

Celebrating
50
years
1968-2018



Icahn School
of Medicine at
**Mount
Sinai**

Innovation in Science and Medicine

Icahn School of Medicine at Mount Sinai

DENNIS S. CHARNEY, M.D.
Dean

October 4, 2018

Celebrating
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Innovation in Science and Medicine

A Medical School that grew out of a Hospital



1852- The Mount Sinai Hospital founded

The Hospital attracted the best and the brightest doctors and soon became known for patient based research and innovations in its 1st 100 years:

1908- Ottenberg performs group matched transfusion

1910- Elsberg introduces endotracheal anesthesia

1915- Lewisohn describes blood preservation solution

1919- Rubin develops first test for tubal patency

1928- Shwartzman describes the “Shwartzman phenomenon”

1929- Swick introduces radio-opaque dye

1929- Master develops the stress test

1959- Ornstein and Davis develop gel-electrophoresis

1959- Berson and Yalow develop radio-immunoassay – Yalow won the Nobel prize

1964- Irving Selikoff and colleagues showed link between asbestos and lung cancer

However, research was changing and becoming more lab-based, conducted in large universities.

To continue to attract top-notch doctors and provide the best patient care, it was clear that Mount Sinai would have to start a Medical School.



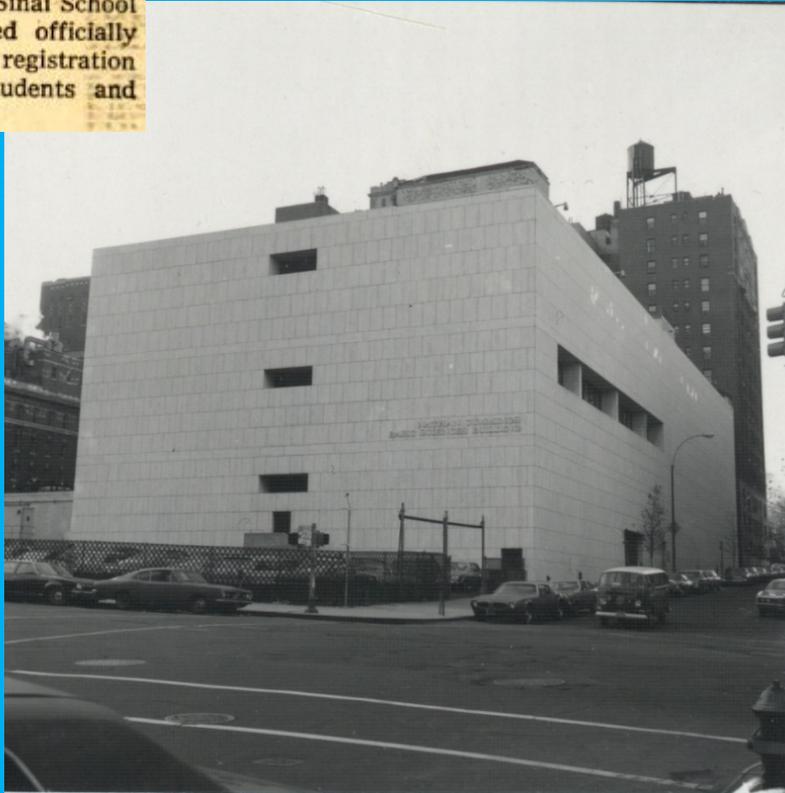
1968- The Mount Sinai School of Medicine admitted its first class.

1968 - Teaching Tomorrow's Medicine Today

Innovation in Science and Medicine

Mount Sinai Opens Its Medical School In Old Bus Garage

The city's seventh medical school—the Mount Sinai School of Medicine—opened officially yesterday with the registration of 36 first-year students and 23 juniors.



From a renovated bus garage on 102nd Street in 1968
to a brand new building in 1974

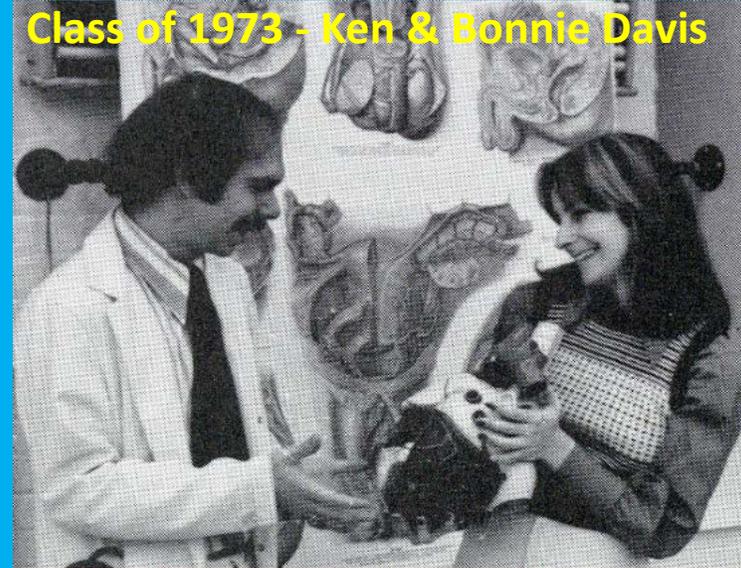
Many Changes – but not the Quest for Excellence

Innovation in Science and Medicine

1970 First Graduating Class



Class of 1973 - Ken & Bonnie Davis



2018 Graduating Class



Continuous Innovations in Education, Research and Patient Care

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Innovation in Science and Medicine

1969-Edwin Kilbourne created the first genetically engineered vaccine

1971-Charlotte Friend and colleagues demonstrated that dimethyl sulfoxide could induce cancer cells, opening the way to less toxic cancer therapy

1974-Emanuel Rubin and Charles Lieber showed that alcohol is toxic to the liver

1980-Daniel Present and colleagues established immunosuppressive agents as first line of therapy for IBD

1982-Ken Davis and Richard Mohs used a specific cholinesterase inhibitor to treat Alzheimer's disease

1987-Mount Sinai School of Medicine admits first batch of Humanities in Medicine students

1991-Francisco Ramirez and colleagues identified the gene for Marfan syndrome

1996-Philip Landrigan and colleagues documented the unique vulnerability of infants and children to pesticides and other toxic chemicals in the environment

2002-World Trade Center Health Program organized in the aftermath of the 9/11 terrorist attacks

2003-Hugh Sampson and colleagues developed a treatment for peanut allergy

2003-Robert Desnick and colleagues develop treatment for Fabry's Disease

2004-Joseph Buxbaum and colleagues identified first common gene variant linked to autism

2005-Eric Genden performed the world's first successful tracheal transplant

2010-Peter Palese and colleagues developed a new influenza vaccine

2011-Roger Hajjar found a new drug target for the treatment and prevention of heart failure

2012-Ross Cagan developed a cancer model in drosophila (fruit fly), and used it to create a new approach to discovery of cancer treatments

2012-Eric E. Schadt and colleagues developed a technique for generating a personal SNP profile or a DNA "bar code"

