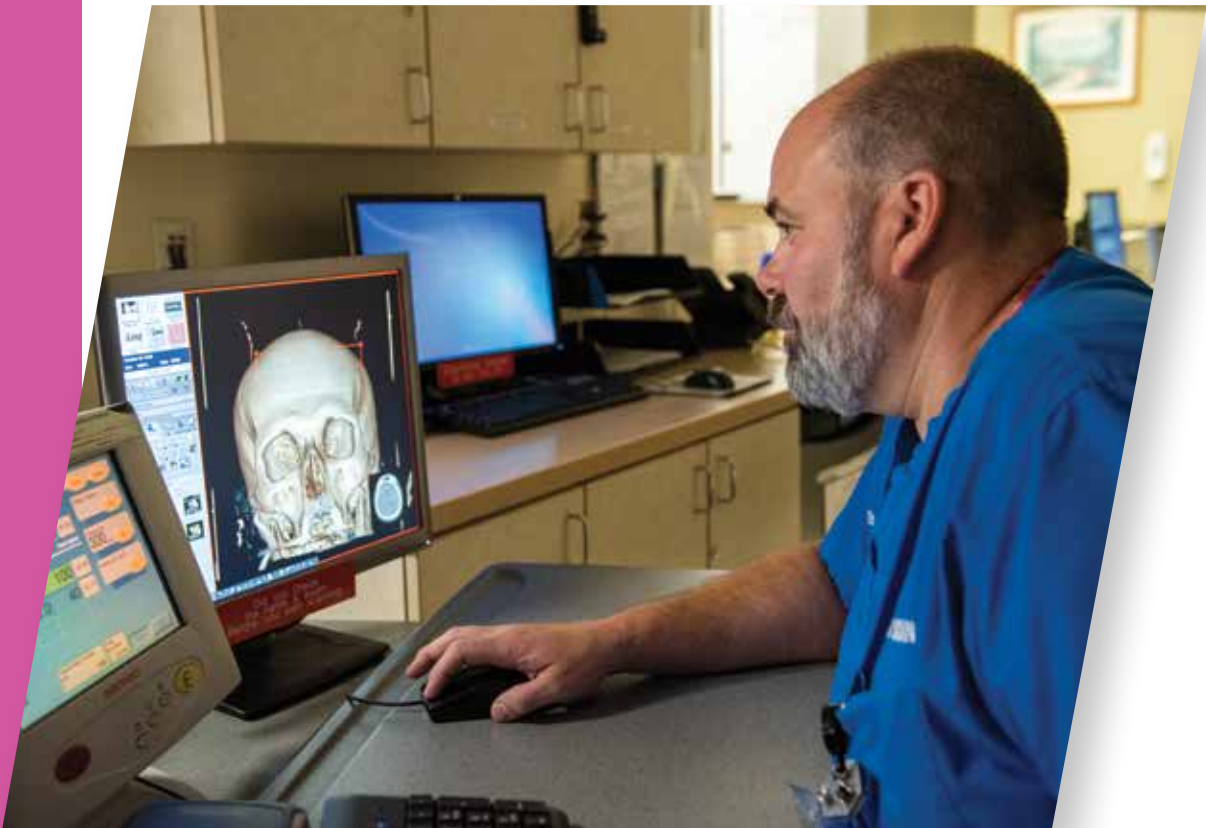
MAJOR THEMES

NEUROSCIENCES

CONTINUED

RECOMMENDATIONS

While the RSOM neuroscience research engine is vibrant and productive, targeted investments will be necessary to enhance its competitiveness and ensure continued growth. The Neurosciences Institute represents an untapped opportunity for connecting neuroscientists, basic scientists, physician-scientists and clinicians across the RSOM and campus. Furthermore, the Neurosciences Institute requires the financial and space resources needed to set up integrated basic and clinical neuroscience programs, and promote research and training activities.



DELIVERABLES

Here are a few areas of interventions:

- 1. Strategic hiring.**
Despite these strengths, the RSOM neuroscience community in its current state lacks the critical mass to build teams of investigators in topical areas. Recruitment should focus on acquiring talent to expand existing areas of excellence and establish new thematic priorities. Philanthropic support through endowed chairs would help secure scientists with established research programs and leadership skills. Recruitment should also balance the acquisition of basic scientists and physician-scientists. The areas of growth should revolve around several key themes:
 - a. **Brain development and aging, and neurodegeneration**
(Alzheimer’s disease and related dementias)
 - b. **Parkinson’s disease and movement disorders**
 - c. **Cellular** (neuronal and glial) **and circuit function**
 - d. **Neuroinflammation, neurovascular function, and brain ischemia, and neurotechnology computation/AI approaches**
 - e. **Neuropsychiatric disorders**
(mood disorders, psychosis, addiction medicine)
- 2. Research support.**
Neuroscience research is both resource and capital intensive, and funding is highly competitive. There is an exceptional opportunity to develop effective strategies to extract clinical data from the EMR, develop robust research databases, and apply computational methods for complex clinical data.
- 3. Trainee support.**
Scientific excellence builds on the success of students and trainees. Developing formalized and federally funded training programs at multiple levels (PG-MSTP, K08/K23, K99, T32, R25) critically depends on appropriate administrative support and institutional commitment. A fully resourced Neurosciences Institute requires the administrative expertise needed to manage the research and educational programs.
- 4. Space.**
The physical infrastructure is quickly aging. Institutional efforts should be made to renovate space and create opportunities to colocalize investigators and shared core facilities to support team success and entice the recruitment of new investigators.

- Create several pipeline programs and scientific symposia to be hosted by the Neurosciences Institute.
 - Neurosciences Institute PG-MSTP:
A postgraduate physician-scientist training pathway by aggregating research-residency tracks across core (neurology, neurosurgery, psychiatry) and related disciplines. Within two years of its inception, this program would be competitive for funding from the NIH (e.g., R25).
 - Meeting of the Minds:
Relaunch this annual, open-to-the-public symposium featuring lectures by renowned neuroscience experts and celebrating RSOM faculty’s achievements.
 - Trainee Symposium:
Provide a forum for institutional trainees to interact with investigators and share their discoveries.
- Establish an NIA-designated Alzheimer’s Disease Research Center within the period covered by this strategic plan.
- Provide a strategic recruitment plan for the Neurosciences Institute within the first year of this strategic plan.
- Develop measurable interactions with the Center for Healthy Aging in both the research and outreach missions.
- Increase the number of NIH research and training grants by 40 percent during the time period covered by this strategic plan.
- Maintain patient outreach programs and develop relationships with our affiliated hospital and medical clinics.

MAJOR THEMES

CARDIO-
VASCULAR
AND KIDNEY
DISEASES



OVERVIEW

The Stony Brook Heart Institute, along with the Department of Vascular Surgery, Department of Neurosurgery, and the Neurosciences Institute, is at the forefront of healthcare innovation. Key strengths include a robust clinical trials network, a comprehensive research infrastructure that supports the analysis of large datasets from electronic health records, clinical trials, biobanks and data analytic platforms. The institute has strengths in clinical care and research in heart failure, non-invasive imaging, electrophysiology, cardiovascular surgery and stroke.

The cardiovascular and cerebrovascular research scientists at the RSOM are located within multiple departments, but there are overarching centers. The Heart Institute faculty provides clinical and research training to cardiology fellows, vascular surgery residents and fellows, undergraduate, graduate and medical students, and internal medicine, medicine-pediatric, general surgery and emergency medicine residents. Cerebrovascular clinical care and research have coalesced into two institutes, the Stony Brook Cerebrovascular Center and the Stony Brook Cerebrovascular and Comprehensive Stroke Center, which provide clinical care and training to residents and fellows.

Kidney disease and cardiovascular disease are closely related. Cardiovascular disease is the primary cause of mortality in patients with chronic kidney disease (CKD). Patients with CKD are more likely to die from cardiovascular disease than they are to progress to requiring dialysis or transplantation. Conversely, most of the genetic diseases that cause abnormal blood pressure in humans involve genes that mediate sodium transport in the kidney. The close relationship between the heart and kidney is recognized clinically as cardiorenal syndrome.

Chronic kidney disease has a devastating impact on our society: In the United States alone, more than 35 million individuals — one in seven adults — have been diagnosed with chronic kidney disease, resulting in significant morbidity and accounting for nearly 25 percent of the Medicare budget. Kidney disease also disproportionately affects older, minority and low-income individuals, and is often associated with other health conditions, including cardiovascular disease. Furthermore, it is apparent that kidney replacement therapies (i.e., dialysis) are merely temporary measures with a yearly mortality rate between 20 and 25 percent and a five-year survival rate of approximately 35 percent. In addition, once individuals with kidney disease are on dialysis, they are eligible for Medicare regardless of age. The Medicare program spends more than \$150 billion, more than 24 percent of total spending, to treat individuals with kidney disease. While kidney transplantation has made some impact on this devastating disease, only about 25,000 kidneys are available for transplantation annually.

In recent years, the field of kidney research has taken on a multidisciplinary approach, from novel engineering strategies to computational tools to investigate the mechanisms as well as potential therapeutic strategies for kidney disease. Furthermore, the field is ripe for implementation of cutting-edge technologies to address the complexity of various drivers that contribute to the development as well as the progression of kidney disease. However, currently there is a dearth of trainees and early-career investigators in the field, highlighting a potential opportunity to invest in cross-disciplinary pipelines to promote kidney research.



MAJOR THEMES

CARDIO-
VASCULAR
AND KIDNEY
DISEASES

CONTINUED

CURRENT STATUS

Strengths of the cardiovascular program include active clinical trialists across the spectrum of cardiovascular disease. Within heart failure, research programs focus on early detection and monitoring of heart failure and cardiomyopathies, novel therapeutic agents and devices, biomarkers to define severity and complications, and gene and cellular therapeutic approaches to improving cardiac function. Board-certified lipidologists lead programs of novel therapies that interrupt critical pathways in cholesterol formation and deposition within the coronary vasculature, including the role of race in the response to therapy. Researchers are developing therapeutic approaches to make coronary atherosclerotic stenosis interventions safer and investigating how to revascularize chronically occluded arteries. In addition, vascular surgery investigators are studying interactions of arterial and venous thrombus with the endothelial cells and how AI applications may enhance early diagnosis and optimize management and outcomes.

The Stony Brook Cerebrovascular Center and the Stony Brook Cerebrovascular and Comprehensive Stroke Center have made significant advances in neuro-interventional therapies, new devices and techniques for the treatment of cerebrovascular disease. These centers acquired and manage two mobile stroke units for Stony Brook University Hospital, the first such program in Suffolk County. Cerebrovascular disease research at the RSOM is funded by commercial concerns that develop tools for the surgical treatment of stroke. The overarching goal for the next five years is to create a Cardiovascular Research Center of Excellence to leverage strengths in clinical cardiology, cardiovascular surgery and cerebrovascular surgery with basic research that aligns.

The RSOM is uniquely positioned to be a leader in kidney research by leveraging the technologies from existing inter- and intra-institutional programs across Stony Brook University in partnership with Northport VAMC, Brookhaven National Laboratory and Cold Spring Harbor Laboratory. While the RSOM kidney research program has grown steadily in the past five years, investments targeted at enhancing this multidisciplinary approach by bringing together investigators and technologies between the physical and biological sciences with clinical medicine will be critical in the next phase of growth in kidney research. These include access to cutting-edge technologies in computational biology, multimodal imaging, drug development, health informatics as well as access to unique local community and population-based research in individuals with kidney disease. Furthermore, the region, specifically Suffolk County, is aging, and is now in the top five counties in New York State with individuals affected by chronic kidney disease. Finally, the recent addition of the National Institute of Health-supported multi-institutional U2C-TL1 New York Consortium for Interdisciplinary Training in Kidney, Urological and Hematological Research (NYC Train KUHR) in partnership with the Albert Einstein College of Medicine, Columbia University and the Icahn School of Medicine at Mount Sinai, positions RSOM to uniquely leverage a cross-institutional approach to train the next generation of investigators in kidney research.



RECOMMENDATIONS

- 1. The Heart Institute has developed** a vibrant clinical reputation with patients coming from beyond our catchment area. This clinical excellence should be the foundation for new research collaborations developing ties to the College of Engineering and Applied Sciences, departments of Biomedical Engineering, Applied Mathematics and Statistics, Physiology and Biophysics for collaborations.
- 2. Encourage members** of the Heart Institute, Cerebrovascular Centers and nephrology laboratories to become involved in the activities and funding opportunities of LINCATS, Center for Healthy Aging, and New York Climate Exchange.
- 3. Develop a clinical trials resource** with administrative support and clinical coordinator infrastructure for providing tools to promote state-of-the-art and novel care for patients with cardiovascular, cerebrovascular and kidney diseases.
- 4. Leverage the reputation and work** of clinical trialists, translational and basic scientists to develop critical mass for training grants, program projects, mentoring and seeking philanthropic funding. Expand federal and non-federal research funding in targeted areas of research. Opportunities for funding include federal sources such as the National Institutes of Health, the Department of Defense and the National Science Foundation, and non-federal sources such as the American Heart Association, American Diabetes Association, American Society of Nephrology and the National Kidney Foundation.
- 5. Identify research laboratory space** for faculty recruits and allied departments to house research faculty in cardio-cerebrovascular and kidney diseases.
- 6. Create a local cardiovascular and cerebrovascular research group** to hold academic meetings and an annual symposium highlighting the work of the RSOM faculty at the Long Island Heart Clinic and Stony Brook Cerebrovascular Center and the Stony Brook Cerebrovascular and Comprehensive Stroke Center.
- 7. Enhance joint seminar programs** on clinical and translational topics in cardiovascular, cerebrovascular and kidney sciences.
- 8. Target support to expand the existing pathway** to train the next generation of investigators in cardiovascular and kidney research. Add to the existing NIH-supported kidney training grant with individual and institutional training and career development programs at every level of training (undergraduate, graduate, post doctoral (MD, PhD) and early-career faculty). Add an NHLBI R38 MD research residency training grant that would provide training in cardiovascular research for residents in medicine, neurology (stroke) and general surgery (cardiothoracic surgery) to feed the pipeline of future physician research investigators.
- 9. Expand the existing patient registry** in cardiovascular disease to include registries for acute kidney injury, chronic kidney disease and cardiorenal syndromes. Utilize the electronic health record to identify and capture patients with such conditions for population science and outcomes research, generating pilot data for extramural grant applications, determining feasibility for enrollment into clinical trials, and identifying phenotypes for cross collaboration with basic and translational investigation.
- 10. Address community engagement** for management of chronic diseases such as chronic kidney disease, stroke and heart failure. Develop a post-admission clinic for enrolling such patients into research studies as well as disease management.

DELIVERABLES

- An increase in research productivity of 40 percent over the five-year period of this strategic plan. This increase applies to new grants as well as peer-reviewed publications.
- An increase in the joint academic activity of clinical and basic science faculty engaged in cardio, cerebrovascular and kidney research.
- An increase in participation of the faculty in LINCATS and in the Center for Healthy Aging. This can be in the form of providing mentorship, participating in workshops and applying for internal grants.
- Establish cross-institutional collaborations in targeted research areas with pilot grants, and multi-disciplinary workshops, and scientific symposia.
- Enhance the existing institutional database of patients with cardiovascular and kidney diseases to provide increased access for health informatics-based research.
- Integrating a research track in cardio and cerebrovascular science for trainees is essential to the strategic educational plan. Enhancing research activity by clinical faculty overseeing young scientists will significantly contribute to achieving scholarly works and securing grant resources. An increase in seminars and an annual symposium to present research by residents, fellows and faculty will be a measurement of increased academic activity.
- Add to the existing NYC Train KUHR grant by expanding NIH research training grants with a minimum of one R25 and one T32 grant focusing on expanding diversity in kidney research, five F30/31/32 training grants, and five K/career development grants in the next five years.
- Expand endowed professorship in kidney research with philanthropic support, with a focus on expanding the partnership with DCI in the next five years.
- Establish an extramurally supported Kidney Research Center in the next five years.

ENHANCING INFRASTRUCTURE

INVESTING IN THE BASIC SCIENCES



OVERVIEW

As we emerge from the COVID-19 pandemic, there is an opportunity to reflect on the pivotal role of the biomedical basic sciences. The fundamental research done on RNA biochemistry, immunology, microbiology and biomedical engineering over decades coalesced into the development of the RNA-based vaccines that ultimately controlled the pandemic in record time. This triumph of the basic biomedical sciences needs to be remembered whenever the continuation of robust basic biomedical research and education is threatened. Because the basic biomedical sciences are expensive and often do not produce immediate results, they are uniquely susceptible to economic pressures. The goal to maintain support for the basic biomedical sciences is one that is shared by all the top universities in the nation.

"There are no such things as pure and applied science. There are only science and the application of science."