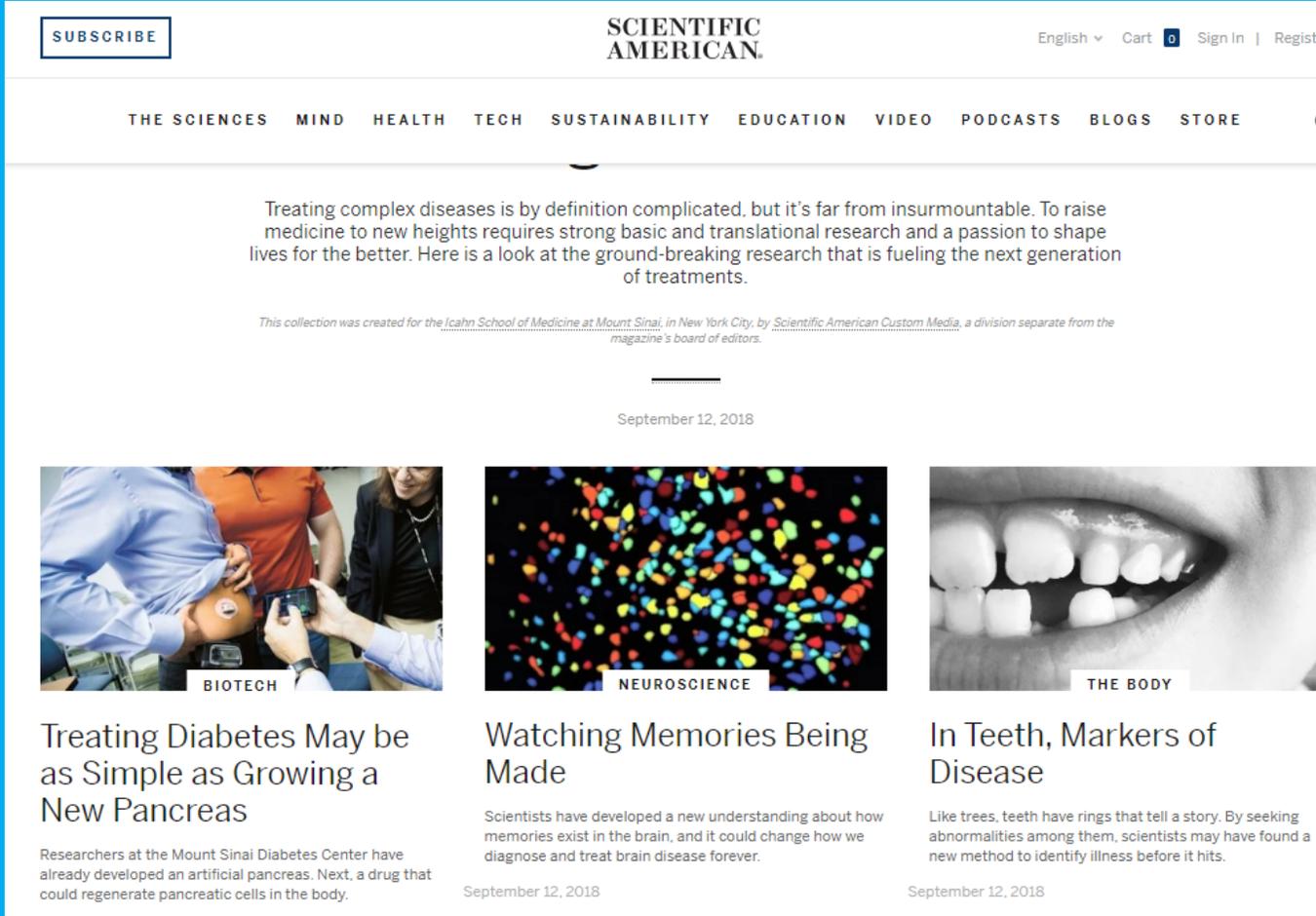
2014-Dennis Charney and colleagues found that ketamine could provide relief to patients with depression and PTSD

2017- Sequencing based genetic tests making a personalized medicine a reality for patients with certain mutations

Reaching New Heights in Medicine

Innovation in Science and Medicine

To mark its 50th anniversary, the Icahn School of Medicine at Mount Sinai has launched a series in partnership with *Scientific American Custom Media* that takes a sweeping look at Mount Sinai's groundbreaking research and innovation fueling the next generation of treatments.



SUBSCRIBE

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THE SCIENCES MIND HEALTH TECH SUSTAINABILITY EDUCATION VIDEO PODCASTS BLOGS STORE Q

Treating complex diseases is by definition complicated, but it's far from insurmountable. To raise medicine to new heights requires strong basic and translational research and a passion to shape lives for the better. Here is a look at the ground-breaking research that is fueling the next generation of treatments.

This collection was created for the Icahn School of Medicine at Mount Sinai, in New York City, by Scientific American Custom Media, a division separate from the magazine's board of editors.

September 12, 2018

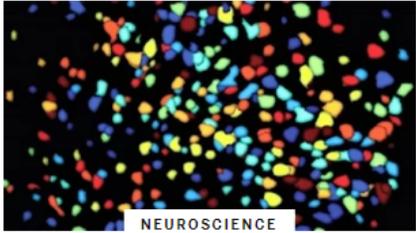


BIOTECH

Treating Diabetes May be as Simple as Growing a New Pancreas

Researchers at the Mount Sinai Diabetes Center have already developed an artificial pancreas. Next, a drug that could regenerate pancreatic cells in the body.

September 12, 2018



NEUROSCIENCE

Watching Memories Being Made

Scientists have developed a new understanding about how memories exist in the brain, and it could change how we diagnose and treat brain disease forever.

September 12, 2018



THE BODY

In Teeth, Markers of Disease

Like trees, teeth have rings that tell a story. By seeking abnormalities among them, scientists may have found a new method to identify illness before it hits.

September 12, 2018

Research Accomplishments

AAMC Rank

U.S. Medical Schools (AAMC) 2017 #4 Research Dollars/Principal Investigator

U.S. Medical Schools (AAMC) 2017 #4 Research Expenditures/sf

Research Quality

NIH funding at the highest level at \$348M – a 9.4% increase over prior year

Ranked #12 in NIH funding as of October 1, 2018

Innovation

ISMMS is #10 in Nature Innovation Index amongst 200 global research institutions

The index measures the impact of science on new therapies

ISMMS won third prize in the AAMC Innovations in Research and Research Education Award Competition

SINAInnovations Health Hackathon attracted participants from top institutions and produced exciting new ideas and products

New Appointments

Innovation in Science and Medicine

Dean

Kumar Chatani

Eric Schadt, PhD

TBA

Information Technology

Precision Medicine

Equity for Women in Science and Medicine

Department Chair/Institute Director

Adam Margolin, PhD

Bruce Sands, MD

Sarah Millar, PhD

**Chair, Department of Genetics and
Director, Icahn Institute for Genomics
and Multiscale Biology**

Director, The Digestive Diseases Institute

Director, Black Family Stem Cell Institute

Executive Vice Presidents:

Joel Dudley, PhD

Erik Lium, PhD

Precision Health

Mount Sinai Innovation Partners

Mount Sinai Doctors Faculty Practice

Alan Adler, MD

Senior Medical Director

New Appointments

Senior Associate Deans:

Judy Cho, PhD

Precision Medicine

Joseph Finkelstein, MD PhD

Information Technology & Chief Research Informatics Officer

Patricia Kovatch

Scientific Computing and Data Science

Valerie Parkas, MD

Admissions, Recruitment and Alumni Affairs

Jonathan Ripp, MD

Well-being and Resilience

Associate Deans:

Saadia Akhtar, MD

Trainee Well-being in Graduate Medical Education

Gali Halevi, PhD

Libraries and Information Sciences

Alicia Hurtado, MD

Medical Student Wellness and Student Affairs

Lauren Peccoralo, MD

Faculty Well-being

Randi Schwartz, MBA

Graduate School

Rhoda Sperling, MD

Research/Conflicts of Interest

MD Students-Matriculating Class of 2018

• Number of Complete Applications	4,896
• Number of Interviews	837
• Size of Class	140
• MD/PhD	12
• Early Assurance	43
• Women	48%
• Underrepresented in Medicine/Science	19%
• Median MCAT	517
• Median GPA	3.84
• Number of Undergraduate Schools	64

MD/PhD Students-Matriculating Class of 2018

Innovation in Science and Medicine

• Number of Complete Applications	322
• Number of Interviews (including 4 Flex Med)	98
• Size of Class (including 3 Flex Med)	12
• Women	42%
• Underrepresented in Medicine/Science	25%
• Median MCAT	515
• Median GPA	3.87
• Number of Undergraduate Schools	10

2018 Flex Med Admissions (Matriculate 2020)

• Number of Complete Applications	754
• Number of Interviews	172
• Number of Offers Accepted	50
• Identified as MD/PhD (potential)	6
• Women	64%
• Underrepresented in Medicine	28%
• Median SAT Verbal	750
• Median SAT Math	765
• Median SAT Critical Reading	775
• Median ACT	33
• Median GPA	3.91
• Number of Undergraduate Schools	23

Innovative New Initiatives

Institutional Partnerships:

- Innovative initiative to diversify the school and the workforce.
- Early Assurance Admissions for outstanding applicants who are in firms doing healthcare consulting or in the military.
- *Current participants:*
US Department of the Navy, Deloitte Consultants, McKinsey & Company

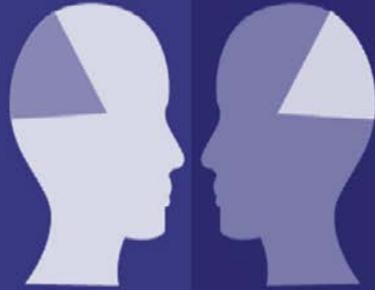
Department of the Navy	1
Deloitte Consultants	2
McKinsey & Co.	2
Total Number Offered Admission	5

2019 will be the first year IP students matriculate at ISMMS

Global Health Initiative - Mount Sinai-CDC Fellowship:

- A scholarly year working with the Epidemic Intelligence Service at the CDC

Diversity Initiative



Racism and Bias

A Change Now Initiative

changenow.icaahn.mssm.edu

VISION

To become a health system and health professions school with the most diverse workforce, providing health care and education that is free of racism and bias.