—Louis Pasteur

CURRENT STATUS

The basic biomedical sciences at the RSOM comprise the departments of Anatomical Sciences, Microbiology & Immunology, Pharmacological Sciences, and Physiology & Biophysics; Biochemistry & Cell Biology and Neurobiology & Behavior are shared administratively with the College of Arts and Sciences. The departments of Biomedical Engineering and Biomedical Informatics are also shared administratively with the College of Engineering and Applied Sciences. Several clinical departments have vibrant basic research programs resulting from their investment in basic biomedical scientists, notably Anesthesiology, Medicine, Neurosurgery, Pathology, Psychiatry and Radiology.

Historically, the basic biomedical sciences have been the main drivers of research in the RSOM, and, importantly, in the entire university. Most of the scientific successes that distinguish Stony Brook University have been achieved by faculty in the basic biomedical sciences. This preeminent role has been eroded. In the period covered by the last Five-Year Research Strategic Plan 2018–2023, the research funding levels of the basic biomedical sciences have decreased, concomitant with a reduction in the number of faculty. In the last few years, investment in the RSOM departments dwindled markedly, resulting in two departments not having the critical mass of faculty needed for a cohesive academic enterprise and in the failure to renovate old space needed for new hires. Moreover, recruitment of new faculty slowed down, leaving some departments with a majority of aging tenured faculty who no longer contribute to the research enterprise.

In this Five-Year Research Strategic Plan 2023–2028, there is an opportunity to grow the basic biomedical sciences. The designation of Stony Brook University as a SUNY flagship, Empire professorships and renewed federal investments in research will be instrumental in building our existing strengths in the basic biomedical sciences. The period covered by the Five-Year Research Strategic Plan 2023–2028 will be crucial for determining the fate of the basic biomedical sciences at the RSOM. Strategic investments added to new directions by the departments will ensure that they will continue to be the research engine of the RSOM.

RECOMMENDATIONS

1. **Develop a uniform and equitable policy for funding** the basic biomedical sciences departments at the RSOM where research merits are the main criteria for support and the funding model enables essential departmental responsibilities to be carried out.
2. **Develop a uniform and equitable policy** for remuneration and incentivization of all basic biomedical science faculty across all RSOM departments.
3. **Require strategic departmental recruitment plans** that consider research themes, teaching duties and integration into RSOM-wide priorities.
4. **Update and optimize the utilization of all research space at the RSOM.**

DELIVERABLES

- An increase in research funding of 40 percent over the five-year period of this strategic plan.
- Facilitate basic biomedical sciences departments to engage in formal undergraduate teaching with salary support so that they can accrue benefits from the educational enterprise of the university.
- Strict adherence to the tenure clock with carefully defined expectations for tenure and promotion.
- Reconsider an integrated plan for graduate studies including all basic biomedical sciences faculty from all RSOM departments. Provide teaching assistantships for all RSOM graduate programs that engage in expanded teaching.
- The Five-Year Research Strategic Plan 2023–2028 presents a great opportunity to develop translational research themes and foster collaborations among the basic biomedical sciences and clinical departments.

ENHANCING
INFRASTRUCTURE

INVESTING
IN THE
CLINICAL
SCIENCES



OVERVIEW

Clinical research is defined as studies involving human subjects or material of human origin. Clinical research includes clinical trials — studies of the safety and effectiveness of the latest advances in patient care. Every medication, surgical device and tool, diagnostic test and procedure used in medicine today has been tested in patients or healthy volunteers who participated in clinical research trials. In addition, clinical research spans a spectrum of observational, qualitative outcomes and population science research.

The clinical research portfolio at the RSOM has been active since its founding, and at present, it is largely funded by foundations and the industry. However, as the RSOM has grown and the clinical departments have emphasized outstanding patient care, the clinical research portfolio has lagged. The Office for Clinical Research is a core of the RSOM, but in its present form, it is inadequate to spearhead increased clinical research. Reversing this trend is the top priority of this Five-Year Research Strategic Plan 2023–2028. Clinical research at the RSOM has to increase in a manner commensurate with the size of the school. A plan to incentivize clinical research will be developed for the next five years with clear metrics for success.

There are precedents in the RSOM that point to our ability to put together highly successful and collaborative programs for clinical research. With the onset of the COVID-19 pandemic in 2020, the RSOM was a source of strength both locally as well as across the state, caring for patients, ill with a pathogen with which we had no previous experience or expertise, and leveraging the entire research infrastructure of the institution, contributing to the body of science to curb the pandemic. Institutionally, there was significant crossing of departments to develop basic and clinical research studies, enroll participants in clinical trials and publish manuscripts that contributed to ending the pandemic. The RSOM was one of only two sites in the state enrolling children in vaccine studies and one of only a handful of sites statewide enrolling adults in vaccine studies.

In 2021, the RSOM convened a Clinical Research Working Group that included representatives from multiple departments on East and West Campus, Dean’s office, Office of the Vice President for Research and School of Social Welfare. The committee identified a number of barriers to increased translational and clinical research. Many of the barriers are in issues of compliance. Increasing and often changing requirements make it difficult for putting together grant applications — notably in applications for research on human subjects (IRB) and in contracts with industry and commerce. Although many of the compliance requirements have a federal origin (and hence are out of our control), some are imposed locally, and it will be important to streamline these as much as possible.

Another barrier is the weak pathway from trainee (residents/fellows) to a career in clinical research. Junior researchers have limited mentorship, and recruitment/retention of early-career faculty is not always successful. Moreover, there are limited resources from Graduate Medical Education (GME) for supporting trainees interested in pursuing a career in clinical/translational research due to clinical demands of the trainees. Additional barriers that were identified include the insufficient staffing of the biostatistical core, the lack of dedicated space for the Office for Clinical Research, and the limited support for clinical trials office (support staff/nurse/location).

RECOMMENDATIONS

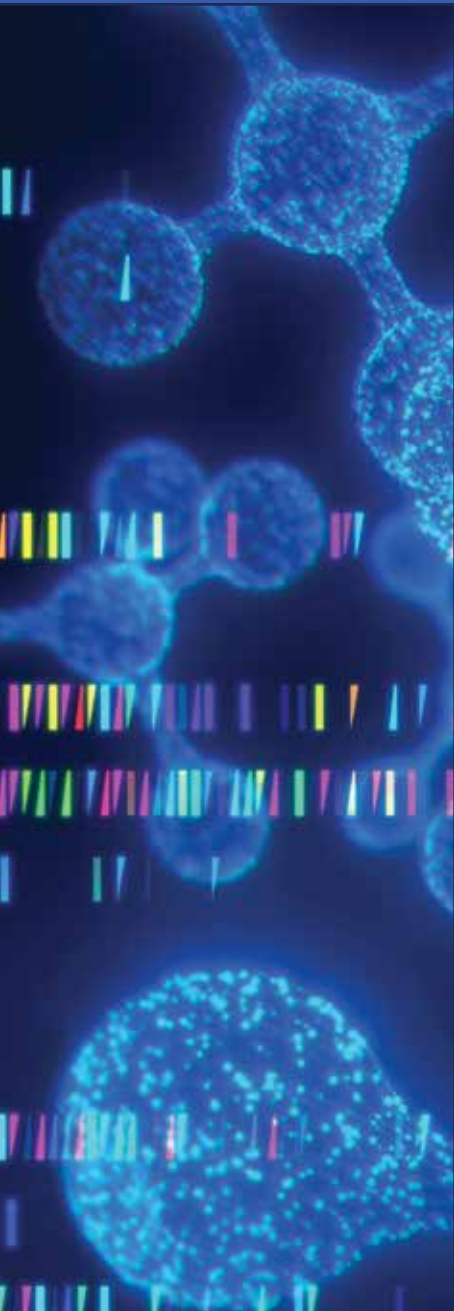
1. **Constitute an institutional research advisory committee** with representatives from every department and center to obtain information and input, and plan areas for improvement.
2. **Strengthen administrative grant support** to assist in all stages of proposal development, including IRB applications and all pre-award requirements. Develop a centralized clinical research support center to enable parallel rather than sequential review of proposals. Develop mechanisms whereby investigators and study teams can monitor the approval process in real time.
3. **Support trainees** (residents, fellows) interested in pursuing a research-intensive career. Incentivize submission of training grants in areas of clear research strengths and provide assistance for writing K scholar applications.
4. **Provide subsidized access to core facilities** such as genomics, mass spectroscopy and bioinformatics: Systems biology can be used to interrogate clinical specimens in an “unbiased” approach. Systems biology involves the use of genomics and mass spectrometry supported by bioinformatics and computational biology to develop models of disease pathogenesis (biomarkers). This approach to research can be used by clinicians to determine aspects of diseases and launch new investigations.
5. **Develop an appropriate model for biostatistical support**, including PhD-level director and core master-level statisticians, to support faculty within departments. Provide the appropriate level of biostatistical support for the various users (medical students, residents, fellows, faculty). Develop a career pathway for growth and promotion of biostatisticians.
6. **Increase critical mass in areas of research strengths:** Require that departments and centers demonstrate a cluster hire approach for recruitment of physician scientists.
7. **Provide clinical research space:** As the new clinical areas are developed off campus, dedicated research space should be built into new construction.
8. **Leverage LINCATS** to support more clinical trials targeting identified populations of interest for the institution.
9. **Foster collaborations** among the basic biomedical sciences and clinical departments.

DELIVERABLES

- An increase in research funding of 40 percent over the five-year period of this strategic plan. An increase in funding for clinical trials of 40 percent by federal agencies.
- Clinical departments need to be reviewed in the context of their support for research and on the return on the investment.
- An increase in the number of training grants and K awards. Each of the four thematic areas should have at least one training grant and at least one new K award per year.
- An increase in the utilization of research cores and electronic medical records for research.
- An increase in the number of faculty hired as clinical research clusters.
- Building of dedicated clinical research space.
- Align research components of GME training with an increase in F series and K awards.

ENHANCING
INFRASTRUCTURE

RESEARCH
CORES



OVERVIEW

The RSOM manages several research cores. For the purpose of highlighting their research functions and capabilities, the cores have been grouped into thematic areas:

- Molecular Biology Cores
- Imaging Cores
- Clinical Research Cores

Molecular Biology Cores

Genomics is the starting point for transcriptomics and mass spectroscopy of proteins, lipids and metabolites to determine the structures and functions of biomolecules. Next-generation sequencing technologies and mass spectrometry have made it possible to query complex biological systems, and bioinformatics of these technologies can develop predictive computational models of disease. The entire continuum of sequencing and bioinformatic analyses is the foundation of systems biology that can provide predictive approaches to complex molecular questions. Although these technologies are used primarily by basic scientists, the continuum of systems biology has important applications to the clinical sciences. Systems biology approaches are unbiased and can be powerful tools for the analyses of clinical samples.

Molecular Biology Cores at the RSOM include Biological Mass Spectroscopy and Genomics, both offering a full range of sequencing services and instrumentation. The Biological Mass Spectrometry Shared Resource provides expertise in discovery and quantitative proteomics, metabolomics and lipidomics. The Genomics Core performs multiple nucleic acid procedures for genetics/genomics research. Single-cell genomics can analyze genetic, epigenetic and surface antigen profiles of individual cells. Bioinformatics services include analysis of gene expression, genome/transcriptome assembly and annotation, single-cell sequencing data analysis, protein structure prediction and others. Importantly, these cores consult on experiment design and controls, obtain the sequences and help with data analysis.

Imaging Cores

The RSOM has unique imaging resources that include positron emission tomography (PET) for human and small animal use, the Central Microscopy Imaging Center (CMIC), magnetic resonance imaging (MRI) for experimental purposes and structural biology (cryo-EM).

Positron Emission Tomography (PET) and Magnetic Resonance Imaging (MRI) at the RSOM.

PET is an imaging technique using positron-labeled molecules of very low mass to image and measure molecular targets. Using PET imaging for a given molecule of interest, it is possible to detect the quantity and distribution of the target, the pathophysiology of disorders affecting that target and treatment outcome prediction. Brain PET, in particular, has received much interest in recent years due to its importance in neurodegenerative and psychiatric disorders. The PET Center is managed by the Department of Psychiatry. There are two research PET scanners, a simultaneous PET/MRI and a preclinical PET imaging facility, allowing quantification of targets in rodents and humans. The facility can synthesize PET radioactive tracers that target neurotransmitters and proinflammatory molecules. The PET Core also provides consultation on the design and regulatory approval of PET studies. There is a small-animal PET imaging facility that features the Siemens Inveon trimodality PET/SPECT/CT, available for research use in the Division of Laboratory Animal Resources (DLAR).

Magnetic resonance imaging has a research-dedicated Siemens MAGNETOM 3T operated by the Department of Psychology. The Department of Radiology of the RSOM has a comprehensive state-of-the-art biomedical imaging infrastructure for carrying out clinical and preclinical research that runs a small animal Bruker Biospec 7.0 Tesla MRI scanner, also housed in the DLAR.

Central Microscopy Imaging Center (CMIC). The RSOM operates the CMIC facility that is used university wide. Some of the microscopes have been acquired recently, notably an inverted Zeiss Confocal LSM 980 with Airyscan 2 NLO Two-Photon Laser Scanning Confocal Microscope System suitable for examination of live material. There is an upright Leica TCS SP8X Laser Scanning Confocal Microscope System. The facility operates two super-resolution microscopes (N-SIM and N-STORM). Transmission electron microscopes include a recent JEOL 1400 and a FEI Bio Twin G. There is a recently acquired Zeiss Crossbeam 340 focused Ion Beam-Scanning Electron Microscope (FIB-SEM). CMIC has up-to-date image capture and processing software, sample preparation instruments, and several ultra and cryomicrotomes. CMIC is staffed with experienced technical staff who can consult on experimental design and provide training on the instruments. Users of CMIC who can demonstrate proficiency with the use of the microscopes and other instruments are permitted to use these without supervision.

Structural Biology. Structural biology to visualize macromolecules related to health and disease lies at the foundation of biomedical research. This powerful collection of techniques can be used to determine the 3D structure of biomolecules such as proteins and protein-nucleic acid complexes. Cryo-EM, along with new computational approaches for image processing, has permitted atomic resolution visualization of biochemical processes in their native cellular environment rather than in isolated preparations. Similarly, the development of high-throughput crystallization pipelines paired with a new generation of X-ray beamlines allow for the structural characterization of hundreds of ligand-protein complexes per day. The combination of outstanding on-site structural biology and computational faculty, and the proximity of Brookhaven National Laboratory (BNL) results in a strong research enterprise in structural biology. The cryo-EM facility housed in the Centers for Molecular Medicine operates a 200 keV Talos Arctica transmission electron microscope equipped with a Falcon 3EC direct electron detector for high-resolution data collection. Technical staff provides regular training in sample preparation and data collection to new users and a suite of GPU machines are available for data processing and analysis.

ENHANCING
INFRASTRUCTURE

RESEARCH
CORES

CONTINUED

Clinical Research Cores

The cores considered below can be used for both clinical and basic sciences projects, but most have a patient component, so they have been grouped under the Clinical Research Cores.

The Biobank is a core facility operated by the Cancer Center. The Biobank provides human biological specimens, and associated clinical data, collected under informed consent to Stony Brook researchers and their collaborators. Banking of biospecimens is performed in a dedicated laboratory to ensure molecular and morphological integrity. Normal and pathological specimens are stored under liquid nitrogen. H&E slides and embedded tissue blocks from all pathology diagnostic cases done at Stony Brook University Hospital are also in this facility.

The Biostatistical Consulting Core (BCC) meets the increasing demand and serves the biostatistical needs of the RSOM by providing consultation, collaboration, education and support. The BCC is managed by the RSOM and is located in the Department of Family, Population and Preventive Medicine. The core has one faculty member with a PhD in statistics, and two full-time and two part-time master-level biostatisticians. The BCC provides a full range of services that include:

- 1. General biostatistical consultation ranging from clinical trial/experimental design to statistical data analysis;
- 2. Biostatistical assistance in grant preparation from formulating the study hypotheses to writing the statistical analysis plan; and
- 3. Statistical short courses or workshops.

Flow Cytometry Research Core is managed by the Stony Brook University Hospital Clinical Immunology Laboratory, and houses four instruments with a broad range of capabilities:

- 1. FACSARIA IIIu Cell Sorter (BD Biosciences);
- 2. LSR Fortessa (BD Biosciences), 4 lasers with 16 fluorescent detectors, equipped with 96-well plate loader;
- 3. CytoFLEX (Beckman Coulter), 6 lasers with 21 repositionable bandpass filters, equipped with plate loader; and
- 4. FACSLytic (BD Biosciences), 3 lasers with 12 fluorescent detectors.

Research Histology Core is managed by the Department of Pathology and offers gross processing of research tissue and cellular specimens, including fixation, paraffin embedding, sectioning and staining. Both routine hematoxylin and eosin (H&E) and advanced immunohistochemical (IHC) staining methods are offered. The core staff and scientific director are available to assist in the development of research protocols that depend on the processing of tissue or other cellular specimens.

RECOMMENDATIONS

- 1. The Biological Mass Spectroscopy and Genomics cores face some challenges. The cost-of-service contracts for the instrumentation is a primary expense that either needs to be absorbed by the RSOM or passed on to the users. Competition from commercial sequencing facilities can provide cheaper services. Neither of these two challenges is unique to the molecular biology cores. The one advantage that these cores have over commercial facilities is providing advice to the user and interpretation on site.
- 2. The PET Center needs to diversify and enlarge its user base to remain solvent. Production of isotope tracers for commercial purposes is one way to increase revenue, but for the purposes of its research commitments, the PET Center needs to involve other departments and centers, such as the Cancer Center, in the RSOM.
- 3. Structural biology at Stony Brook University and the development of considerable new national facilities at BNL in both cryo-EM and crystallography makes the RSOM a highly attractive career destination for new faculty. Ties to BNL will be enhanced by developing new research programs and complementing existing priority areas. The most obvious recommendation is to recruit new faculty in cryo-EM and X-ray crystallography who can add to the community of structural biologists and further strengthen our links to BNL. These faculty should be spread across multiple RSOM basic science departments targeted to current areas of priority for the RSOM, such as aging, infection or cancer.
- 4. Enhance ties between the RSOM and BNL. Faculty at the RSOM are regular users of the world-class structural biology facilities at BNL, including the NSLS-II synchrotron for collection of X-ray crystallography diffraction data, and the Laboratory of Molecular Biosciences, which houses a 300 keV Titan Krios transmission electron microscope. Our structural biologists cooperate to secure block allocation groups that allow regular and flexible access to these facilities. This link between SBU and BNL is further strengthened by joint appointments.
- 5. Biostatistical services need to be expanded and are crucial for clinical and population-based research. These services can be centralized in a core or disseminated across several departments. The decision as to how best to provide biostatistical services will need to be made in the period covered by this strategic plan.
- 6. While basic scientists are recruited with start-up funds that can be used to pay for core use, early-stage clinical faculty are hired with less or no start-up money. A program to provide funds for research-oriented early clinical faculty for core use should be instituted along with a milestone mechanism to track progress.
- 7. There are some features and problems that are common to all cores. Obtaining high-end instrumentation can be done through S10 grants (or similar from other federal institutions). S10 applications need to have a clear plan for paying technical personnel to run the instrument and for payment of service contracts for at least five years. This plan needs to be in place at the time of submission.

DELIVERABLES

- An overall increase in core use of 7 percent per year for five years.
- Diversification of the use of the PET Center by other clinical departments.
- An enhanced relationship with BNL through new faculty in structural biology as measured by increased joint grants and publications.
- Determination as to how best to provide biostatistical support for researchers.
- A plan to make cores accessible to young clinical faculty to launch their research careers.
- Acquisition of instrumentation via federal funds including a plan for use and maintenance.

INSTITUTIONAL
THEMES

CENTER FOR
HEALTHY
AGING



OVERVIEW

Aging is the progressive increase of physiological deterioration leading to impaired organ function and is a primary risk for degenerative diseases, including both sporadic cases and those with genetic underpinnings. Aging is universal to all living species, and it has always been assumed that it is unavoidable. In recent years, however, the science of aging has demonstrated unequivocally that the development of aging is controlled by biomolecular and genetic pathways.



CURRENT STATUS

Stony Brook Medicine (SBM) and Stony Brook University (SBU) have many existing strengths in aging research, education and patient care. Collectively, the Renaissance School of Medicine (RSOM), College of Engineering and Applied Sciences (CEAS) and College of Arts and Sciences (CAS) have more than \$17 million in research funding from the National Institute of Aging. Additional funding from the NIH and the National Science Foundation raises the total to more than \$23 million. The RSOM has nationally prominent research programs in neuroscience (Alzheimer’s disease, Parkinson’s disease), inflammation in aging (inflammaging), metabolism and metabolomics with a focus on lipidomics (relevant to ketones and aging), and DNA damage. State-of-the-art imaging facilities (MRI/PET) exist for imaging the aging brain, and there is a unique ability to generate novel PET tracers using the RSOM’s cyclotron core and the Brookhaven National Laboratory’s synchrotron.

Clinically, SBM has broad strengths in providing care for aging patients and innovative clinical research in geriatrics. The RSOM has a Center of Excellence for Alzheimer’s Disease supported by New York State. Stony Brook University Hospital pioneered the development of geriatric hospitalist medicine as a specialty and has been designated by the Institute for Healthcare Improvement as an Age-Friendly Health System that includes unique features such as a geriatric emergency department. The SBU campus houses the Long Island State Veterans Home, which provides residential and day care to more than 350 aging veterans and serves as an important teaching site for the geriatrics fellowship.

All five of the health sciences schools and the program in public health have research, clinical and educational programs devoted to geriatrics. Examples include the Adult-Gerontology Nurse Practitioner program in the School of Nursing, the Center for Aging in Place in Suburbia created by the School of Social Welfare, and an NSF grant to create in-home sensing technologies for smart aging, which is a collaboration involving the CEAS, RSOM, School of Social Welfare and School of Nursing.

Fundamental geroscience research can be found in several departments of the RSOM as well as in departments from the main campus. Convergence of existing expertise is expected to lead to a nationally prominent research portfolio.

The RSOM has unique imaging resources. Positron emission tomography (PET) is an imaging technique using positron-labeled molecules of very low mass to image and measure molecular targets. Brain PET, in particular, has received much interest in recent years due to its importance in neurodegenerative and psychiatric disorders, and is thus uniquely suited for aging research. Stony Brook University has two research-dedicated PET scanners, a simultaneous PET/MRI and a preclinical PET imaging facility, allowing quantification of targets in laboratory animals and humans. The facility can synthesize PET tracers that target new molecules.

The RSOM has a large geriatric clinical practice that includes ambulatory and inpatient services, outreach programs to nursing and rehabilitation centers in our area, including the Long Island State Veterans Hospital on the Stony Brook University campus, and a program on translational research and geriatric care. The Center of Excellence for Alzheimer’s Disease serves more than 54,000 patients on Long Island suffering from dementias. In addition, Stony Brook Medicine has achieved status as an IHI Age-Friendly Health System and is working to improve care related to geriatrics. The Health Resources Services Administration awarded a \$10 million grant to the RSOM to create inpatient research capacity. With these existing outstanding clinical programs, geriatrics represents a unique opportunity for faculty to address the basic and clinical science of the multi-system decline of physiologic systems with aging; develop unique, interdisciplinary strategies to study our aging patients; and reach out to the community to develop services that will enhance the quality of life of our elderly population.

INSTITUTIONAL THEMES

CENTER FOR HEALTHY AGING

CONTINUED

RECOMMENDATIONS

1.

The creation of a Center for Healthy Aging (CHA) at the RSOM will support a vibrant program of geroscience and geriatric research. The CHA is initially funded by the President’s Innovation and Excellence Fund. Formation of the CHA is already leveraged by substantial federal funds in aging research by state-of-the-art imaging facilities, and by an extensive geriatric clinical practice. While it is easy to see how these strengths can establish the RSOM as the premier Center for Healthy Aging, Stony Brook University has provided the resources to promote the integration of geroscientists and clinicians into teams examining similar topics across additional areas. A critical mass of aging research, education and patient care already exists at the RSOM. What is needed now is the Center for Healthy Aging to coordinate the various activities, promote bidirectional interactions between aging researchers and geriatricians, transform the care of the aging in Suffolk County and elevate the national prominence of the RSOM.
2.

Achieving this goal will require two major components: the Center for Healthy Aging (CHA) and an Age-Friendly Learning Health System (AFLHS). The Center for Healthy Aging will function as a discovery platform generating new basic science insights, drugs, devices, and clinical and informatic tools. The products will be evaluated in an age-friendly AFLHS using implementation science and newer clinical study designs, such as cluster randomization and adaptive clinical trials. The “glue” connecting the major components will consist of interdisciplinary research grants, new geroscience training programs and biomedical informatics. A key requirement will be a Community Outreach Advisory Board that will provide input into aging research at the initial stages and will include representation from health systems, government, community-based organizations and agencies serving older adults in Suffolk County.
3.

The CHA will be supported initially by funds made available by the President’s Innovation and Excellence Fund and distributed by an executive committee headed by the Dean of the RSOM, including NIA-funded investigators, members of other health science schools and clinicians. Initial activities will be to fund local geroscience research projects aimed at convergence of topics that will unify our existing strengths as well as our translational research efforts.
4.

The science of mobility has been identified as a new research opportunity for the CHA that would be inclusive of our medical specialties, other schools of the health sciences and the university. An integrated, multidisciplinary approach to understanding factors that contribute to reduced mobility will help to target interventional strategies or environmental modifications to reduce the occurrence of falls, which are a major cause of morbidity and mortality in older individuals. As such, when translated to the clinic, Stony Brook’s research endeavors, focusing on reducing age-related decline/disease through multidisciplinary approaches, will also result in a reduction of falls. In-house and outreach programs will be evaluated as part of the progress of the Center for Healthy Aging.

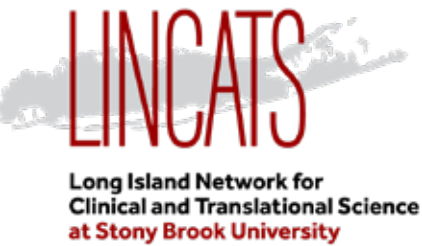
DELIVERABLES

- A yearly request for applications by the Center for Healthy Aging will be issued for research projects on any aspect of aging. These applications will be competitive and expected to lead to federal grants.
- A yearly symposium on all aspects of aging will be held showcasing funded research.
- Expand the application of PET imaging to aging research in the brain and other organs.
- Assembling groups of researchers and geriatricians that could develop proposals and programs to offer services and to submit grants to federal institutions.
- Metrics include symposium participation, number of applications submitted for the various RFAs, extramural research funding and impactful scholarship.
- Training programs in geriatrics and aging research.
- Development of service programs and community outreach.
- In collaboration with the Neurosciences Institute, obtain an NIH-funded Alzheimer’s Disease Research Center within the timeframe of the strategic plan.
- Obtain a Claude D. Pepper Older Americans Independence Center within the timeframe of the strategic plan.



INSTITUTIONAL
THEMES

LONG ISLAND
NETWORK
FOR CLINICAL
AND
TRANSLATIONAL
SCIENCE
(LINCATS)



OVERVIEW

The foundational work to build a hub that supports clinical and translational science and build the infrastructure needed to accelerate the progress from discovery to implementation to improve public health outcomes has been assembled. This hub is named the Long Island Network for Clinical and Translational Science (LINCATS), established with institutional funds, with plans to continue to develop and apply for federal support. This program will enhance the research infrastructure by supporting services, educational programs to enhance the research workforce and supply seed funding in its pilot program. It will also promote innovation and create new tools to be distributed to other research groups, and it will spread dissemination and implementation of evidence-based practices into communities.

CURRENT STATUS

LINCATS is led by Stony Brook University (SBU) and associated hospitals and medical centers, in collaboration with Brookhaven National Laboratory (BNL), Cold Spring Harbor Laboratory (CSHL) and the Northport VA Medical Center (NVAMC). Over the last four years and through the pandemic, LINCATS integrated existing services, developed a comprehensive set of new services and resources for trainees and investigators, and played a major role in SBU’s response to the pandemic, including timely patient care and new clinical trials for vaccines and therapeutics. LINCATS has three advisory boards, including community, internal and external advisory boards, and established an institutionally supported K12 program that currently supports four K12 awardees. This program has the dual purpose of increasing the scholarly workforce in research and showing feasibility to obtain federal funding and support from the National Center for Advancing Translational Sciences (NCATS) and become one of the federally funded national CTSA hubs.

LINCATS received \$10 million from the Health Resources and Services Administration as a congressionally directed spending to build a research-dedicated inpatient unit to support LINCATS research operations.

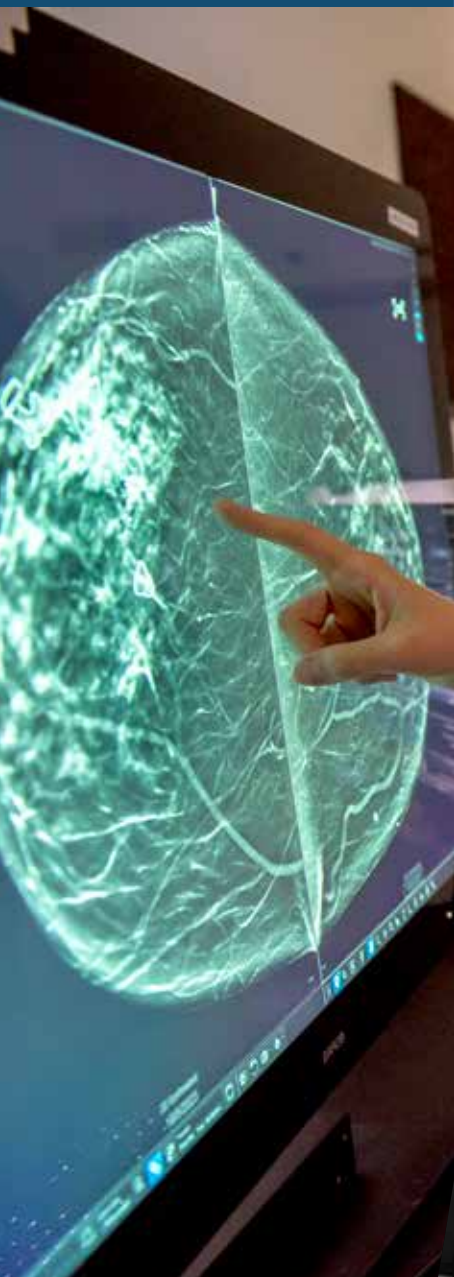


RECOMMENDATIONS

1. **Enhance the foundational efforts across all areas:** build an inclusive workforce, enhance trainee pipeline, facilitate new research areas, provide literacy in new technical areas, and provide support services and career enhancement.
2. **Increase federal funding in related mechanisms:** training programs, core services.
3. **Continue institutional support** through successful NCATS funding and beyond.
4. **NCATS’s mission is based on integration** of resources, services, education to facilitate translation from discovery to impact public health. LINCATS has representation from all schools and colleges, and will continue to promote removal of barriers to enhance collaborations.
5. **In the workforce development plans, offer a Clinician Track,** which includes 10 hours of on-demand course content and a practical mentoring experience. The motivation for participating will be to enhance preparedness for research, which for faculty clinicians is vital for promotion in an academic medical center. Learning is supported with real-time on-demand office hours and an optional experiential component. We will advertise Program for Research Operations, Productivity and Excellence (PROPEL) to all clinical department chairs, making it available to all employees.

DELIVERABLES

- Persist in efforts to obtain funding from NCATS for LINCATS to establish LINCATS as a national CTSA hub.
- Infrastructure building: Provide support to investigators by facilitating all aspects of research, including experimental design, statistical support, regulatory guidance, recruitment, data analysis and multidisciplinary collaborations. Specifically, this includes collection of evaluation data through the Services Pricing and Application for Research Centers (SPARC) system; developing AI tools; improving Institutional Review Board (IRB) efficiency; promoting use of informatics, biobanking and genotyping; and facilitating access to nationwide CTSA resources with the Hub Liaison Team (HLT).
- Education: Initiate PROPEL to train research coordinators across all fields of research, including entrepreneurship, and facilitate collaborators with BNL, CSHL and NVAMC.
- Community engagement: The Community Engagement Network for Translational Science (CENTS) will bridge the distance between segregated and stratified communities, establish multiple connectivity nodes throughout the network, involving IT services, newsletter, website and mini-TED talks, and a Summer Research Institute.
- Innovation in CTS: Major chokepoints in clinical and translational science (CTS) through development and evaluation of AI methods for extracting and classifying features from multi-modal datasets will be identified.
- Integration within the CTSA national network: Will facilitate multi-center studies. The HLT will connect LINCATS researchers with CTSA hubs conducting complementary research. The Health Informatics services will make large-scale multi-CTSA projects accessible to LINCATS researchers.
- Workforce training: Supports and trains scholars to become independent investigators in clinical and translational science and positively impact the overall health of the community.
- Clinical research space: Complete renovation of space on 18S of the hospital to accommodate eight state-of-the-art beds. The unit will facilitate research studies and funding for studies that require inpatient monitoring.