LCME Accreditation

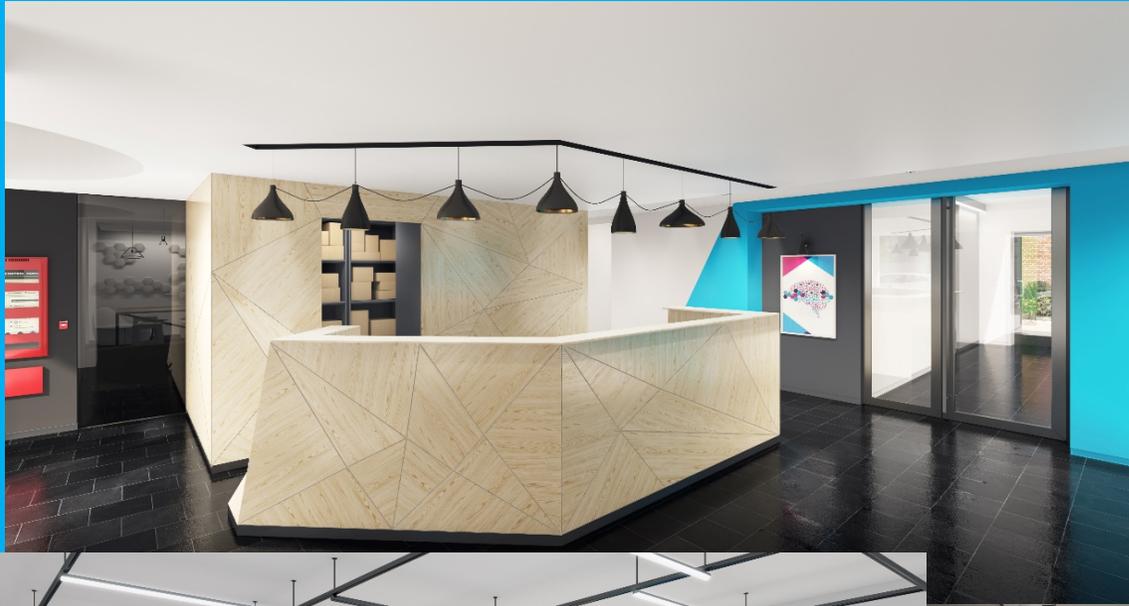
Upcoming re-accreditation site visit by the *Liaison Committee on Medical Education (LCME)* in late October of 2019

- **Showcase efforts and challenges in continuous quality improvement of admissions, enrollment, curricular affairs, student affairs, and diversity**
- **Quality Improvement Teams analyze outcomes data and provide supporting documentation**
- **Students complete an independent student analysis**
- **Subcommittees synthesize information from Quality Improvement Teams and the student analysis in order to provide self-study reports**

An LCME task force will summarize these reports and submit all required material to the LCME in August of 2019

Aron Hall First Floor Renovations

Innovation in Science and Medicine



First floor of Aron Hall will be transformed into a Center for Learning and Development. The Center will include student academic and wellness advising, mental health, other support services in addition to expanded study and quiet space



Projected Completion Date ~ 1st Q 2019

Graduate Medical Education

- ❖ ISMMS still the largest sponsor in the US (>2,500 residents and clinical fellows in 12 hospitals)

- ❖ Residency programs ranked by Doximity (2018-19)
 - Two in Top Ten
 - Dermatology (#4)
 - ENT (#6)
 - Five in Top 20
 - Psychiatry (14)
 - Emergency Medicine (#16)
 - Nuclear Medicine (#17)
 - Physical Medicine and Rehab Medicine (#18)
 - Ophthalmology (NEEI-#19)

- ❖ New Accredited Programs in 2018
 - Addiction Medicine (First in US)
 - Pediatric Pulmonary
 - Regional Anesthesiology and Acute Pain Medicine
 - Internal Medicine (South Nassau)
 - Internal Medicine – Pediatrics (4-yr program-only one in NYC)

Graduate Medical Education

Innovation in Science and Medicine

This is the 3rd ISMMS recipient of ACGME Parker Palmer Courage to Teach Award

Parker J. Palmer Courage to Teach Award
for Program Director Excellence



The Parker J. Palmer Courage to Teach Award honors program directors who find innovative ways to teach residents/fellows and to provide quality health care while remaining connected to the initial impulse to care for others in this environment. The ACGME congratulates the 2018 recipients of the Courage to Teach Award.



Saadia Akhtar, MD
Program Director for Emergency Medicine
Mount Sinai Beth Israel/Icahn School of Medicine at Mount Sinai
New York, New York

Nominators had this to say:

"One of [Dr. Akhtar's] first accomplishments was to have our upcoming annual academic assembly, as well as those going forward, be anchored by the uniting theme, "Taking care of our learners, ourselves and each other." In addition, she launched the creation of a major task force on well-being, resilience and suicide prevention whose product over the last 11 months has been quite impressive."

"Not being content with influencing only the Program Director Association, she partnered with the American College of Emergency Physicians, our specialty's largest organization, to lead, for the first time in our specialty's history, a summit on Emergency Medicine Physician Wellness and Resilience with representatives from all of the emergency medicine stakeholder organizations. The summit, which occurred in February, was charged with looking at five major topics that span the spectrum of practice that would yield a list of deliverables, some of which could be implemented immediately, along with future initiatives related to wellness and resilience that would be formalized in a summit proceedings manuscript that will be published in our specialty's leading journal."

2017 Recipients



Adam Levine, MD
Professor of Anesthesia and
PD MSH Anesthesia



Vicki Shanker, MD
Assistant Professor of
Neurology and PD MSBI
Neurology

PhD Students-Matriculating Class of 2018

• Number of Complete Applications	536
• Number of Interviews	165
• Size of Class	41
• Women	49%
• Underrepresented in Medicine/Science	22%
• Median GPA (Undergrad and Grad)	3.80
• Number of Undergraduate Schools	38

Master's Students-Matriculating Class of 2018

- **Master of Science in Public Health: 66 (plus 10 Certificates)**
- **Master of Science in Biomedical Sciences: 38**
- **Master of Science in Clinical Research: 27
(plus 8 PhD and 10 Certificates)**
- **Master of Science in Healthcare
Delivery Leadership: 21**
- **Master of Science in Genetics Counseling: 12**
- **Master of Science in Biostatistics: 5**

Graduate School Notable Accomplishments

- ❖ Recruited the highest credentialed and most diverse PhD class
- ❖ Achieved a highly diverse MSTP class (25% UISM, 42% women)
By using recruitment paths through Flexmed, PREP, and SURP.
NIH awarded an additional T32 training grant slot to MSTP in recognition of its commitment to diversity
- ❖ Launched the *Biomedical Data Science Initiative* to bridge research and educational endeavors in computing and big data analytics across various departments and institutes at Sinai.
- ❖ Developed new courses in Computer Systems, Algorithms, and Machine Learning for Biomedical Data Science in response to an increasing demand for knowledge and skills in data science.
- ❖ Expanded entrepreneurship training using NSF I-Corp™ Lean LaunchPad approach to create and test innovations in real time.