INSTITUTIONAL
THEMESTECHNOLOGY
AND
MEDICINE

OVERVIEW

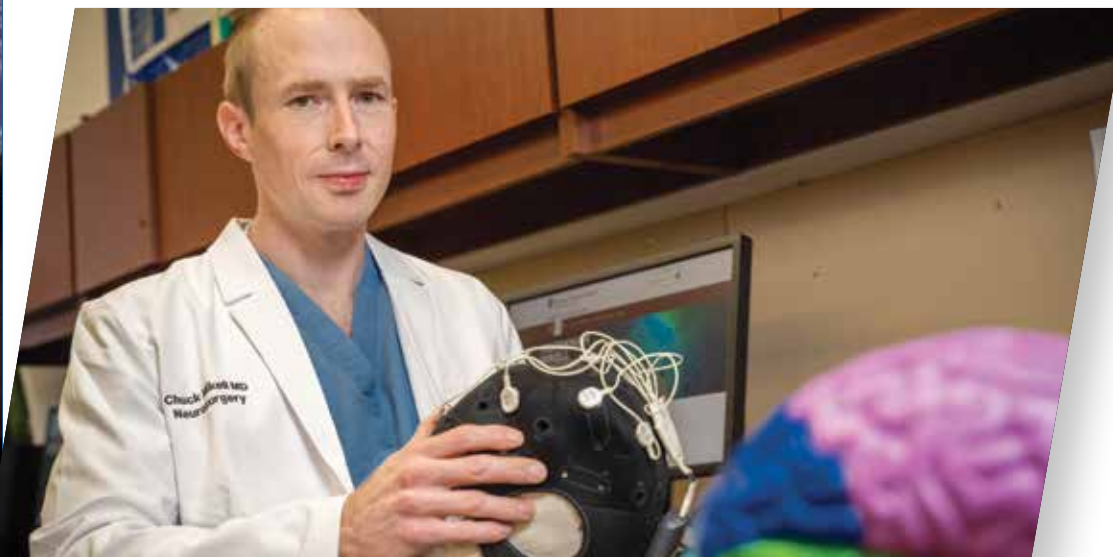
Fundamental biological breakthroughs made by academic scientists over the last two decades have exponentially advanced the field of biomedicine. Sequencing and mining of the human genome, the discovery and application of RNAi technology, development of induced pluripotent stem cell technology, synthetic biology and the discovery of CRISPR, cancer immuno-therapy and magnetic resonance imaging, to name just a few. And in each case, it is the push to translate basic biomedical science into applied technology that has fostered the development of new diagnostics, therapeutics and medical devices. The maturation of artificial intelligence is making rapid and profound impacts on science, technology and society. AI-related methods are revolutionizing analytic methods in clinical applications, such as pathology and radiology image analysis, and AI methods in bioinformatics and computational chemistry are having profound impacts in many basic science areas.

The Renaissance School of Medicine (RSOM), in collaboration with departments in the College of Engineering and Applied Sciences (CEAS) and in partnership with Brookhaven National Laboratory (BNL), is well positioned to contribute significantly to these frontiers in medicine, by catalyzing new collaborations and new perspectives, culminating in the formulation of unique biomaterials for tissue engineering, synthetic biology advances for new vaccines and drugs, microfluidics for labs-on-a-chip and single-cell diagnostics, artificial intelligence-based methods for carrying out high-fidelity characterization of cells, microanatomic structures and spatial “omics” in pathology whole-slide images, software and hardware imaging strategies for new approaches to PET, MRI and advanced microscopy, engineering advances in robotics for nursing care and minimally invasive surgery, artificial intelligence approaches to identify new therapeutic targets for disease, sensing and remote medicine, and informatics initiatives to help understand the basis of cell senescence, susceptibility to neurodegenerative diseases and the impact of climate change on human health. By encouraging the bridging of East and West campuses, and fostering new, bold approaches to everything from personalized medicine to global health, Stony Brook can help improve the health of our region and country and contribute to the economy of Long Island and New York State.

The RSOM has a range of strengths, including outstanding basic science departments, excellent patient care and a growing foundation of multidisciplinary initiatives, including LINCATS, the Center

for Healthy Aging and the Cancer Center. The RSOM has tremendous strength in biomedical imaging-based artificial intelligence with core AI faculty in Biomedical Informatics, Pathology, Radiology and Biomedical Engineering. New faculty recruitments and investments in core facilities build on these strengths, and strategic hires have helped in areas such as brain imaging (PET/MRI), providing insights into neurodegenerative disorders, infectious diseases and the development of vaccines, diagnostics and treatments for Lyme disease, and bioinformatics and the understanding of the impact of pandemics, such as COVID-19. But there remain many unrealized opportunities that can build on the existing strengths of Stony Brook, both as a School of Medicine and as a university, with the goal of establishing unique identities in biomedicine.

Collaborations with materials science and the Center for Functional Nanomaterials to develop wearable sensors to help monitor the aging population, or with medicinal chemistry, the NSLS-II and the Laufer Center to translate basic biomedical discoveries into new disease targets and new drugs. Collaborations between Biomedical Informatics, Computer Science, Pathology and Radiology are leading to the development of novel methods for predicting outcome and steering treatment decisions. The development of new biomaterials, biomarkers and nanotechnology has advanced both basic sciences and clinical research in the areas of cancer diagnosis and therapeutics and other clinical areas. New integrated bioimaging technology, such as integration of optical, terahertz, MRI/PET and ultrasound imaging, provides insight into brain function and diseases and treatment strategies. The robust clinical care environment is ideal for partnerships with the growing pharmaceutical and biotech industries of New York State and could establish the RSOM into a major hub for clinical trials for the region. These goals can be realized by incentivizing distinct disciplines to work together, and with seed funding for applied science, toward the development of new technologies and the formation of new companies. In parallel with encouraging an innovation environment, educational initiatives such as the Scholars in Biomedical Sciences (SBMS) and the Advanced Graduate Certificate in Life Sciences Innovation and Entrepreneurship, will help develop a workforce that can help accelerate the translation of science into technology. Partnerships with Empire State Development and attracting the investment horsepower of New York State could help ensure that promising science and the new companies built on these technologies stay here, in our region.



INSTITUTIONAL THEMES

TECHNOLOGY AND MEDICINE

CONTINUED

CURRENT STATUS

Stony Brook University has a long tradition of innovation and entrepreneurship, and there is a great opportunity in turning basic science discoveries into new technologies that help promote patient care. The RSOM has a sizable clinical research portfolio supported by pharma and by other commercial concerns. In addition to the areas of strengths in the RSOM, there are several resources across campus and the region that can help drive basic science discoveries into new intellectual property, technology and companies. These include the Research and Development Park, the Long Island High Technology Incubator, the Laufer Center for Physical and Quantitative Biology, the Center of Excellence in Wireless and Information Technology, the Institute of Chemical Biology & Drug Discovery, and the Institute for Advanced Computational Science. Further, the NYS Center for Advanced Technology in Medical Biotechnology (Center for Biotechnology [CfB]) has a strong track record in fostering the translation of basic into applied science, securing new intellectual property, promoting SBIR/STTR funding streams and translating that work into new therapeutics, diagnostics, medical devices and companies. Over the course of its history, the CfB has managed four distinct pre-seed and seed-stage funds, contributing to 578 patents and 113 option/license agreements. These investments have led to multiple FDA-approved products (including Xiaflex®, Oracea® and Cavistat®) and the formation of dozens of biosciences companies (including Targagenix, Codagenix, Cornerstone Pharma, Exogen and Celmatix). Leveraging these resources can augment the impact of LINCATS, Center for Healthy Aging and other initiatives. Intellectual and fiscal investments might be made to encourage such collaborations, with the goal of building new program projects, partnerships with industry, and de-risking inventions to attract outside investors.

Stony Brook University in general, and the RSOM in particular, has flourished by encouraging independent investigator-initiated research at the basic science level. Success has been measured by publications in high-impact journals and securing state and federally funded grants to support these endeavors. Of course, these outcomes should continue to be the hallmark of the RSOM and should be encouraged and incentivized.

For basic science to translate into new innovations, the RSOM should foster technology development, de-risking of intellectual property, collaboration/partnerships with industry, clinical trial participation, education of the bio-innovation workforce, and ultimately, the attraction of outside capital and management toward the formation of new companies.

To attract venture firms and pharma/biotech investment, there is an opportunity for a regional initiative to include CSHL, BNL and others to encourage infrastructure investment from NYS. Indeed, the confluence of expertise and resources across its institutions provides a comprehensive platform for discovery, development and commercialization of biomedical innovations. The university should engage NYS (e.g., NYSTAR, ESD), the federal government (e.g., NIH, EDA) and the private sector to help establish the region as a biomedical hub of technological innovation.

Stony Brook University has an excellent technology transfer organization, Intellectual Property Partners (IPP), and an entire campus that is dedicated to technology development, the R&D Park just west of main campus, including a new building, the Innovation and Discovery Center. These resources, particularly if integrated with seed capital from the university and the region, could help fuel the development of new technologies and provide the foundation for new companies. The university should build infrastructure in the R&D Park, including intellectual capital, such as Bioentrepreneurs in Residence, and physical resources, such as bio-ready laboratory space, to help recruit and root companies to the region.

Stony Brook University has established strong educational programs in the areas of biomedical engineering, cellular and molecular biology, pharma/biotech, and bioinformatics, including doctoral, master and professional certificate programs. Mentoring and training students will be essential to further enhance the innovative research workforce and outcomes. Providing student fellowship and stipend supplements would attract more excellent students into our programs.

RECOMMENDATIONS

1. **Establish a seed fund for the translation** of basic and applied science into new diagnostics, therapeutics and medical devices to include clinical departments that are already engaged in clinical trials.

2. **Establish a seed fund for the development** of artificial intelligence-based research including:

a. development of methods to anticipate treatment outcomes/steer patient treatment decisions;

b. clinical decision support; and

c. development of AI methods to support integrative analysis of molecular, imaging and clinical data.

IPP disclosures of new methods developed through these seed grants will be strongly encouraged.

3. **Incentivize the submission of SBIR/STTR proposals** to federal funding agencies, and the submission of disclosures for the establishment of intellectual property.

4. **Promote workforce development** through the offering of innovation and entrepreneurship training for graduate students, postdoctoral fellows, residents and clinicians.

5. **Formulate partnerships** with established pharma and biotech, and proactively seek industry contracts with faculty, including the participation in clinical trials.

6. **Recruit venture capital and senior bioscience company leaders** to review the research and technology development portfolio of the RSOM, and participate in the leadership of LINCATS and the Center for Healthy Aging.

7. **Foster cross-campus collaborations** toward the development of technologies to prevent injury and disease in collaboration with LINCATS and the Center for Healthy Aging.

8. **Collaborate with CEAS** in the new New York State-funded IEDM building construction and establishment to support research enterprise for advanced basic and translational research.
- DELIVERABLES
- An increase in the number of grants/projects funded by the private sector for clinical research at the RSOM.
 - Establishment of training programs focused on life sciences-centric innovation and increase pharma and biotech ties with a dedicated program at the RSOM associated with the Office of Clinical Trials to search for opportunities in conducting clinical trials.
 - An increase in the number of disclosures made to IPP to protect new discoveries in basic science laboratories.
 - An increase in the number of artificial intelligence-related disclosures made to IPP to protect new discoveries in AI-related research.
 - An increase in the number of SBIR/STTR submissions from faculty and senior students to promote NewCo growth on and near campus.
- CONTRIBUTORS
- | | | | | | |
|--------------------|-------------------|-----------------|--------------------|-------------------|----------------|
| Anissa Abi-Dargham | Alfredo Fontanini | Robert Honkanen | Sandeep Mallipattu | Clint Rubin | Adam Singer |
| Jorge Benach | Michael Frohman | Wali Karzai | Sharon Nachman | Joel Saltz | Hal Skopicki |
| Jiang Chen | Marc Halterman | Susan Larson | James Penna | Elinor Schoenfeld | David Thanassi |
| Raphael Davis | Susan Hedayati | Ke Jian Liu | Yi-Xian Qin | Kenneth Shroyer | Vincent Yang |
- 40 Stony Brook Medicine
- Renaissance School of Medicine 41



EDUCATION

The Renaissance School of Medicine endeavors to train learners across the educational continuum.

The educational programs at the Renaissance School of Medicine (RSOM) strive to train learners across the educational continuum to provide compassionate clinical care, advance knowledge and innovation in medicine through individual effort and through collaboration with others in all areas of Health Sciences, and equitably serve our diverse communities in an inclusive and sensitive fashion. Our vision is that learners who have completed their training in one of the Renaissance School of Medicine programs will exhibit:

- A dedication to building a deep knowledge and understanding of basic medical sciences and continuously update and use this knowledge to improve patient care.
- A drive to develop outstanding clinical acumen and consistently improve clinical skills.
- A commitment to lifelong learning and adapting to medical, societal, and technological changes, and incorporating new knowledge and skills into clinical practice.
- A strong belief in the value of the people they serve, taking their diverse backgrounds, beliefs and traditions into consideration while delivering competent and compassionate care.
- The ability to deliver the highest quality care, which provides for equity in access and incorporates intercultural literacy.
- Professional behavior at all times with patients, colleagues and staff across the healthcare fields.
- A commitment to share knowledge and skills with the local and global community.

The major efforts in medical education across the spectrum from medical school through postgraduate training and into continuing education focus on four key areas: One, medical education must keep current with the rapid pace of technological changes, which impact diagnosis, therapy, communication, record-keeping and clinical reasoning. Adoption of technological advances into curriculum and practice must be faster than a traditional training model can provide, and our educational enterprise must be prepared to assess new technologies for their relevance, for their additive benefit to education and for incorporating these enhancements into the curriculum. Two, the changing demographics of our society, the gaps in equity and access among groups within our society, and the recognition that the process of care delivery must incorporate the cultural assumptions of those we serve mean that education and efforts to reduce inequities in the teaching of medical care must continually reassess our success in providing our community with the medical training for physicians who can best serve them. That means both understanding the issues and backgrounds of a diverse array of people in heritage and identification and helping create a physician workforce that reflects the larger society it serves. Three, the plague of burnout and disillusionment described among many trainees and practitioners strongly suggests that the development of professional commitment and identity must be strengthened through the educational process. This includes understanding the ways in which physicians must attend to their own well-being, both with regards to the work environment and their physical and mental health. Four, the need to innovate in educational techniques has grown in importance. Similar to technology and artificial intelligence in clinical medicine and their impact on physicians and patients alike, the ways in which people learn now is radically different than the ways past physicians learned, requiring educators to develop new tools in their portfolio both to accommodate new educational formats and to improve the effectiveness and efficiency of their teaching.

This strategic plan for education at the RSOM endeavors to address areas for growth and development for the educational enterprise which will ensure that learners will be well prepared to practice leading-edge medicine far into the future, while at the same time building upon our considerable strengths as a school. Because we firmly believe that learning is a lifelong endeavor, our learners include every step of the educational spectrum, from undergraduate medical students, through residents and fellows, to faculty physicians.

PRIORITY AREAS

- Curriculum
- Evaluation
- Innovation
- Data Management/
Dashboard of
Educational Metrics
- Well-Being

OTHER KEY AREAS

- Interprofessional
Dashboard of
Educational Metrics
- Graduate Studies at
the RSOM

PRIORITY AREAS

CURRICULUM

**Enhance Professional Identity Formation**

The development of a physician's professional identity is a paramount component of the educational process. Understanding the arc of development of professional identity formation — the responsibility physicians have to their patients, the community, society and themselves — is fundamental to the process of medical education. The curriculum at all Phases will provide the markers for professional identity formation and serve to ensure that the learning necessary for these milestones to be met is made explicit and modeled among the faculty. This includes ensuring the practice of maintaining the well-being of learners and faculty.

Our current program to help students develop a professional identity includes educational sessions beginning in the Transition to Medical School course during Phase 1, and subsequent follow-up sessions in Phase 2. A greater number of experiences spread throughout the Phases would benefit the learning process in this regard.

Improve Student Readiness to Assume GME Roles Upon Graduation

A frequent refrain from residency programs across the country is that first-year residents are not ideally prepared to assume the roles and responsibilities required of them. Concerns include perceived inadequate skills in clinical assessment and decision-making, procedural skills (for procedural specialties), understanding management of emergent situations and reduced skills in discriminating between equivalent treatments with disparate costs.

Currently, we prepare students for residency during Phase 3 experiences in Transition to Residency courses, which teach and develop advanced Entrustable Professional Activities (EPAs). We assess our graduates' preparation by utilizing a survey of program directors from the institutions accepting our graduates as residents, specifically inquiring about preparation and readiness for residency. Additionally, we track the EPAs appropriate to becoming residents during Phase 2 of the curriculum. For those who fail to progress satisfactorily by the end of their sub-internship experience, they can remediate during an Advanced Clinical Experience during Phase 3.

Incorporate New Technology Used in Care Into the Medical School Curriculum

Physicians must be able to identify new clinical technology that may be of benefit in patient care, appraise its effectiveness and relevance, and maintain the ability to learn and adapt their care to this new technology. Examples of such technologies include the rapidly expanding use of ultrasound in clinical practice outside of radiology and the use of non-invasive ventilatory support. Currently, our students learn diagnostic ultrasound and the use of ultrasound in clinical settings during the Introduction to Clinical Medicine and Pathophysiology courses in Phase 1. They have additional elective opportunities for the use of ultrasound in Phase 3.

In addition, the Department of Biomedical Informatics, in collaboration with the Department of Pathology, offers a Fellowship in Clinical Informatics. The two-year postgraduate program provides training in an environment of interdisciplinary collaboration between clinicians, clinical informaticians, clinical data scientists, pathology and radiology informaticians, and machine learning experts. The goal of the program is to develop in-depth expertise in clinical informatics along with the application of clinical data analytics and machine learning in the field of healthcare.

Climate Change and Its Impact on Health

Changes in climate have clear and unmistakable impact on the health of populations, particularly notable among people with chronic health conditions and among people who come from lower-income zip codes. Changing hospital admission and emergency room volume related to heat, humidity and particulate matter in the air are easy to see and follow predictable patterns. The students we are training to care for the population in the years to come must be able to identify how alterations in the physical environment trigger increases in such illnesses as infectious diseases, respiratory illnesses and the like.

We currently have no curriculum at the RSOM related to climate change and health.

Aging and Medicine

The U.S. is an aging population. According to the United States Census Bureau, 15 percent of the population currently are over 65 years of age. The Census Bureau predicts that those over 65 will make up 21 percent of the population by 2030, and by 2060, will comprise 25 percent of the population. Additionally, those over 85 are predicted to triple by 2060, a time likely to be within the career span of our current students. Accordingly, our students must be prepared to understand the basic biology of aging and attempts to slow or intervene in the processes that contribute to aging; they must be able to think creatively and incorporate models of caring for elderly patients to maximize safety and independence, while appreciating the burden on a fragile pool of caregivers; and lastly, they must be able to identify how to diagnose and treat conditions that have a different presentation and pose different outcome challenges than in younger patients.

We currently have a module in our Phase 1 course, Medicine in Contemporary Society, covering aging and geriatrics, experience in geriatrics during the Primary Care clerkship in Phase 2, and elective experiences during Phase 3.

Value and Quality

Healthcare in the United States is changing. Driven by the unsustainable expense of healthcare, there is an intense focus on the value and quality of care provided. Physicians practicing in this age of American healthcare need to understand the value of the interventions they recommend, as they will be judged by metrics based on the effectiveness and quality of care. Physicians will also be expected to engage in processes to improve overall patient safety and the quality of care provided. It is paramount that practicing physicians know the language, available tools and approach to engaging in quality improvement.

PRIORITY AREAS

CURRICULUM

CONTINUED

RECOMMENDATIONS

Professional Identity Formation (PIF)

- 1. **Develop and publish taxonomy of PIF virtues**
(Other-related values [ORV], Self-related values [SRV], Equal-related values [ERV])
- 2. **Revise current PIF curriculum;** map and link tripartite taxonomy to curriculum
- 3. **Develop and implement at least one activity/evaluation** to correspond to each tripartite taxonomy item
- 4. **Update current website for PIF**
- 5. **Collaborate with well-being strategic planning group** to link well-being/wellness resources on site and promote resources to students
- 6. **Review/revise existing PIF scales** to include ORV, SRV, ERV

UGME-GME Transition

- 1. **Expand resident readiness by enhancing** clinical reasoning skills across all Phases of curriculum
- 2. **Enhance resident readiness by teaching skills** in managing diagnostic uncertainty and value-based care
- 3. **Utilize self-reflection and faculty coaching** to develop a competency-based individualized learning plan as a formative tool for graduating students transitioning to residency

Technology

- 1. **Provide faculty with training and resources** to integrate or enhance use of technology in teaching
- 2. **Pilot use of innovative technologies** to deliver curricular content
- 3. **Promote digital/technological competency** for all learners
- 4. **Provide new scholarly opportunities** to help learners become leaders in developing technology-driven healthcare solutions
- 5. **Establish educational group** to identify artificial intelligence (AI)-related technological improvements in both clinical education and clinical care, and provide recommendations for implementation into the curriculum for all learners to prepare them for the care of patients in the years to come

Climate Change and Medicine

- 1. **Work with the School of Marine and Atmospheric Sciences (SoMAS), the Program in Public Health (PPH) and appropriate RSOM departments** (e.g., Microbiology, Infectious Diseases in Pediatrics and Internal Medicine, Pulmonary in Pediatrics, Internal Medicine and Emergency Medicine) to develop curriculum pertaining to the effects of climate change on health
- 2. **Work with SoMAS, PPH, appropriate RSOM departments and the New York Climate Exchange on Governors Island** to mentor scholarly projects related to climate change, health and disease for the RSOM Scholarly Concentration Project for students and scholarly projects for residents and fellows

Aging

- 1. **Develop enhanced modules** expanding on existing offerings for RSOM students on aging, and incorporate across educational Phases into appropriate existing clerkships/ learning experiences
- 2. **Create learning modules** relevant to various GME specialties related to caring for aging patients and identifying differences in disease presentation, treatment and normal aging related to specialty
- 3. **Work with the Center for Healthy Aging (CHA)** to create student and resident/fellow research opportunities within ongoing research efforts in the Center

Value and Quality

- 1. **Implement Business of Medicine elective for Phase 3 students.** The goals of this course will be to expose students to the deeper workings of the healthcare system and review approaches for both high value care and quality improvement to provide students with a toolkit for their future practice
- 2. **Establish educational group** to identify care trends moving care to nontraditional settings (e.g., moving hospital care to home, use of remote patient monitoring, diagnostic and therapeutic technology that supplant current procedural care) and provide recommendations for implementation into the curriculum for all learners to prepare them for the care of patients in the years to come

PRIORITY AREAS

EVALUATION



Ensure Evaluation Accurately Reflects the Quality of the Educators

Meaningful evaluation of the skills of educators should reflect their ability to impart the knowledge, joy and responsibility of caring for people to learners. Currently, students have a reduced opportunity to evaluate their faculty educators. This is in part based on a perceived lack of confidentiality, and in part based on a large number of teaching physicians with whom students interact in certain experiences. The GME programs have a more developed system of faculty evaluation, which are administered through the residency management system New Innovations. A fully robust faculty evaluation system will provide meaningful feedback to faculty for use individually, by their chairs/division chiefs to help guide their skills development and for use in the promotion and tenure process.

Promote Competency-Based, Outcomes-Oriented Evaluation Tools

As national trends move away from traditional grading and scoring techniques, evaluation of learners should more fully reflect the comprehensive range of performance in articulated outcomes and expectations. Evaluations should be considered formative (i.e., behavior-changing) rather than summative (i.e., judgmental). The elimination of grades in Phase 1 courses and the elimination of a numerical score in Step 1 of the USMLE mean that RSOM student assessment should include such outcomes-oriented performance metrics as a better means of providing students with meaningful feedback and self-directed learning.

RECOMMENDATIONS

- 1. **Develop anonymous educator evaluations** for UGME programs
- 2. **Develop a platform** for students to complete evaluations of individual faculty educators
- 3. **Implement and provide evaluations** to department chairs for faculty annual reviews
- 4. **Work with APT committee** at the RSOM and Vice Dean, Faculty Affairs to integrate educator evaluations into promotion process

PRIORITY AREAS

INNOVATION



Promote Innovation in Medical Education

The understanding of optimal modes of education progresses in a similar fashion to other scientific inquiry. Learners across the educational spectrum deserve to gain knowledge in the most effective ways. Faculty and learners engaged in education should be supported to pursue novel ideas and test their success in the realm of education.

Currently, thanks to a generous endowment from the Donoho family, we have an Academy of Clinical and Medical Educators (ACES), which takes candidates who are interested in advancing their medical education through an application process. The members receive one-on-one mentoring from a senior ACES member, and carry out a medical education scholarly project.

Further efforts to broaden the opportunities would benefit the faculty, students and trainees as a whole throughout the RSOM community.

Enhance Technology in Medicine for Learners and Faculty

Technological advances impact both the care we deliver and the ways we can teach that care. We have already incorporated many technological advances into the educational curriculum, such as simulation, or use of ultrasound in clinical settings. As our tools expand, we must continue to explore ways in which technological advances such as artificial intelligence (AI) or virtual reality expand our ability to teach. This also includes utilizing digital resources as a means of providing information and curriculum to learners at all stages.

RECOMMENDATIONS

- 1. **Partner with the Vice Dean, Faculty Affairs** to expand the innovation scholarship within the ACES academy
- 2. **Explore funding** for educational innovation pilot grants
- 3. **Partner with existing SBU resources** (e.g., CELT, CSC) to expand the reach of educational innovation efforts
- 4. **Explore external funding** to support educational innovation and develop Innovation Center without walls
- 5. **Create a committee** charged with assessing new educational technology and AI for incorporation into education
- 6. **Provide faculty with training and resources** to integrate or enhance use of technology in teaching
- 7. **Pilot use of innovative technologies** to deliver curricular content
- 8. **Promote digital/technological** competency for all learners
- 9. **Provide new scholarly opportunities** to help learners to become leaders in developing technology-driven healthcare solutions
- 10. **Develop a communication platform** such as podcasts to disseminate educational news and faculty development

PRIORITY AREAS

DATA
MANAGEMENT/
DASHBOARD OF
EDUCATIONAL
METRICS



Our ability as an organization to have meaningful and easy-to-access information about trends among our learners is important to our ability to enhance and develop our curriculum, and to promote individualized learning plans for students. Currently, information about student and resident baseline data resides in multiple areas and is not linked with any educational outcome’s performance across the educational spectrum. As outcomes-based assessments develop (such as the ACGME Milestones utilized by GME programs), learner performance patterns may be better characterized, and signs early in training, which tend to predict success or challenges in certain areas, may yield valuable information for us as educators, enabling us to both enhance or accelerate certain parts of the curriculum, and to provide early intervention in learners with a higher likelihood of facing challenges with specific areas. Finally, it would enable the creation of educational dashboards suitable for review at executive levels to provide a quick visual overview of learner performance. Such capabilities do not currently exist in the RSOM.

RECOMMENDATIONS

1. **Develop a database to serve as a repository** of both learner characteristics (schools, scores, etc.) and outcomes
2. **Create dashboard to easily see performance of curriculum** by content area, evaluations of courses/rotations, evaluations of educators
3. **Utilize dashboard and database** to refine and improve curriculum
4. **Utilize database to identify curricular concerns**, develop predictive models of education and drive curricular improvement

PRIORITY AREAS

WELL-BEING



The well-being of learners is critical to a number of areas in their education. Importantly, burnout and related symptoms are common during medical education, and though data reveal a wide range of estimates, the data suggest that approximately half of medical students experience burnout at some time during their education (Ishak et al., Clin Teach, 2013). Estimates among residents and fellows are similar. Problems related to burnout include risk of personal morbidity, such as substance use disorder and suicide, effects on development of professional identity, departing from medical careers. The causes of burnout and reduced well-being include extrinsic factors such as time demands and financial pressures, and social or intrinsic factors such as denial, disparity between what a curriculum promises and the reality of those teaching who may minimize learner concerns (aka “hidden curriculum”), lack of opportunities to maintain well-being and suboptimal role-modeling from those teaching the students and residents.

Currently, modules on well-being and maintaining well-being are given to students during Phase 1 and Phase 2. In addition, the RSOM has clubs that promote well-being among students. For GME programs, an institution-wide well-being committee considers and implements well-being programs for all residents and fellows. The institution sponsors a number of well-being and social events, and administers a resident/fellow well-being survey (Mayo Well-Being Index) twice a year. It also provides two board-certified psychiatrists on faculty who deliver as-needed mental healthcare to any resident or fellow, free of charge. Individual programs offer other well-being interventions to their own trainees.

RECOMMENDATIONS

1. **Implement annual student assessment** for factors in the student learning environment that positively or negatively impact student well-being
2. **Develop a centralized source** of student well-being/mental health support resources to assist with effectively addressing student needs/concerns
3. **Educate and support student development** as stewards of physical and mental health and well-being
4. **Improve student equitable access** to academic support, career advising, counseling services and other resources
5. **Provide targeted coaching** by qualified educators to instill growth mindset for effective lifelong learning and resilience, and to assist transition to becoming a master adaptive learner
6. **Collaborate with/support MeSH** (Medical Student Happiness, Health and Humanism) leadership and other student groups to pilot and disseminate learner-driven wellness initiatives

OTHER KEY AREAS

INTER-
PROFESSIONAL
EDUCATION
AND
INTER-
PROFESSIONAL
COLLABORATIVE
PRACTICE



The 2003 report *Health Professions Education: A Bridge to Quality* by the Institute of Medicine (IOM) emphasized the importance of educating health professionals in interdisciplinary teams to provide the safest and highest quality care. Since then, there has been a growing body of research that supports the effectiveness of incorporating interprofessional education (IPE) and interprofessional collaborative practice (ICP) into health professional training and practice.

Today it is clear that IPE and ICP are essential to the delivery of modern high-quality healthcare and healthcare education. Training healthcare professionals to work collaboratively as interdisciplinary teams enables these professionals to provide accessible, patient-centered care that promotes well-being and improves health outcomes for diverse populations.

The RSOM recognizes the significance of IPE and ICP and seeks to equip medical and other health professions students with the necessary knowledge, skills and attitudes to work effectively in interprofessional teams.

RECOMMENDATIONS

- 1. Establish a Center for Interprofessional Innovation** in collaboration with the Stony Brook Medicine Schools of Nursing, Social Welfare, Health Professions and Dental Medicine and the Program in Public Health
 - Recruit a director to lead the Center for Interprofessional Innovation (CIPI)
 - Establish a CIPI Advisory Council, which includes representation from the RSOM
- 2. Cultivate strategic IPE partnerships** through CIPI that support and expand IPE experiences for our medical students
 - Survey faculty and professional staff in the five Stony Brook Medicine Health Sciences schools and the Program in Public Health to determine perceptions on the value of IPE, consider needed resources and support to develop and implement IPE activities, and identify existing IPE activities
 - Develop a curriculum map of current IPE activities to identify gaps in and opportunities for interprofessional collaboration, education and training
 - Collaborate with CIPI to develop, implement and evaluate IPE activities
 - Expand interprofessional collaboration to include other academic units across the university as well as the local and regional communities
- 3. Foster the development of future leaders** in interprofessional education, in collaboration with CIPI:
 - Provide faculty and professional staff with training and support in IPE/ICP
 - Establish an IPE mentoring program for faculty and professional staff
- 4. Promote competency-based interprofessional practice**
 - Align the development of IPE educational activities with the Interprofessional Education Collaborative (IPEC) core competencies (i.e., Values/Ethics, Roles/Responsibilities, Interprofessional Communication and Teams/Teamwork)
 - Evaluate student performance in IPEC competencies in the clinical learning environment
- 5. Promote interprofessional collaborative scholarship**
 - Engage students, faculty and professional staff in IPE/ICP scholarship
 - Support the development of grant applications for external funding of IPE initiatives



OTHER KEY AREAS

GRADUATE STUDIES AT THE RSOM

OVERVIEW

The RSOM has 10 doctoral-granting graduate programs and four master’s level programs:

- Anatomical Sciences
- Biochemistry and Structural Biology
- Biomedical Engineering
- Biomedical Informatics
- Microbiology and Immunology
- Molecular and Cellular Biology
- Molecular and Cellular Pharmacology
- Neuroscience
- Physiology and Biophysics
- Population Health & Clinical Outcomes Research

The graduate program in Genetics is not department specific and is an inter-institutional doctoral-granting program, leveraging the strengths in genetics at Stony Brook University, Cold Spring Harbor Laboratory and Brookhaven National Laboratory.

The Molecular and Cellular Biology program is not department specific and has a large number of faculty members from the RSOM and the main campus, so it can be considered an “umbrella” program for graduate studies.

The Center for Medical Humanities grants an MA in Medical Humanities, Compassionate Care, and Bioethics, as well as a joint MD/MA degree. The MS in Biomedical Sciences is shared by nine of the graduate programs listed above.

The Department of Family, Population & Preventive Medicine has a Nutrition division that offers MS programs in Nutrition and Professional Nutrition Practice. Both MS programs offer concentrations in Advanced Nutrition Therapy & Critical Care and Integrative Nutrition.

Typically, the graduate programs are sponsored and administered by departments of the RSOM as well as by departments that are shared administratively with other schools of the university. Each departmental graduate program usually consists of all the faculty in the department as well as faculty from other departments that have requested membership. Overall, most graduate programs at the RSOM include faculty from several basic health sciences, clinical sciences and main campus, as well as Brookhaven National Laboratory and Cold Spring Harbor Laboratory. The requirements to join a departmental graduate program vary in some aspects but not substantially. Most will require that faculty requesting to join a graduate program outside of their own department demonstrate that they can support the stipend of a graduate student and support their research expenses. The interdisciplinary nature of the graduate programs is a major strength of the RSOM, and offers a wide range of research options to the students.