Graduate School Notable Accomplishments

- ❖ Granted accreditation by NYSED for a new *Master in Biomedical Data Science* program (launching in 2019).
- ❖ Established a new “Meharry-Mount Sinai Research Scholars Program” with the ultimate goal of creating a pipeline for postdocs and faculty who are underrepresented in science.
- ❖ Established a new “Exchange Program” with Cooper Union.
- ❖ Discontinued GRE requirement for PhD admissions (because of lack of demonstrated predictive value for success, and bias against women, UiS, and economically disadvantaged groups)
- ❖ Introduced new ways to celebrate PhD achievements and build community (NYC-first PhD Lab Coat Ceremony)

❖ Mentoring

- Online resource toolbox for faculty that includes podcasts, and audio/video training modules
- “Mentoring the Mentor” training workshops for faculty from across the health system
- Social media training for career enhancement of junior faculty

❖ Leadership Training

- Professional development workshops and events on diversity, work/life balance, and mentorship
- Leadership in Emerging Academic Departments (LEAD) program with the CTSA
- Faculty Development Symposium focusing on leadership and mentoring and work/life balance

Office of Academic Development and Enrichment

- ❖ **Promoting Collaboration**
 - **Faculty Idea Prize for Innovative Collaborations**
 - **Winners announced at SinInnovations**
 - **Collaborative events featuring women leaders in academic medicine**
 - **Junior faculty collaborations by organizing team events**
 - **Coffee-talk, Faculty First Luncheons, Junior Principal Investigator's group**

- ❖ **OADE's 10 Year Anniversary in 2019**
 - **Tri-State Faculty Development Symposium in 2019**
 - **A social media forum called "We-Lead," featuring women in academic medicine**
 - **Feature 10 years of faculty career success stories through social and print media**

Diversity

- ISMMS was acknowledged for the 4th consecutive year by HEED (Higher Education Excellence in Diversity) for outstanding diversity programs and outcomes.
- MSHS, including the school was ranked #1 by DiversityInc in 2018 (4th consecutive year for ranking in Top 10 hospitals and health systems and 2nd consecutive year #1 ranking).
- All MSHS hospitals were acknowledged by HEI (Health Equity Index) for excellence in LGBT patient care in 2018.
- The Office for Diversity and Inclusion (ODI) and CHECER (Center for Health Equity and Community Engaged Research) are leading an effort to design a Health Disparities Dashboard.
- The Office of the Dean established a Dean for Equity for Women in Science and Medicine position

Diversity

ODI's Patricia S Levinson CMCA marked its 20th year anniversary this year.

ODI / CMCA celebrated 10 years of its HCOP NERA MedPrep Programs:

- >200 graduates matriculated into medical school to date
- 57 enrolled in residency programs.
- NERA was recently awarded competitive renewal funding of \$3.1 Mil for 5 years through 2023.

ODI / Center for Excellence in Youth Education (CEYE) continues to provide innovative science enrichment programming to Junior /High School and college students.

>450 students participated in formal programs in 2018.

HCOP (Health Careers Opportunity Program);
NERA (Northeast Regional Alliance;
MedPrep (free summer enrichment program for URM)

Diversity

- The Department of Medical Education, in partnership with ODI has launched the Racism and Bias Initiative and is co-developing a longitudinal anti-racist based curriculum to teach mitigating bias as a clinical skill.
- Med Ed and ODI / CMCA co-support and established a new role – Director of Strategy and Equity Education Program.
- ODI / CMCA sponsors the Diversity in Biomedical Research Council and is co-chaired by Dr. Ann-Gel Palermo, Associate Dean for Diversity and Inclusion in Biomedical Education.
- As of July 2018, seven departments have established Vice Chairs for Diversity and 17 departments have established or are in process of launching a departmental Diversity Committee.
- The Faculty Diversity Council and GME Diversity Council continue to focus on recruitment, retention and advancement of women and URIM faculty and house-staff.

Office of Well-Being and Resilience (OWBR)

Innovation in Science and Medicine

❖ **New A MSHS-wide effort Initiative launched March 2018**

❖ **OWBR Mission:**

Your professional fulfillment is essential to your well-being and the delivery of the best education, research and patient care.

- **We will drive change by promoting initiatives aimed at removing barriers to your well-being and reconnecting you with the meaning of your work.**

❖ **OWBR Team recruited to address the well-being needs of each cohort for which the OWBR is responsible.**

❖ **Our Team:**

- | | |
|-----------------------------|---|
| – Jonathan A. Ripp, MD, MPH | Senior Associate Dean for Well-Being and Resilience |
| – Lauren Peccoralo, MD MPH | Associate Dean for Faculty |
| – Basil Hanss, PhD | Associate Dean for Graduate School |
| – Alicia Hurtado, MD | Associate Dean for Undergraduate Medical Education |
| – Saadia Akhtar, MD | Associate Dean for Graduate Medical Education |
| – Anu Anandaraja, MD MPH | Program Director |

❖ Major Responsibilities

- Promotion of Well-Being
- Raising Awareness of Existing Offerings
- Promoting a Culture of Well-Being
- Enhancing mental health resources for students

❖ Efforts to-date:

- Needs Assessment and Listening Tour
- Development of a Faculty Well-Being Champion program
- Website Development
- Survey – based Measurement Tool (in development)
- Establishment of Suicide Response Team and Protocol draft

❖ Planned/On-going Efforts

- Consolidate disparate existing programs across sites and campuses
- Further expand Wellness Forums/Luncheons – opportunities to listen & learn
- Further expand Mental Health Resources and Access

❖ Initiatives for 2018-19 Academic Year

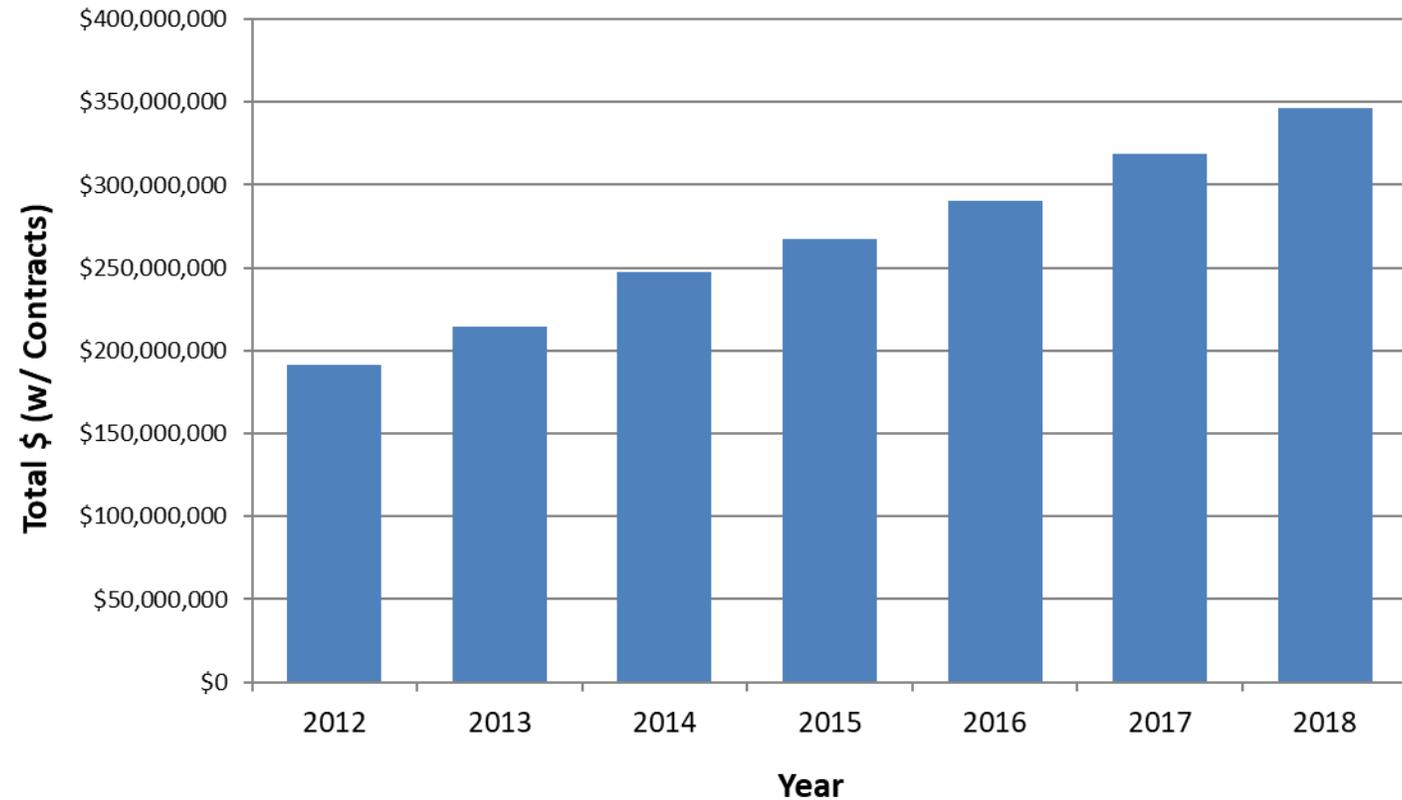
- Resilience Training Program
- Build out student support infrastructure
- Medical and Graduate School-wide survey regarding access to mental health care and develop action plans to address gaps in service

NIH Funding

Innovation in Science and Medicine

ISMMS Total NIH Funding 2012 - 2018

Source: Grants & Contracts Office, ISMMS



Department NIH Funding Rank-2017: [Source: Blue Ridge 2017 Data]

Basic:

Genetics	#4
Microbiology	#4
Neurosciences	#4
Pharmacology	#4

Clinical:

Emergency Medicine	# 3
Internal Medicine	#10
Pediatrics	#11
Physical Medicine	# 6
Psychiatry	# 6

Mount Sinai Innovation Partner (MSIP)

❖ Mount Sinai i3 Asset Accelerator

- Fund to advance commercially relevant Mount Sinai assets
- 4 funded projects in the last year, 7 proposals currently under review
- Pool of 24 experts advising on i3 proposals including health and life science venture capitalists, experienced entrepreneurs and corporate operators, and subject matter experts
- Fund is now additionally supported by philanthropy

❖ Startup Support

- Offered strategic support and enabled 5 startups from Mount Sinai technologies.
- Successfully submitted and placed three teams into the NYC iCorps start-up and technology company development program.