The graduate programs at the RSOM operate independently at some levels. For example, each program has its own policies on admissions and students are selected by a departmental committee. Likewise, each program formulates its own core course and dissertation requirements, and policies regarding advancement to candidacy. However, all graduate programs of the RSOM must meet all the educational requirements of the graduate school insofar as adherence to the academic calendar, maintaining the Graduate Bulletin, establishing degree requirements and providing graduation information.

Students admitted to each graduate program at the RSOM are provided with an assistantship (stipend), which, depending on the program, can be either research or teaching. The graduate school provides assistantships for first-year students to all the graduate programs except for the basic sciences departments at the RSOM (Anatomical Sciences, Microbiology and Immunology, Molecular and Cellular Pharmacology, and Physiology and Biophysics). In these graduate programs, first-year students are paid from departmental or training grant funds. This is an anomaly in that all other graduate programs in the university receive institutional assistantships (TA lines). During the first year, students typically do several rotations in different laboratories, and take required core courses. Thereafter, students choose a laboratory where they will perform the research toward their dissertation. After joining a laboratory, students are paid from research funds generated by the mentor.

OTHER KEY AREAS

GRADUATE STUDIES AT THE RSOM

CONTINUED

CURRENT STATUS

There are six NIH-funded training grants (T32) in which RSOM faculty participate:

- 1. Medical Scientist Training Program (MSTP)
- 2. Molecular and Cell Biology of Infectious Diseases (MCBID)
- 3. Training Program in Pharmacological Sciences (TPPS)
- 4. Initiative for Maximizing Student Development (IMSD)
- 5. Scholars in the Biomedical Sciences (SBMS)
- 6. Chemical Biology Training Program (CBTP)

Four of the T32 grants (MSTP, SBMS, IMSD, CBTP) support trainees from programs across the university, while two (MCBID, TPPS) are directly associated with a single graduate program. T32 grants are prestigious, highly competitive, and constitute a crucial source of graduate student support. They also provide stipends for academically strong students with an emphasis on diversity.

The U2C New York Consortium for Interdisciplinary Training in Kidney, Urological and Hematological Research (NYC Train KUHR) is a NIH training grant with slots for nine predoctoral students. This U2C training supports multi-component research resource projects and centers that will enhance the capability to serve biomedical research, and is shared among four participating institutions (RSOM, Albert Einstein College of Medicine, Columbia University School of Physicians and Surgeons, and Icahn School of Medicine at Mount Sinai).

The IRACDA New York Consortium for the Advancement of Postdoctoral Scholars (NY-CAPS) is a competitive K12 program from the NIH to address the national need for greater diversity among tenure-track faculty in the biomedical sciences. The IRACDA supports trainees from programs across the university, but the PIs are RSOM faculty.

The total enrollment in the doctoral programs as of September 2022 is 304 students across the graduate programs associated with the RSOM. Doctoral graduate programs in the RSOM strive to be inclusive and 18 percent of the students actively enrolled are from historically disadvantaged groups. The mean time from admissions to obtaining the degree is 5.35 years, but this is variable among the graduate programs.



RECOMMENDATIONS

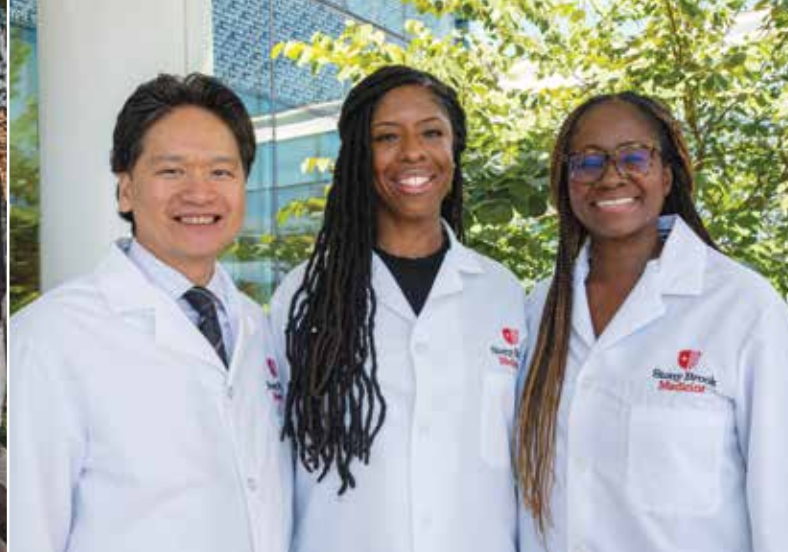
- 1. **Increase the overall quality of our graduate student applicant pool.** This could be measured in higher GPAs and prior research experience. However, this goal also needs a broader institutional approach that includes better stipend packages and housing subsidies for outstanding students.
- 2. **Increase diversity of entering student classes** for the duration of the Five-Year Education Strategic Plan.
- 3. **Create the expectation that students** should apply for a Ruth L. Kirschstein Predoctoral Individual National Research Service Award (F31).
- 4. **Expect that priority areas** (cancer, neurosciences, ID, aging), by coordination with each graduate program in the RSOM, will write a T32 application. Appropriate incentives such as program director (PD) and administrative support should be provided by the Dean’s office in areas of strategic priorities, and serving as PI for a T32 should be upweighted in the APT process to be equivalent to serving as PI for a research grant.
- 5. **Create a Physician Scientist Training Program** (funded) to promote clinical trainees to pursue careers in science. We currently have small, unfunded opportunities for residents and fellows interested in learning science, mostly as intermittent “one-off” opportunities (e.g., Internal Medicine Research Track, Anesthesia) or the K-prep program supported by the Dean’s office. Such opportunities are hindered by the unavailability of funding support for trainees who wish to learn the skills needed for science careers. Such a program would increase the pipeline of clinicians pursuing science, and create more robust ties between the investigation arms of clinical and basic science departments. The presence of mentors is critical for the success of this, as it is for the MSTP program, so this would need a multi-year process to ensure adequate resources within the school.
- 6. **Establish a stable, sustainable funding structure** for graduate students in concert with the graduate school.
- 7. **Expect that TA lines** will be made available by the graduate school to the RSOM graduate programs (Anatomical Sciences, Microbiology and Immunology, Molecular and Cellular Pharmacology, and Physiology and Biophysics) that are not presently provided with TA lines. This poses a large recruitment challenge that substantially limits enrollment.
- 8. **Create a multi-departmental panel** to explore in depth the creation of centralized umbrella graduate programs in the biomedical sciences in the RSOM. This would make our programs more attractive, increase the quality of applicants, improve enrollment, improve the quality of our education, remove redundancy and possibly create administrative savings.

COMMITTEE MEMBERS

Steering Committee: Perrilynn Baldelli, Maribeth Chitkara, Mary Kritzer, Susan Lane, Stephanie Maiolino, Uchechi Oddiri, Stephen Post, Eva Swoboda

Retreat Participants: Sherif Abdel-Misih, Lovedhi Aggarwal, Robyn Blair, Maribeth Chitkara, David Cohen, Robin Cunningham, Howard Fleit, Michael Frohman, Jack Fuhrer, Elizabeth Garduno, Taly Glaubach, Cara Harth, Janet Hearing, Richard Iuli, Laura Kantor, Leah Kaufman, Dorota Kowalska, Mary Kritzer, Dorothy Lane, Susan Larson, Wei-Hsin Lu, Farah Monzur, Farzana Nuruzzaman, Vishal Patel, Lisa Strano-Paul, Eva Swoboda, Liliana Tique, Michelle Tobin, Styliani-Anna Tsirka, Daniel van Arsdale, Andrew Wackett, Jennie Williams

Dean’s Office: Jorge Benach, David Cohen, Howard Fleit, Jack Fuhrer, Richard Iuli, Wei-Hsin Lu, Lisa Strano-Paul, Andrew Wackett, William Wertheim



Renaissance
School of Medicine
Stony Brook University

**DIVERSITY,
EQUITY, INCLUSION
AND BELONGING**

Diversity, equity, inclusion and belonging (DEIB) are central to making the RSOM a local, national and global leader.

This strategic framework affirms a values-based, shared vision for the strategic direction of the Renaissance School of Medicine (RSOM), which is paramount to our success. Diversity, equity, inclusion and belonging (DEIB) are central to making the RSOM a local, national and global leader.

Differences in identities and lived experiences contribute to a dynamic academic medicine community, profoundly impacting ways of thinking, behaving and relating to others. Diverse identities extend far beyond traditional demographics of race/ethnicity/gender, including but not limited to varying abilities, age, sexual orientation, religious/spiritual beliefs and nation of origin.

To build and sustain an inclusive working and learning environment, we must recruit and retain diverse faculty, staff, students and trainees; foster an environment that promotes a more inclusive culture; and strengthen institutional infrastructure and systems to support DEIB efforts.

This strategic plan is a living document and represents the commitment of the RSOM. Collaborative, creative and ambitious, our strategic plan advances the DEIB values, vision and mission that exemplify the very best of who we are right now and who we want to become.

The plan outlines the current status, gaps and recommendations in six areas of focus: (1) Education; (2) Student Affairs; (3) Healthcare; (4) Research; (5) Faculty/Staff Affairs; and (6) Community Outreach. We hold ourselves accountable for prioritizing DEIB by committing to infusing DEIB into everything we do. We provide strategic recommendations with short- and long-term benchmarks in several areas: (1) Culture and Climate; (2) Curriculum; (3) Education and Engagement; (4) Equity within Recruitment, Retention and Advancement; (5) Improvement and Accountability; (6) Research; and (7) Recruitment of a Vice Dean for DEIB.

At the Renaissance School of Medicine, we educate and train students, clinicians and investigators in the biomedical and clinical sciences so that they are well prepared to advance our local and global community through inclusive and equitable research, education, care and advocacy. Our commitments are:

- To infuse DEIB into everything we do: education, student affairs, healthcare, research, faculty/staff affairs and community outreach.
- To develop, support and integrate DEIB/health equity policies and practices, and identify key resources within the institution and beyond.
- To strive for excellence, which requires us to honor diversity, promote equity and inclusion, and create an environment of belonging.
- To promote and support interdisciplinary initiatives and collaborative partnerships that advance and improve health, equity and care for underserved and all communities, locally, nationally and globally.

PRIORITY AREAS

- Education
- Student Affairs
- Innovation
- Healthcare
- Research
- Faculty/Staff Affairs
- Community Outreach

PRIORITY AREAS

EDUCATION



CURRENT STATUS

It is critical to build a diverse population of physicians to address and reduce health disparities for those medically underserved. At Stony Brook University (SBU), we have multiple programs that promote a pathway to medicine and STEM fields broadly and pipeline programs that connect the next generation of physicians directly to the RSOM, especially for individuals who are underrepresented in medicine (URiM).

Pipeline Programs

Initiative for Maximizing Student Development: Maximizing Excellence in Research for Graduate Education (IMSD-MERGE). The Stony Brook University IMSD-MERGE Program aims to increase the number of URiM individuals completing highly productive biological and biomedical science degrees at Stony Brook University, and prepare them for seamless advancement into successful research careers.

Stony Brook Underrepresented PRE-MED Scholars (SUPREMES). The SUPREMES program provides opportunities and activities to qualified underrepresented Stony Brook University undergraduates interested in pursuing a medical degree at the RSOM. Participation in SUPREMES guarantees admission to the RSOM, as long as participants meet the program’s academic requirements.

Expanded Stony Brook Underrepresented PRE-MED Scholars (eSUPREMES). Most recently, through funding obtained from the Associated Medical Schools of New York (AMSNY), the SUPREMES Program is extended to recruit and train students from three community colleges (Suffolk, Queensborough and Nassau community colleges) and SUNY Old Westbury (SUNYOW). This program will support trainees in their pursuit of a medical education (MD) degree or dual degrees (MD/MPH or MD/PhD).

Associated Medical Schools of New York (AMSNY) Post-Baccalaureate Program. Students who applied to the RSOM and were interviewed but not accepted may be recommended for acceptance into the AMSNY program. The 12-month program provides the participant with formal mentoring, advising and a tailored curriculum. Upon successful completion, the participant is accepted into the RSOM.

Pathway Programs

Biology Partnership in Research and Education Program (BioPREP). This is an NIH-funded program to encourage underrepresented community college students to further their education past the BA degree, and pursue advanced degrees and careers in biomedical sciences. Students are provided the opportunity to spend 10 weeks at Stony Brook University in a biology laboratory learning molecular biology techniques and performing a mentored research project.

Increasing Diversity in Undergraduate Cancer Education and Research (INDUCER) Program. The long-term goal of the INDUCER Program is to increase the numbers of underrepresented students pursuing research careers in the biomedical sciences with an emphasis on studying the biology of cancer. Laboratory and mentored experiences will enable participants to develop qualifications and references needed for entry into the strongest graduate/medical programs in the country. Overall, this will increase diversity in biomedical sciences and promote awareness of issues, such as health disparity being placed in the forefront.

Pre-Medical Access to the Clinical Experience (PACE) Program. The PACE Program allows Stony Brook undergraduate students who are in their junior and senior years and have self-identified as a pre-med student to shadow Stony Brook School of Medicine faculty members in private practices, and in the hospital, in order to increase their exposure to clinical experiences and their ability to

successfully apply to medical school. PACE Scholars are also provided with the following sessions: How to Study, The AMCAS Application, Professional Communication, Professional Etiquette, The MCAT, How to Write a Personal Statement and Relieving Stress. These sessions are facilitated by RSOM faculty and medical students. PACE Scholars are also mentored by our medical students.

SUNY Chancellor’s Pre-Medical Opportunity Program. This program seeks to address persistent disparities in medical education by attempting to level the playing field for talented and capable Educational Opportunity Program (EOP) students who pursue a career in medicine.

Undergraduate Clinical Exposure Program (UCEP). The UCEP is designed to provide clinical exposure to SBU undergraduates, giving them the opportunity to work with patients from diverse socioeconomic backgrounds, and educate them on fundamental clinical skills. Students attend a number of workshops pertaining to different medical specialties and the medical school application process. They also shadow medical students and attending physicians who work at the clinic.

Undergraduate Medical Education

Curriculum

The majority of RSOM courses work to incorporate healthcare issues and disparities involving race, ethnicity, disabilities, mental health, implicit bias, the LGBTQ* community, socioeconomic status and the impacts of substance abuse with additional consideration to social determinants of health. In the preclinical curriculum, the Medicine in Contemporary Society course serves as dedicated time for students to begin exploring these issues with the opportunity to participate in selective courses on structural racism, children and ethics, ethics surrounding pain and drugs, spirituality and healthcare, climate change, and treating patients with intellectual and developmental disabilities. This curriculum is then reinforced during the core clinical rotations, sub-internships, electives and advanced clinical experiences where students begin to care for patients who are affected by the aforementioned issues and ethics. Surveys conducted by the Office of Medical Education discovered that this was primarily experiential during the clinical years with little structured didactic teaching.

Mentoring

Big/Little Mentoring Program. Completely student-run, this program pairs up M2s and M1s at the start of the academic year for the purpose of the M1 class to have a mentor to reach out to for academic advice and social support.

POD Advising Program. Composed of a small group of students from all classes along with one or two attending physicians, the POD Advising Program allows for students to meet every few months and connect with and obtain academic and career advice from upperclassmen and attending physicians. Fourth-year students serve as peer advisors.

American Medical Women’s Association Mentoring Program. Female medical students are offered the opportunity to gain insight into their field of interest from the perspective of a professional woman in that field.

Black and Latinx Student Alumni Network Mentoring Program. Medical school alumni and URiM residents are paired with URiM medical students. This program is primarily run by Stony Brook Medicine alumni.

Stony Brook Obstetrics & Gynecology Mentoring for Students of Color. Formed in 2023, this program offers specialty mentoring for students of color interested in pursuing an OB/GYN specialty.

Recruitment

Pre-Medical Access to the Clinical Experience (PACE) Program. This program offers Stony Brook undergraduate students who are in their junior and senior years and have self-identified as a pre-med student to shadow Stony Brook School of Medicine faculty members in private practices, and in the hospital, in order to increase their exposure to clinical experiences and their ability to successfully apply to medical school. PACE Scholars are also mentored by our medical students in the Student National Medical Association.

Undergraduate Program for Health Sciences. This program serves as a hub for students, faculty, alumni and community to provide information, meet, share, advise and engage in activities relating to the educational and social advancement of historically underrepresented students at SBU and SUNYOW, who are interested in pursuing careers in the health professions.

Admissions

The RSOM Committee on Admissions (COA) is composed of 75 faculty members and approximately 20 medical students from each of the M2, M3 and M4 classes. Interviews address the 15 core competencies for entering medical students as endorsed by the AAMC Group on Student Affairs Committee on Admissions, one of which is cultural competency. The RSOM COA has also hosted presentations for members on disrupting implicit bias and creating equity in healthcare.

PRIORITY AREAS

EDUCATION

CONTINUED

Graduate Education Programs

Center for Inclusive Education. Established in 2002, the Center for Inclusive Education (CIE) has been committed to advancing diversity in graduate education, academia and the scientific workforce. The CIE works to recruit, retain and graduate underrepresented and otherwise disadvantaged scholars, as well as those scholars who advance the mission of increasing diversity of their respective fields. The CIE provides financial assistance, social support and advocacy. The CIE also promotes academic and professional development and a strong sense of community through signature core activities, including the Research Café series, topic-based lunches, Real Talk discussion groups, invited speakers and the Community of Student Mentors program.

The CIE is dedicated to increasing awareness of issues related to diversity at the university level, collaborating with faculty and staff to enhance the diversity of their respective departments, identify and work to remove barriers to underrepresented scholar success, and, at the national level, engage in scholarly research activities and program assessment, with the ultimate goal of contributing to a greater body of knowledge related to issues of inclusion and diversity. These efforts have been recognized through several grants from the National Institutes of Health, the National Science Foundation and the State of New York. With more than 600 alumni and 160 current scholars, the CIE remains dedicated to the mission of enhancing diversity and inclusion in the academic world.

The Renaissance School of Medicine also has several initiatives underway to improve the care and treatment of individuals with intellectual and developmental disabilities (IDD). Funding from an American Academy of Developmental Medicine and Dentistry (AADMD) grant led to integration of content on intellectual and developmental disabilities throughout the RSOM curriculum. Some highlights include an introduction during the Transition to Medical and Dental School (TMDS) course to a panel of patients with IDD and a very popular Medicine in Contemporary Society (MCS) selective focused on treating patients with IDD. From this grant, a student chapter of AADMD has formed that is composed of 30 medical and dental students.

Leadership Education in Neurodevelopmental Disabilities (LEND) Center. The LEND Center is an interdisciplinary program that provides trainees (graduate students, residents, fellows, interns, working professionals, family members and self-advocates) with the skills necessary to affect positive change for individuals with neurodevelopmental disabilities (ND). The Stony Brook LEND program aims to train leaders in a wide range of healthcare disciplines to deliver culturally responsive, high-quality, evidence-based care focused on meeting the needs of individuals with ND. In addition to educating trainees on how to optimize the clinical experience for those with ND, the program offers instruction related to advocacy, policy and research. A primary mission of the LEND Center is to “foster community, inclusion and acceptance of individuals with ND and their families through dissemination of current knowledge and offering a regional ‘hub’ for the provider community.”

Graduate Medical Education

The RSOM Graduate Medical Education (GME) comprises 76 programs, including residencies and fellowships with 764 trainees (2022–2023). As part of a recent self-study for ACGME accreditation, we have identified improving education for trainees regarding healthcare disparities and health equity as a primary focus. GME created a committee to address this need and is partnering with Stony Brook Medicine’s new Health Equity Steering Committee, via its education subcommittee. This education subcommittee will create standardized health equity education for all employees. The RSOM GME Inclusion and Diversity Committee develops and strengthens support and

opportunities for groups underrepresented in medicine, and helps to create awareness and acceptance among all faculty, trainees and other personnel. The committee includes four subcommittees addressing recruitment and retention, support, education and awareness, and community advocacy. The RSOM GME Wellness Committee creates and implements initiatives focused on wellness and well-being for residents and fellows. These efforts directly promote belonging. Various wellness events are hosted every 4–6 weeks, such as lunches, bowling and ice cream socials. Other belonging activities include resident appreciation month and a summer barbecue. The RSOM GME also has a residents and fellows assistance program, which provides free and confidential mental health treatment by mental health professionals.

GAPS

- Limited programming that pipelines directly to the RSOM.
- Current health equity education is limited in breadth and depth. The curriculum lacks a course wholly dedicated to health equity/DEIB as well as continuous and emphatic reinforcement of this education from Transition to Medical School to graduation.
- Limited specialty-specific advising that begins from the first year of medical school and is strengthened through clinical rotations and the residency application process.

RECOMMENDATIONS

- Need to connect pipeline programs and carve out more pathways leading directly to SBU/RSOM with financial and academic support, as well as accountability for success.
- Partner with national organizations, such as Black Men in White Coats, to expand the pipeline.
- Utilize a holistic review framework in the Undergraduate Medical Education admission process.
- Develop postgraduate pipeline programs leading to faculty positions at the RSOM.
- Conduct ongoing climate/pulse surveys to students to allow for feedback on the implementation of a DEIB curriculum and ensure exceptional education on these topics.
- Focus course work and clinical rotations on caring for the unique needs of BIPOC, LGBTQ* and other URiM populations.
- Modify the curriculum to address the social determinants of health during the clinical rotations and include lectures addressing healthcare disparities for vulnerable populations. Health equity education also should be expanded to faculty members for more effective integration into the existing curriculum.
- Employ health equity resources (content experts) to expand curricula across all Phases of RSOM curriculum and to all providers (including attending physicians, resident physicians, nurses, etc.).

- Formalize mentoring programs at all levels.
- Implement specialty-specific advising from both resident and attending physicians.
- Institute recruitment activities, which would include participation in national meetings and trips to high schools, colleges and universities with a significant URiM population.
- Establish programs similar to SBU’s Discover Dental School: Summer Scholars Program to increase intramural recruitment.
- Establish a program similar to Mentoring in Medicine’s Health and Science Day.
- Programs that offer a venue for students with issues external to their studies, but which affect their success, such as Keeping It Real, and workshops (safe space, micro-aggression, etc.) should be adopted and provided to all students and postdoctoral fellows.

PRIORITY AREAS

STUDENT
AFFAIRS



CURRENT STATUS

Students at the RSOM study and work to understand, serve and represent our surrounding communities and those that are most in need, as well as learn to collaborate with colleagues of different backgrounds and perspectives to foster an inclusive environment. There are a number of student organizations that spearhead these commitments. It should be emphasized that the following organizations and their impacts are a result of the efforts of the RSOM student body. It is also essential that students are encouraged to maintain their own wellness in order to effectively advocate for themselves and others to promote a culture of utmost inclusion and belonging.

Medical Student Pride Alliance. Founded in 2019, the Stony Brook University Medical Student Pride Alliance (MSPA) Chapter was named Chapter of the Year by the MSPA National Leadership Team. A primary goal of this student group has been to increase awareness of the LGBTQ* population in Suffolk County and increase advocacy initiatives. The MSPA runs a presentation during the Transition to Medical School course on the difference between sex and gender, as well as how to talk to patients who do not adhere to heteronormative standards. The group also works to educate RSOM students on the transgender and intersex patient population through annual patient panels.

Student National Medical Association (SNMA). This student group has worked to increase the exposure of URiM medical students through outreach programs with high schools in the community including large numbers of URiM students to encourage young adults to begin thinking about becoming doctors and applying to medical school. The SNMA has also worked with the Undergraduate Minority Association of Pre-Med Students and the PACE Scholar program to clarify and encourage the process of applying to medical school. Dr. Jedan Phillips was appointed Associate Dean of Minority Affairs in December 2020.

Latino Medical Student Association (LMSA). Given the RSOM’s large Spanish-speaking patient population, the LMSA has served an important role in creating welcoming spaces for URiM students and patients. The LMSA has spearheaded a Medical Spanish Interpreter Program in the emergency department as well as the creation of English to Spanish medical dictionaries for incoming students, and it runs a presentation during the Transition to Medical School course to introduce new students to the Latinx and underserved population in the area. This year, the LMSA created and printed laminated English to Spanish booklets that were given out to first-year medical students during TMDS along with an introduction to medical Spanish presentation. The Hispanic Heritage Night Gala is the LMSA’s capstone event to conclude Hispanic Heritage Month and advocate for the Latino and Hispanic communities and celebrate their cultural heritages. The LMSA has raised more than \$5,000 for SB HOME, the student-run free clinic, in the last five years. The group has also organized events for URiM residents and medical students to meet and network. The LMSA now also has a role in the resident GME subcommittee on diversity.

Student Wellness. Over the last few years, students have been increasingly seeking out mental health resources for support during their education, especially during their clinical years. The RSOM currently recommends students use the university’s Counseling and Psychological Services (CAPS) for individual and group counseling with a licensed professional as well as TimelyCare for 24/7 access to a mental health professional and more scheduled counseling services.

GAPS

- Many DEIB resources are located on the undergraduate campus. The LGBTQ* Center, the UNITI Cultural Center, and the Office of Equity and Access are not accessible to medical students.
- There are limited data on health and service needs of students. For example, Sexually Transmitted Infection (STI) testing is expensive for students who choose not to use the university’s insurance.
- Students’ clinical duty hours conflict with CAPS and TimelyCare scheduled counseling hours.

RECOMMENDATIONS

- Increase recruiting locations and sessions for BIPOC, LGBTQ* and other URiM applicants.
- Increase funding and financial flexibility for URiM student organizations.
- Establish an LGBTQ* alumni group and SB Foundation account.
- Establish formal mentoring/support services for BIPOC, LGBTQ* and other URiM medical students.
- Establish a longitudinal source of funding for BIPOC, LGBTQ* and other URiM students to attend conferences like SNMA and LMSA.
- Implement mental health/personal days for students with an emphasis on making wellness a priority during clinical rotations.
- Develop and implement climate/pulse surveys on student wellness to better understand student needs and sufficiency of CAPS and TimelyCare as resources.

PRIORITY AREAS

HEALTHCARE



CURRENT STATUS

In line with our mission to deliver inclusive and equitable care, we are keenly aware of the need for cultural humility and sensitivity in our care for all patients, especially individuals who experience barriers to accessing care. We have and continue to develop programming and collect data to strategically inform our healthcare practices.

Center for Healthy Aging. Suffolk County is home to nearly a quarter of a million residents >65 years old, and there has been a 56 percent increase in the >85 population over the past decade. Led by the RSOM, the Center for Healthy Aging (CHA) is a campus-wide initiative to improve the care of people as they age and to address their primary goals: to be able to live at home as they age and to maintain a high quality of life. The approach of the CHA is to develop a better understanding of the biology, physiology, sociology and psychology of aging through research and innovation.

Global Health Equity Initiatives. The RSOM is focused on improving the quality of medical care locally and globally. Our Global Health Equity initiatives are focused primarily in Mozambique, with smaller programs in Latin America, the Caribbean, and Tanzania. Across the globe we support health education initiatives, programs aimed at improving the quality of care for poor populations and research initiatives with a laser sharp focus on health equity and health outcomes.

Latinx Bilingual Bicultural Collaborative. The goals of the Bilingual Bicultural Collaborative in the Department of Psychiatry and Behavioral Health include: 1) Improving and enhancing physical and mental healthcare for Latinx/e and Spanish-speaking communities in the region, specifically targeting healthcare inequity. 2) Implementing education and training opportunities for bilingual and bicultural staff and local community clinicians. 3) Recruiting and retaining bilingual bicultural staff, trainees and clinical faculty. 4) Supporting the clinical integration of healthcare among the Stony Brook Medicine network.

Healthcare Without Borders Conference. An annual conference focused on open discussions with community providers and members from across New York about issues surrounding equitable and culturally sensitive healthcare for undocumented folx in our communities, specifically Latinx, unaccompanied immigrant children and adolescents. Learn about various local organizations that accompany Latinx, immigrant youth and families in care, in addition to available resources at Stony Brook Medicine. Of importance, Spanish-speaking interpreters and Spanish-language closed captioning will be available for different parts of our program.

Indigent Health. Medically indigent patients include persons for whom medical bills would threaten the household financial viability. These persons in our catchment area may be uninsured or undocumented residents. This is typically an underserved population who may not otherwise have access to high quality healthcare.

AccessGYN. University Associates in Obstetrics & Gynecology recognizes the importance of access to routine gynecologic care for all patients. We are committed to providing preventive care services such as cervical cancer screenings, STI testing, contraceptive counseling and mammograms to our community, regardless of insurance status. Our AccessGYN program is dedicated to offering free gynecologic care to uninsured patients.

Stony Brook Health Outreach and Medical Education (SB HOME). SB HOME is a medical student-run, physician-supervised free clinic affiliated with the RSOM. The clinic provides high quality and comprehensive primary care to uninsured adults on Long Island at no cost. The clinic naturally provides a rich opportunity for students to receive direct clinical training in culturally sensitive and compassionate care for some of the most health vulnerable individuals within our community.

LGBTQ* Health. We are leading the region in efforts to understand and care for the health needs of sexual and gender diverse individuals (LGBTQ*). Stony Brook Medicine established an LGBTQ* Committee to address the needs of the LGBTQ* community, including patients, faculty, staff and trainees. Our committee is multidisciplinary and includes medical and behavioral health providers and trainees, nurses, students, education specialists, and representatives from human resources, information technology and hospital administration. The mission of the committee is to review, address and affirm the specific and unique needs of LGBTQ* individuals, as well as promote respectful and culturally sensitive care to the LGBTQ* community. All Stony Brook Medicine hospitals have been designated as “Leaders in LGBTQ Healthcare Equality” by the Human Rights Campaign (HRC) Foundation for 2022–2024. The Healthcare Equality Leader status is a competitive designation that requires facilities to meet strict criteria in five areas: Non-Discrimination and Staff Training; Patient Services and Support; Employee Benefits and Policies; Patient and Community Engagement; and Responsible Citizenship. In 2020–2021, Stony Brook Medicine conducted the first health needs assessment of LGBTQ* adults residing in Nassau and Suffolk counties. With the support of more than 30 community partners, we achieved 1,150 completed surveys. Key findings include costs (21%) and travel time (25%) as barriers to accessing healthcare; elevated mental (e.g., 60% with chronic depression) and behavioral health concerns (e.g., 35% excessive alcohol use); and reports of disrespectful and non-affirming treatment from healthcare providers (37%). Data gathered are being utilized to construct a clinical strategy for addressing the health needs of the LGBTQ* community. Specialty LGBTQ* health services are emerging, including the OBGYN Pride Clinic, breast/chest feeding and lactation medicine services, and gender-affirming voice training. We also have a growing LGBTQ* provider directory.

Native Nations. There are two New York State-recognized native nations on Long Island including the Shinnecock Nation and the Unkechaug Nation. We recognize that there are other Indigenous People residing in Long Island as well. The **Shinnecock** (“People of the stony shore”) **Nation** is one of the oldest self-governing tribes in New York and was formally recognized by the United States federal government as the 565th federally recognized tribe on October 1, 2010. There are currently more than 1,589 enrolled tribal members and about half of the Shinnecock membership live on the reservation at Shinnecock Neck in Southampton, NY. The RSOM recently received a contract from the Indian Health Service to work closely with and support the Shinnecock Nation in developing a 5–10-year behavioral health strategic plan. The **Unkechaug** (“People from beyond the hill”) **Nation** is located on the Poospatuck (“where the waters meet”) Reservation in Mastic, NY. The total population is approximately 450 people, of which ~250 reside on the Poospatuck Reservation. Health concerns for the people of the Unkechaug Nation include diabetes, depression and asthma — all three of which are found in higher rates than the national average. In a 2008 assessment, their asthma incidence was rated at three times the national average, which could be related to inadequate housing, exposure to mold and kerosene heating, and living on the water.

Women’s Health. Cultural, biological and lived experiences put women at risk for a unique set of mental and physical health problems. For example, women are more likely to experience traumatic and stressful events, such as intimate partner violence, sexual assault, pressure from changing gender roles/norms and stress related to childbirth. Our goal is to be a resource and a partner for the women of Suffolk County at every stage of their lives — from adolescence through the reproductive years into a long, healthy midlife and beyond. The RSOM has many initiatives aimed at addressing the unique health needs of women.

GAPS

- Limited Spanish-speaking clinicians.
- Difficulty with connecting LGBTQ* patients to specialized and affirmative health services.
- Lack of comprehensive and integrated gender-affirming care services specialized for adolescents and adults.
- Limited data describing the health needs and disparities within the Suffolk County community.
- Limited culturally informed training to address health disparities and health equity for underserved communities.
- Resources to provide equitable healthcare to all communities, including the uninsured and undocumented populations.