❖ Digital Health Developments

- Mount Sinai is at the forefront of the transforming landscape in digital health
- Spun out five digital health companies with focuses as diverse as speech, imaging, renal function, ovulation determination, and joint replacement

❖ Mount Sinai/Celgene Consortium Development

- The consortium between Celgene, Mount Sinai, and three other NCI-designated Cancer Centers granted Mount Sinai an additional multi-million dollar award to advance research, development, and treatment.

Mount Sinai Innovation Partner (MSIP)

❖ Education and Outreach

- Created the Mount Sinai Innovation Group (MSIG), a common space and learning environment for MSHS innovators to share best practices in commercialization and entrepreneurship
- Deepened engagement with the NYC and global life sciences ecosystem
- Developed and introduced a comprehensive series of entrepreneurship classes (the Primer series), providing accessible, short introductions to entrepreneurship and technology development.

❖ Internship and Externship programs

- Continued the Commercialization Fellows program [no change]
- Partnered with the NYCEDC LifeSci Internship Program, helping to expand workforce development initiatives to under-represented minorities
- Created legal externship program

Mount Sinai Innovation Partner (MSIP)

Innovation in Science and Medicine

- ❖ Spun out Monogram Orthopedics, Inc., a startup to improve, standardize, and integrate robotic and 3D-printed implant technology.
- ❖ Licensed pioneering technologies for the development of transformative therapies for Farber's disease.
- ❖ Partnered with a start-up to develop state-of-the-art human heart tissue engineering for drug discovery.
- ❖ Launched a start-up focused on development of novel small molecules to treat cancer by turning on the body's own tumor suppressor signaling pathway.
- ❖ Entered commercial partnerships to validate a novel gene therapy to cure catastrophic treatment resistant pediatric seizure disorders like Dravet Syndrome.
- ❖ Forged a joint development partnership to develop novel small molecules to prevent and reverse kidney disease.
- ❖ Partnered with a start-up to develop technologies that help families achieve their fertility goals.

Mount Sinai Doctors Faculty Practice Accomplishments 2018

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	Growth	Operating Margin
2017	4.3%*	2.4%
YTD 8/2018	7.8%*	5.2%

* adjusted for Sema4 spinout

Central Billing Office/IT

- Led Wave 5 implementation of Epic Practice Management system across all campuses
- Improved cash reconciliation process between billing systems and general ledger
- Increased automated payment options – 24/7 online and IVR phone payments
- Redesigned organizational structure to better support Epic implementations and Customer Service

New Sites

- Multispecialty practices opened in Stuyvesant Town and Ansonia on Broadway
- Opened Urgent Care Site in DUMBO
- Practice opened at Credit Suisse offices to support employees

“Welcome” Self-Registration Module

- Implemented patient self check-in module all practiced using Epic Practice Management platform

Mount Sinai Doctors Faculty Practice Accomplishments 2018, continued

Access Center

- Received two Patient Access Symposium awards for Best Practice in Access Technology and Management
- Robust Quality Assurance and Access Optimization programs
- Texting for appointment reminders, med refills, and MyChart signups

Access Center Growth	2016	2017	2018	2019 Projected
# of Calls/Year	2,138,157	2,673,503	3,487,446	4,246,492
Total Agents	165	194	255	305
Total Home Agents	2	27	60	100

Online Scheduling

- Increasing patient interactions with online, do-it-yourself scheduling with Zocdoc and MyChart
- Adding ~700 physicians Zocdoc’s functionality on Mount Sinai “Find-a-Doc”
- 45% of patients are new to the Health System
- Expanding Zocdoc to Resident Clinics, Network, Clinically Integrated Network, and Ancillaries

Zocdoc Growth	2016	2017	2018
Total Providers	465	613	1,385
Total Bookings	104,756	122,129	134,506

Mount Sinai Doctors Faculty Practice

Ongoing Initiatives

IT and Central Billing Office

- Leading Epic Wave 6-7 Practice Management implementations through 2021
- Implementing M*Modal dictation software for physicians
- Building enterprise dashboard of key performance indicators for all MSDFP and Network practices



Epic Full Roadmap				
	2018	2019	2020	2021
MSHS <i>Enterprise Wide</i>	38%	53%	84%	100%
MSDFP – MSH/MSQ	94%	96%	99%	100%
MSH / MSQ <i>Art28/Technical Billing</i>	Art 28: EHR & PB Only Technical: EHR Only		100%	100%
MSBI / MS Brooklyn	8%	57%	97%	100%
MSSL / MSW	50%	74%	99%	100%
NYEE	-	-	100%	100%
Network	-	4%	99%	100%

Access

- Continued Access Center growth
- Expansion of Zocdoc and MyChart DIY Scheduling
- Upgrading phone system and piloting use of robotics
- Implementing standard medical records request vendor

Mount Sinai Doctors Faculty Practice

Ongoing Initiatives

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Commitment to Caring

- Implementing the C2C Program focused on improved patient experience, employee engagement, and physician wellness
 - Integrating with Disney program downtown and expanding to all MSDFP
 - Developing physician communication training



Clinical Program Development

- Developing plans for new building at 101st Street and Lexington Avenue
 - Services will include Daycare (double current capacity), new and expanded clinical programs, and dry research
- Developing new Faculty Practice space in St. Luke's Clark Building
- Ongoing moves and renovations at Brodsky, Mount Sinai Downtown Union Square, and 98th Street

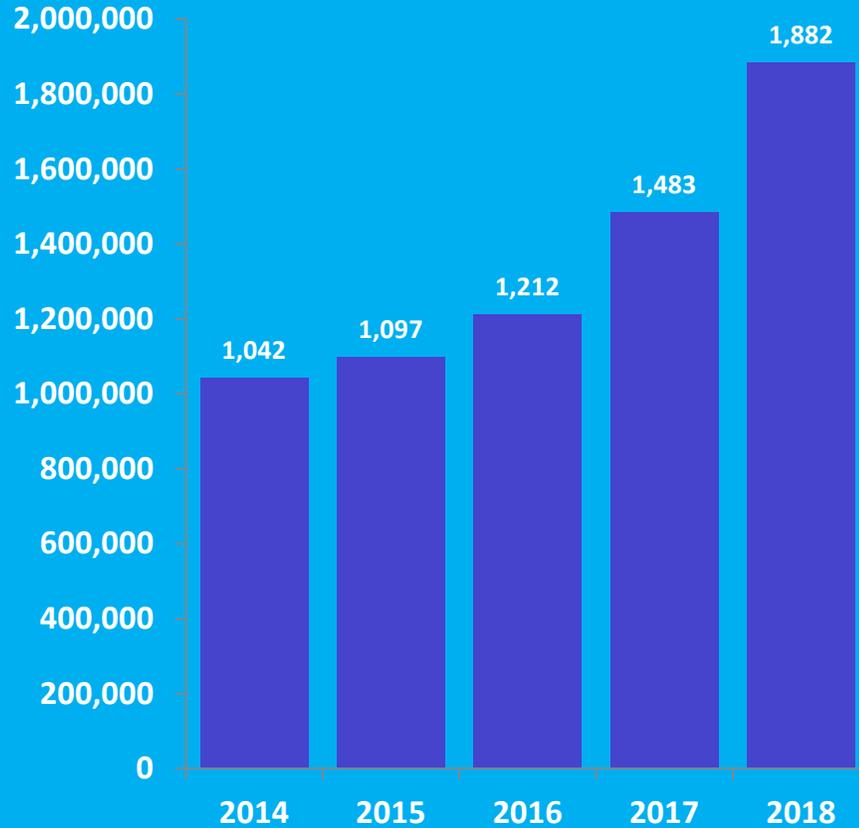
Mount Sinai Doctors Faculty Practice Clinical Activity (Uptown Campus)

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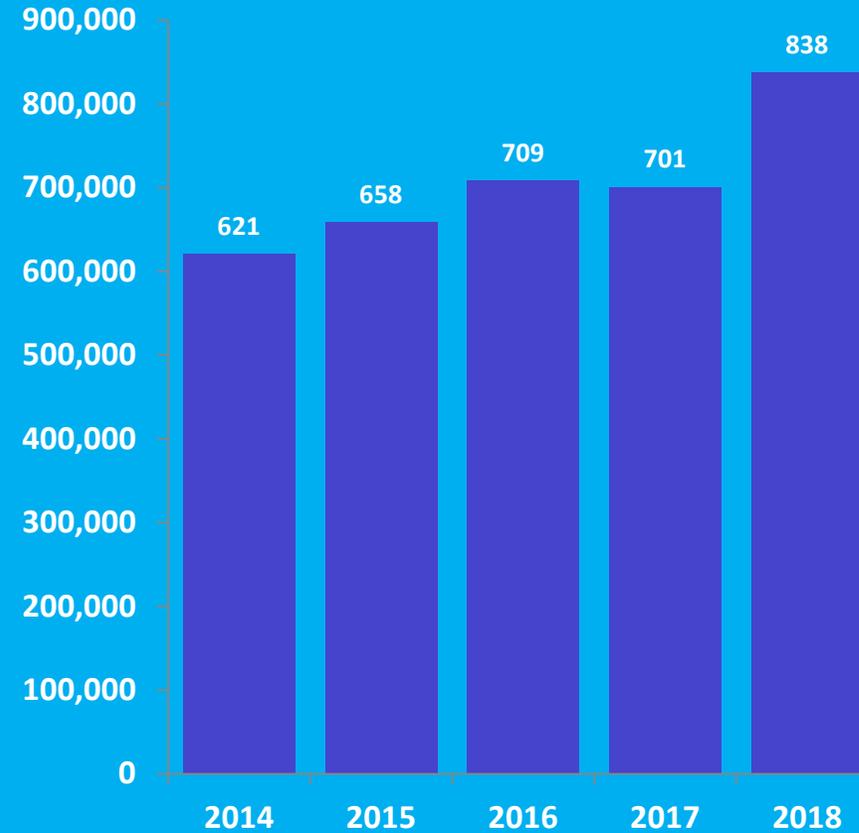


Innovation in Science and Medicine

Ambulatory Encounters 2014 – 2018*



Outpatient Visits 2014 – 2018



*2018 Annualized based on August YTD

Financial Results

The School's goal for 2018 is close to breakeven operating results.

Financial Operating Results:

	<u>Results</u>
2018	Close to breakeven
2017	\$ (1.883) *
2016	\$ (14,062)
2015	\$ (12,894)
2014	\$ 85
2013	\$ 77

* Includes one-time benefit from School's share of Laboratory business sale

Research and FPA growth are major contributors to the School's financial success

Financial Opportunities for Continued Success

Research

- Backlog of unexpended grants exceeds \$350 million.
- Faculty grant funding success rate exceeds national average(2017 grant proposals increased 16.1%).
- NIH Budget increase \$3 billion.
- Rapid clinical trial growth

Licensing / Royalty / Startups

- Elagolix – Royalty Income expected in fourth quarter of 2018 or first quarter of 2019.
- Esketamine – Royalty Income expected in 2019.
- Renalytix AI – IPO in October
- i3 Accelerator Fund.
- Strong pipeline of Development Stage Assets.

Clinical

- Maximize FPA growth opportunities and efficiency.
- Beth Israel, Saint Luke's West and 85th Street Growth.
- Therapeutic Infusion Program.
- Pulmonary Institute.
- Next Generation Health Institute.
- Population Health Management.

Strategic Plan Philanthropy

- \$1.5 billion Campaign Underway..

Financial Challenges to Continued Success

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- **Liquidity constraints from rapid growth.**
- **Member Hospital faculty practice finances.**
- **Clinical space constraints.**
- **Capital Project Funding for existing School buildings.**
- **Investment returns necessary to meet endowment income spending budget.**
- **Growth of Royalty and Licensing income.**
- **Philanthropy support for Strategic Initiatives.**
- **Revenue Diversification.**

Action Plan to Meet Financial Challenges

- **Continue successful Financial Policies and Goals:**
 - School's financial operating results must meet budget using only the 4.5% endowment spending rate investment income.
 - Department's must consistently achieve positive financial results.
 - Clinical Depts minimum 2.5% margin.
 - Basic Sciences, Research Institutes achieve budget targets.
 - Incentive plans encourage revenue and margin growth.
- **Principles of Department Compensation Models consistently followed:**
 - 100% of compensation tied to performance
 - Compensation must be covered by Teaching, Research and Clinical Revenue
 - Quality, productivity and outcomes goals integrated
 - Performance goals for each physician with regular reviews of actual results
 - Productivity Standards.
- **Business plans for all clinical and research initiatives.**
- **Continuous monitoring of financial results with timely corrective actions**
- **Realize Financial Opportunities**

Guiding Principles

1. Take advantage of the size and excellence of the Mount Sinai Health System
2. Establish unrivaled excellence in medical and graduate education
3. Anticipate and fund new areas of research that will result in discovery of novel approaches to disease diagnosis and treatment
4. Invest further in current areas of excellence
5. Power an “Engine of Discovery” to create more IP, more collaborations with Industry, and more Mount Sinai companies

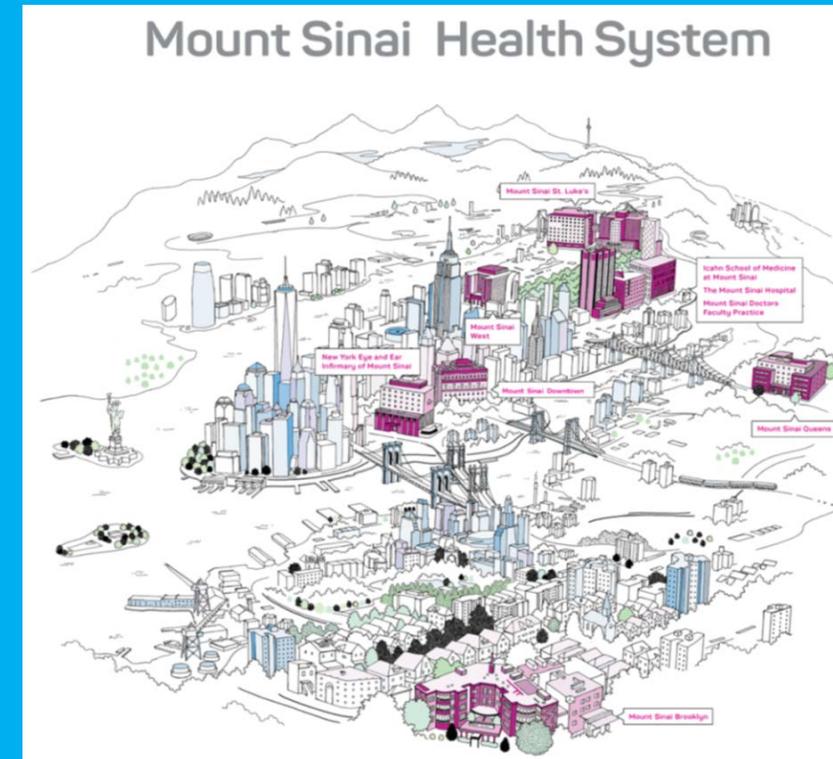
Taking Advantage of the Health System (MSHS)

1. Establish the following new Research Institutes:

- Addiction Institute at Mount Sinai
- Adolescent Health Research Institute
- Exposome Institute
- Institute for Transformative Clinical Trials
- Women's Health Research Institute

2. Expand the scope of research to additional disease areas:

- Diabetes/Obesity
- GI
- Kidney
- Pulmonary
- Pediatrics
- Others



Taking Advantage of the Health System (MSHS)