RECOMMENDATIONS

- Develop provisions of care for all communities, especially those who are uninsured.
- Require coursework and/or clinical rotations for undergraduate and graduate students and postgraduate trainees focused on health equity for underserved communities at the local, national and/or global level.
- Establish ongoing data collection tools to understand the health needs and disparities of the Suffolk County community.
- Develop a patient health navigation team for LGBTQ* healthcare and for other communities in need of coordinated specialty care.
- Develop comprehensive and integrated gender-affirming care services specialized for adolescents and adults, including but not limited to primary care, hormone management, psychiatry/behavioral health, OB/GYN, family planning and surgery.
- Develop an institutional-wide cohesive Global Health Program that is interdepartmental and multidisciplinary with the primary aim of improving health outcomes.

PRIORITY AREAS

RESEARCH



CURRENT STATUS

To ensure the health of our local, national and global community, it is imperative to address health disparities and develop and evaluate methods to promote health equity. A comprehensive Health Equity Initiative has been launched at Stony Brook Medicine, which includes the RSOM and other health sciences schools. The RSOM’s Clinical Trials Steering Committee meets monthly to assess and devise efforts to increase inclusive representation of patients in our clinical trials.

Examples of active research projects aimed at reducing health disparities include (but are not limited to) studies and/or interventions related to: mental health stigmas among pregnant women; newborns and breast-feeding; tumor biology, chemoresponse and cancer racial disparities; mobile mammogram in underserved communities; diet, colon cancer and health disparities at the VA; COVID clinic outcomes; and treatments for Lyme disease. Additionally, ongoing efforts related to LGBTQ* health and the Shinnecock Nation are described below.

LGBTQ* Health. In 2020–2021, Stony Brook Medicine conducted the first health needs assessment of LGBTQ* adults residing in Nassau and Suffolk counties. With the support of more than 30 community partners, we achieved 1,150 completed surveys. A team of RSOM investigators have begun to evaluate the data and will utilize results to strategically address the health needs of the LGBTQ* community and to support applications for federal funding.

Shinnecock Nation. We are preparing to engage with the community to conduct a behavioral health needs assessment. Data gathered will be used to develop a 5–10-year strategic plan for behavioral health. Data will also be used to support federal funding proposals. There is currently a pilot study underway via the Department of Psychiatry & Behavioral Health aimed at evaluating the feasibility and acceptability of a mind-body treatment program for members of the Shinnecock Nation community.

GAPS

- Limited external funding for research focused on health disparities and health equity.
- Limited efforts to promote and sustain collaborative interdepartmental efforts focused on health disparities and health equity.

RECOMMENDATIONS

- Provide resources to support faculty in the development of grant proposals for federal funding focused on health disparities and health equity.
- Establish internal funding opportunities to promote collaborative interdepartmental efforts focused on health disparities and health equity.

PRIORITY AREAS

FACULTY/STAFF
AFFAIRS



CURRENT STATUS

Our faculty, as clinicians, educators and researchers, are committed to serving the community and our students, and making strides in biomedical and clinical research that will benefit people of all demographics. Thus, it is important that the RSOM represents and interacts with the surrounding community and students.

Currently, the racial and ethnic identities of our faculty are comparable with the national averages across all medical schools. This is also true for the gender distribution of the faculty (although these data only refer to male and female genders).

Faculty Onboarding.

As faculty first arrive at the RSOM, the Human Resources department hosts a series of onboarding events to familiarize them with the processes and procedures of SBU. This is followed by an in-person faculty orientation session held by the Office for Faculty Affairs (OFA), which connects them with the rest of the campus and allows them to meet some of the other newly arrived colleagues. The faculty are also informed about the presence of the Ombuds Office, as well as about benefits such as the Employee Assistance Program. In addition to academic and campus information, the faculty learn about the arts, the film festival and Staller Center (they are provided with free tickets to the first Staller performance of their choice), the Seawolves and athletics, the facilities for exercising, walking and the options for wellness activities. After that first session, the new faculty participate in monthly workshops touching on different topics from teaching to professionalism to recruiting students to networking.

Additional Training.

For existing faculty or faculty coming at a more senior level, additional training opportunities, toward leadership, are available, organized by the OFA (for clinical faculty), the provost’s office (for basic science faculty) and the hospital (for both faculty and staff). Moreover, the OFA, in collaboration with the departments, will sponsor a few faculty members each year in leadership and other training professional workshops.

GAPS

- Faculty demographics do not reflect the composition of our medical school classes or the community we serve.
- Current human resource data collection systems are not inclusive of all gender identities and other URiM identities (e.g., sexual orientation).
- Limited education during onboarding regarding RSOM DEIB efforts.

RECOMMENDATIONS

- Increase outreach effort to support the recruitment of diverse faculty/staff in all specialties and departments.
- Enhance sense of community and respect for faculty from different groups through additional social and professional events.
- Provide leadership opportunities to faculty, including supporting attendance at appropriate workshops and seminars.
- Develop global engagement opportunities for faculty.
- Provide easily accessible wellness programs that will help with retention.
- Enhance faculty/staff onboarding to include RSOM DEIB efforts.
- Modify demographic forms to be inclusive of “gender identity” with expansive choices and sexual orientation.

PRIORITY AREAS

COMMUNITY
OUTREACH



CURRENT STATUS

The RSOM faculty, staff, students and trainees are encouraged to participate in public service in their communities and in local neighborhoods surrounding SBU. The RSOM supports a number of community partnerships that focus on addressing social determinants of health and achieving health equity.

Black Men in White Coats.

Long Island’s first chapter of Black Men in White Coats was officially established in October 2022 at the RSOM. Advised by RSOM faculty, the chapter is one of 38 affiliates throughout the country on a mission to increase the number of Black men in the field of medicine. There are seven medical students involved in the chapter, which also receives input and guidance from a larger Black Men in White Coats Committee of faculty and staff.

During the 2022-23 academic year, the chapter has interacted with more than 400 students from elementary to bachelor’s degree-level students and led six presentations. Prior to becoming an affiliate chapter, the Diversity, Equity and Inclusion Committee at Stony Brook University partnered with the RSOM to host a screening of the “Black Men in White Coats” documentary and a panel discussion featuring RSOM faculty and students. A Black Men in White Coats Youth Summit at Stony Brook was held in Fall 2023.

Health Occupations Partnership for Excellence (HOPE) Program.

Sponsored by Stony Brook University Hospital in partnership with the University and Hospital Community Relations Office, the HOPE Program seeks to decrease healthcare disparities by increasing the number of healthcare providers from underserved and underrepresented communities.

The RSOM helps offset costs of the two-year program, which is open to 11th and 12th grade students from Brentwood, Longwood and Wyandanch school districts. The RSOM faculty lead on-campus presentations for the students and help facilitate activities. Since 2005, the HOPE Program has helped launch the college careers of nearly 200 young people from Long Island.

K12 Outreach and Education.

Throughout the year, RSOM faculty and students visit classrooms throughout Long Island. Districts such as Brentwood, Comsewogue, Copiague, Longwood, Southampton, William Floyd and Wyandanch have welcomed faculty and students to participate in discussions and presentations about careers in medicine with students across grade levels.

In addition, Community Health Policy faculty lead an annual Doctors Back to School Day as part of the American Medical Association’s (AMA) initiative. In 2022, RSOM volunteers spoke to more than 500 high schoolers from Brentwood, Longwood and Wyandanch high schools, and for the first time led a Spanish-language session for students.

LGBTQ* Community Engagement Efforts.

Our 2020-2021 LGBTQ* Health Needs Assessment was made possible by relationships with more than 30 community partners. We continue to work closely with community partners to develop the next steps for improving the care and treatment of LGBTQ* individuals in Long Island and increasing cultural sensitivity toward this population. The Suffolk County Farm and Education Center, as part of the Cornell Cooperative Extension, continues to be a key partner for collaborative educational events, including an annual LGBTQ* Pride Celebration and an annual Coming Out Day family event. Our Stony Brook Medicine LGBTQ* Committee supports our institution’s sponsorships of LGBTQ* Pride events and other community outreach initiatives.

GAPS

- Limited financial and staff resources to scale community outreach and engagement efforts.
- Siloed community engagement and outreach efforts across SBU leading to potential duplication of efforts.
- Unclear process for faculty, staff, students and trainees to engage with community outreach and engagement efforts.
- Lack of long-term, community and evidence-based approaches to improve the health outcomes for underserved and underrepresented communities (e.g., blood pressure screenings and other health screenings).

RECOMMENDATIONS

- Work with Advancement and Development staff to identify and attract potential donors and other strategic partners to help fund DEIB community outreach efforts.
- Collaborate with University and Hospital Community Relations to create an annual report highlighting community outreach efforts across the Stony Brook Medicine enterprise.
- Leverage and seek involvement in ongoing community outreach efforts taking place across Stony Brook Medicine, including efforts underway by the Health Equity Initiative Community Partnerships Subcommittee.
- Refine the process for faculty, staff, students and trainees to participate, lead and encourage compliance using evidence-based community health screenings and programming.
- Expand the Black Men in White Coats initiative by developing a RSOM program to support the advancement of Black men in medicine at the RSOM.

DELIVERABLES

Implementation of this strategic plan includes clear benchmarks across five priority areas:

- 1. Culture and Climate:** Integrate *belonging* strategies into the RSOM, ensure DEIB is a priority, and develop and implement inclusive policies and accessibility processes across the school.

Year 1 Goals

- G1. Work with communication and marketing leadership to develop strategies to improve belonging, including cultivating institutional pride and engagement of faculty, staff, students and trainees.
- G2. Develop a RSOM DEIB central website.
- G3. Develop employee resource group for sexual and gender expansive individuals (LGBTQ*).
- G4. Create an Office for Women in Medicine for mentoring and career development for early- and mid-stage faculty.
- G5. Work with the Office of Diversity, Inclusion and Intercultural Initiatives (DI3) to develop a plan for institutional DEIB online and/or hybrid trainings and professional development.
- G6. Update RSOM DEIB central website and ensure all RSOM websites reflect our DEIB values, including but not limited to activities, language and pictures.

PRIORITY AREAS

COMMUNITY
OUTREACH

CONTINUED

Years 2-4 Goals

- G1. Pilot belonging and engagement strategies and integrate DEIB and wellness initiatives to promote compassion and maintain psychological safety for faculty, staff, students and trainees.
- G3./G4. Expand employee resource groups with integration opportunities for URiM employees to create opportunities for mentorship, well-being, professional development, community events and advocacy.
- G5. Implement, evaluate and expand DEIB online and/or hybrid training and professional development.

Year 5 Goals

- G4. Assess impact of DEIB online and/or hybrid trainings and professional development.
- G5. Full coordination and integration of RSOM DEIB efforts.

2. Curriculum: Implement and integrate equitable curriculum, enhance inclusive pedagogy and practices, and increase opportunities for expanding awareness and knowledge on matters of bias and accessibility in medicine and the impact of structural disparities in healthcare.

Year 1 Goals

- G1. Establish a taskforce of experts (including external consultants as needed) to review the medical school curriculum and make recommendations regarding improving the breadth and depth of the integration of health disparities and health equity education.
- G2. Incorporate assessment of the integration of health disparities and health equity education in student course evaluations.

Year 5 Goals

- G1./G2. Implement, evaluate and revise medical school curriculum focused on health disparities and health equity education.

3. Education and Engagement: Increase DEIB education, engagement and capacity through professional development, community building, global programs and educational opportunities for all members across the RSOM, collaborators and stakeholders.

Year 1 Goals

- G1. Develop a plan to coordinate and financially sustain pathway and pipeline programs that support the recruitment of BIPOC, LGBTQ* and other URiM students to SBU/RSOM.
- G2. Host the Black Men in White Coats Chapter Youth Summit to educate URiM and BIPOC students, parents and teachers about careers in medicine.

Years 2-4 Goals

- G3. Establish a quarterly RSOM forum for faculty, staff, students and trainees to encourage discussion of DEIB issues and identify relevant areas of need.

- G4. Launch an integrated pathway and pipeline program to support the recruitment and retention of Black men in medicine.
- G5. Develop and implement an annual health equity conference.

Year 5 Goals

- G6. Expand community partnerships and dissemination of accessible healthcare education and resources for underserved and all communities.

4. Equity within Recruitment, Retention and Advancement: Establish a portfolio of programs that supports the recruitment, mentorship and advancement of our diverse community of faculty, staff, students and trainees.

Year 1 Goals

- G1. Increase recruiting sessions (i.e., relevant professional organizations, conferences and activities; community colleges) for BIPOC, LGBTQ* and other URiM students, trainees and faculty applicants.
- G2. Establish a robust DEIB budget, including increased funding for URiM student organizations; scholarships for BIPOC, LGBTQ* and other URiM students; and other initiatives to promote recruitment and advancement of our diverse faculty, staff, students and trainees.
- G3. Establish an LGBTQ* alumni group and SB Foundation account.

Years 2-4 Goals

- G4. Develop a postgraduate pipeline program (i.e., IDEA fellows) to support the recruitment of BIPOC, LGBTQ* and other URiM trainees to faculty positions at the RSOM.
- G5. Develop, implement and evaluate periodic climate/pulse surveys on wellness to better understand the needs of faculty, staff, students and trainees.
- G6. Develop and pilot a mentoring program between BIPOC, LGBTQ* and other URiM medical students and graduate trainees.
- G7. Develop, implement and evaluate robust wellness programming to support the well-being of faculty, staff, students and trainees.
- G8. Establish mechanisms for acknowledging and supporting DEIB leaders to aid in retention.
- G9. Enhance retention of DEIB faculty through expanded opportunities for mentoring by senior faculty and peer/ near-peer mentoring groups, for scientific growth, professional development, institutional engagement and career advancement, dual career support and the development of a sense of community with faculty at similar career stages.
- G10. Develop mechanisms to support options for cluster hiring (a practice that has proven to aid in retention).

Year 5 Goals

- G4. Further develop, implement and evaluate pipeline programs to support the recruitment of BIPOC, LGBTQ* and other URiM trainees to faculty positions at the RSOM.
- G6. Formalize mentoring programs at all levels.
- G11. Develop global engagement opportunities for faculty, students and trainees.

PRIORITY AREAS

COMMUNITY
OUTREACH

CONTINUED

5. Improvement and Accountability: Create an annual review and reward process for evaluation and assessment of ongoing DEIB initiatives and programs.

Year 1 Goals

- G1. Develop climate/pulse surveys for students to allow for feedback on the inclusion of health disparities and health equity in curriculum.
- G2. Establish new DEIB departmental strategic plans and respective report cards to hold chairs accountable for outcomes.
- G3. Designate a DEIB representative to join RSOM policy committee(s) to ensure that our policies are inclusive and equitable.

Years 2-4 Goals

- G1. Implement and evaluate climate/pulse surveys for students to allow for feedback on the inclusion of health disparities and health equity in curriculum.
- G4. Work with the Office of DI3 to conduct a DEIB needs assessment for the RSOM.
- G5. Improve human resource data collection systems to allow for inclusive reporting of identities, including gender identity and sexual orientation.
- G6. Conduct regular climate/pulse surveys for faculty, staff, students and trainees to allow for feedback on RSOM DEIB efforts and develop relevant response efforts.
- G7. Conduct regular climate/pulse surveys on wellness to better understand the needs of faculty, staff, students and trainees and develop relevant response efforts.

Year 5 Goals

- G1./G6./G7. Periodically conduct regular climate/pulse surveys and develop relevant response efforts.



6. Research: Develop, implement and assess initiatives to address health disparities and methods for promoting health equity.

Year 1 Goals

- G1. Enhance the coordination and integration of the Stony Brook Medicine Health Equity Initiative.
- G2. Coordinate with the RSOM Clinical Trials Steering Committee to assess and devise efforts to increase inclusive representation of patients in our clinical trials.
- G3. Provide resources to support faculty in the development of grant proposals for federal funding focused on health disparities and health equity research.
- G4. Establish internal funding opportunities to promote collaborative interdepartmental efforts focused on health disparities and health equity research.

Years 2-4 Goals

- G2. Designate healthy equity clinical research leadership to collaborate with the RSOM Clinical Trials Steering Committee to expand healthy equity research across the RSOM.

Year 5 Goals

- G5. Expand global health equity research efforts.

7. Recruitment: Recruitment of a Vice Dean for DEIB.

- Develop an organizational structure for DEIB at the RSOM
- Faculty and Staff Diversity Ambassadors Council
- Student Leaders' DEIB Council
- GME Inclusion and Diversity Committee
- Organize and unify DEIB initiatives and collaborate with existing programs/initiatives; create a public website that clearly delineates DEIB structure at the RSOM, showcases our DEIB efforts and provides an easily accessible mechanism for communicating suggestions, feedback and concerns.

COMMITTEE MEMBERS

Judi Brown Clarke (co-Chair), Wilfred Farquharson, Jack Fuhrer, Adam Gonzalez (co-Chair), Erika Karp, Barbara Nemesure (co-Chair), Lynda Perdomo-Ayala, Stella Tsirka, Elizabeth Varghese (medical student), Sierra Washington, Jennie Williams, Erika Zambrano Alvarez (medical student)



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