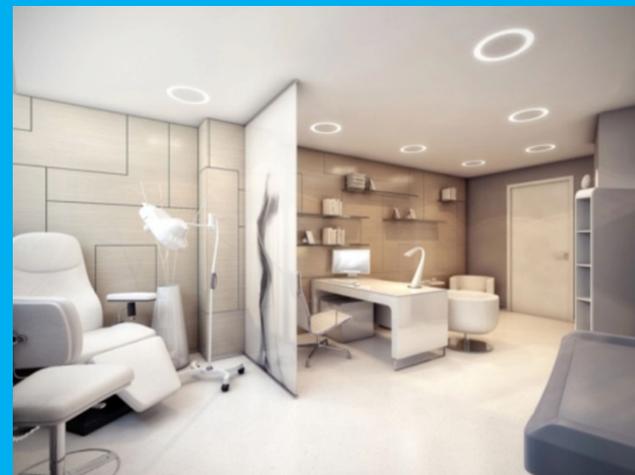
3. Invest in Surgical and Rehabilitation Innovations

- Simulations to guide surgeons
- Exoskeletons - helping people regain use of their limbs

4. New Academic Department: Health System Design & Global Health

- Transformation strategies for optimized healthcare in our local communities and globally
- Next generation care models to pioneer innovative approaches to healthcare

5. Institute for Next Generation Health Care



Unrivaled Excellence in Medical Education

Innovation in Science and Medicine

Diversity of thought, experience and demographics is the key to progress and innovation in medical education, patient care, and biomedical research. It is critically important for creating an environment of learning and discovery that challenges convention and offers every student the opportunity to achieve their fullest potential to impact the health of the world.



Unparalleled Excellence in Graduate Education

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- Spearhead a pedagogical shift to transform biomedical research and its translation into precision medicine.
- Reaffirm Mount Sinai as a leading choice for world-class graduate scientists who will innovate and make breakthrough discoveries that lead to better patient outcomes.
- Curriculum reform that will empower graduate and post-graduate trainees with the necessary skills to break down current barriers and achieve interdisciplinary innovation.

Anticipate & Fund New Areas of Research

Major Investment in Precision Medicine

Precision Medicine is an innovative model of healthcare that customizes diagnosis and treatment for individual patients, based not only on our DNA, but also on everything else in our medical history, lifestyle, and environment.

Precision Medicine promises to yield dramatic advances in diagnosis, treatment, and prevention.

Precision Medicine is a major initiative of the National Institutes of Health and Mount Sinai will lead the way.

Anticipate & Fund New Areas of Research

Major Investment in **Precision Medicine**

Mount Sinai is uniquely poised to lead Precision Medicine efforts nationally:

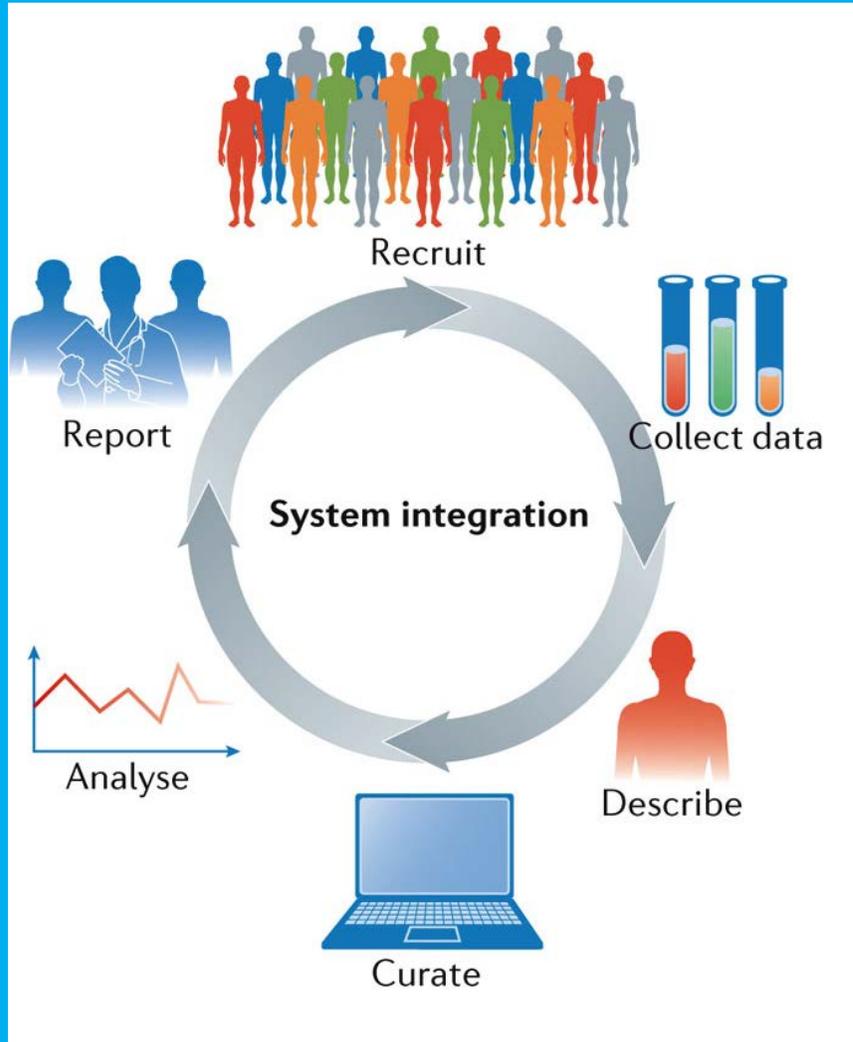
- Large and diverse patient population
- World class interdisciplinary expertise in genomics, big data, supercomputing, and bioinformatics
- Ability to translate from lab directly to the clinic

Precision medicine will transform healthcare delivery:

- Patients are more in control and have better outcomes
- Reduced costs and side effects with more accurate treatments
- Mount Sinai will be the leading institution in promoting wellness.

Anticipate & Fund New Areas of Research

Precision Medicine – The Future of Healthcare



Genetic Vulnerabilities
Medical History
Laboratory Tests
Life History & Environmental Influences

↓

Data Science

↓

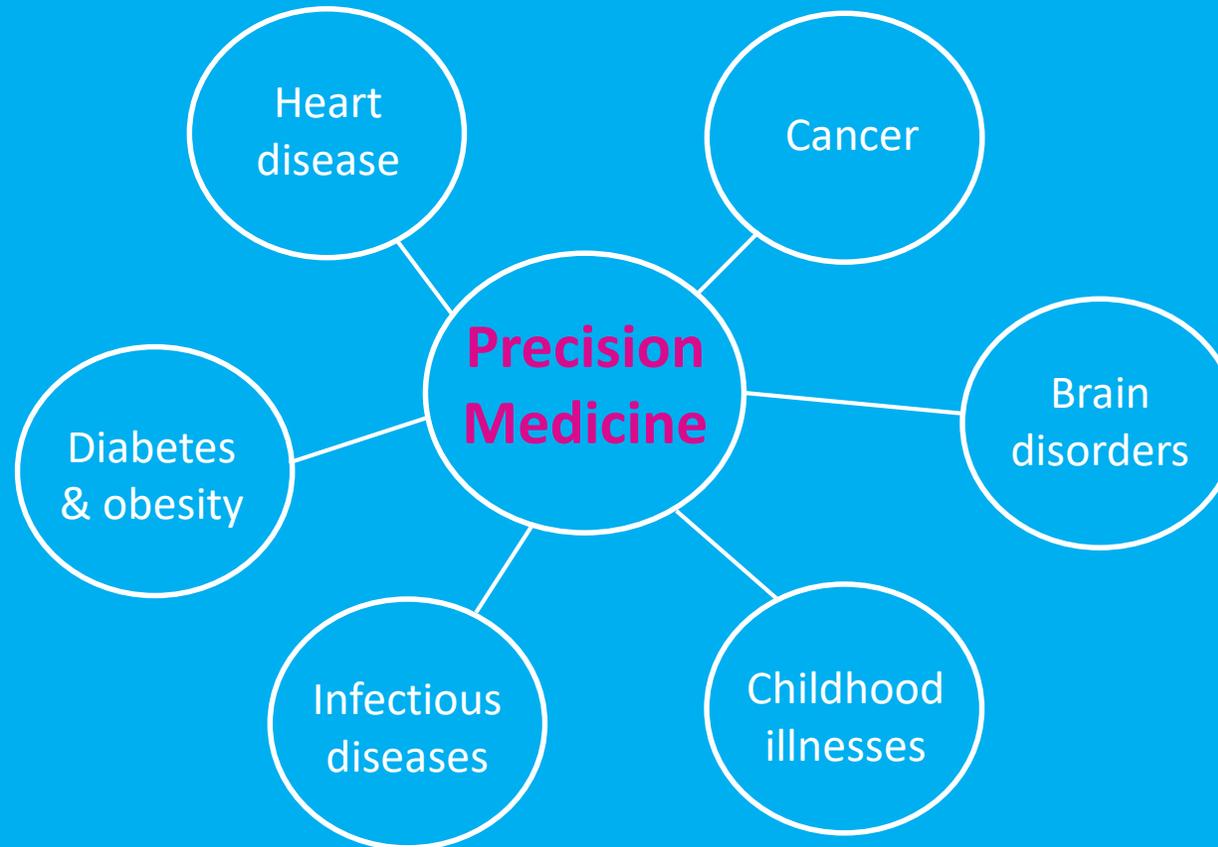
Assessment of Risk
More Accurate Diagnosis

↓

Tailored Treatments and Cures
Ultimately: Disease Prevention

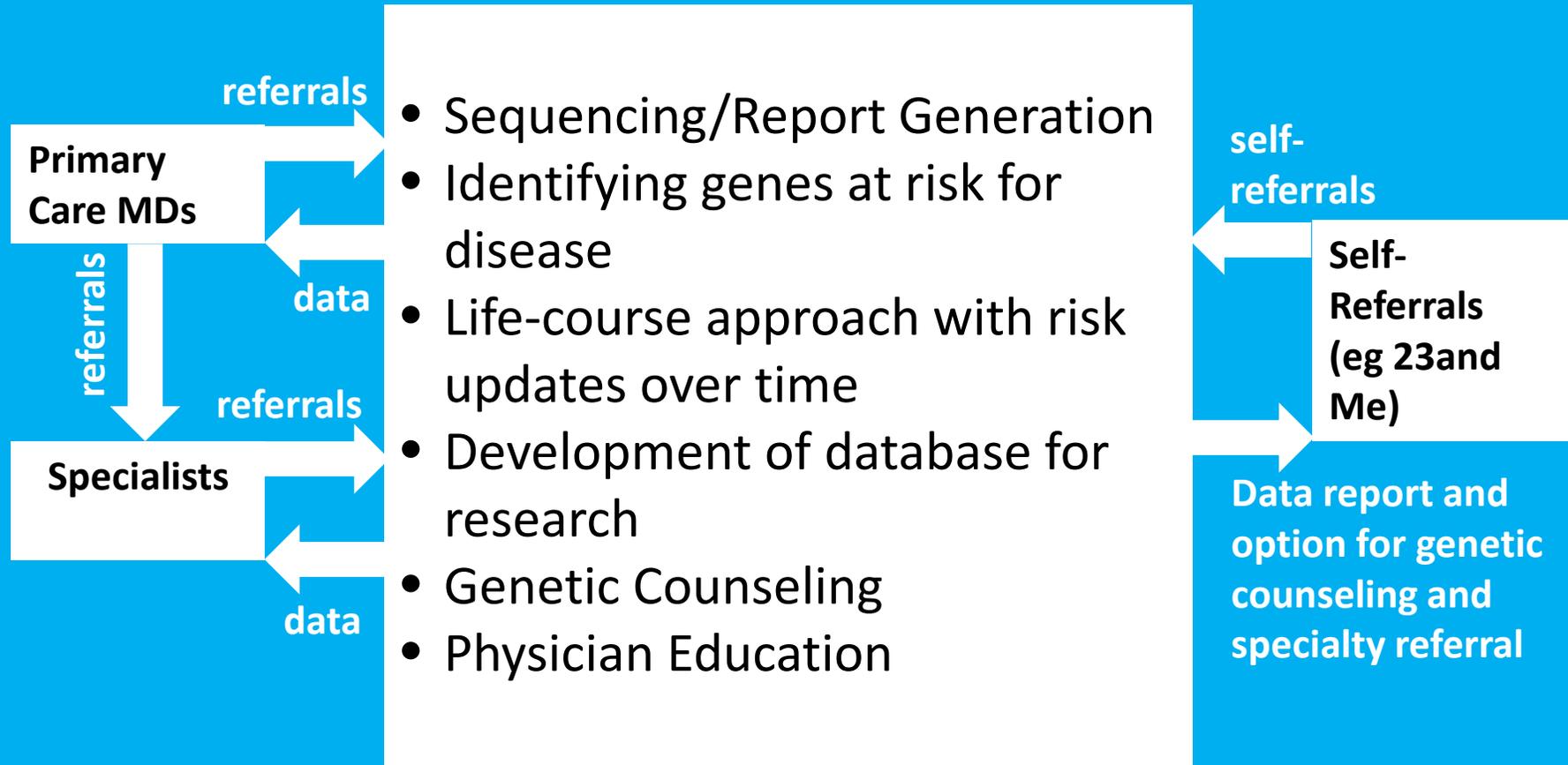
Anticipate & Fund New Areas of Research

Precision Medicine – A New Model of Discovery to Transform Healthcare



Driving advances in all areas of healthcare...

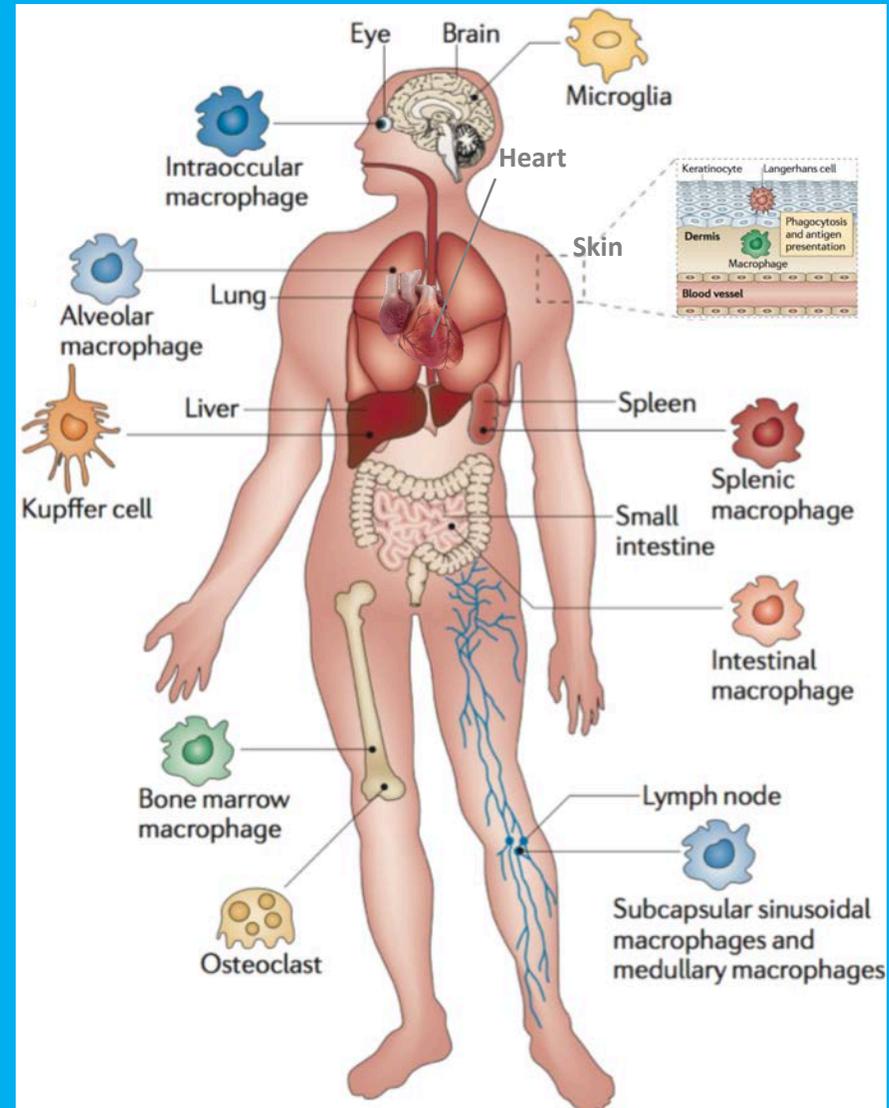
Center for Genomic Health



Anticipate & Fund New Areas of Research

Major Investment in Immunology

Cells of the immune system are present in every organ, influence all disease states, and represent a path toward unprecedented, targeted intervention to treat human illness.



Powering the Engine of Discovery

Mount Sinai Drug Discovery Institute

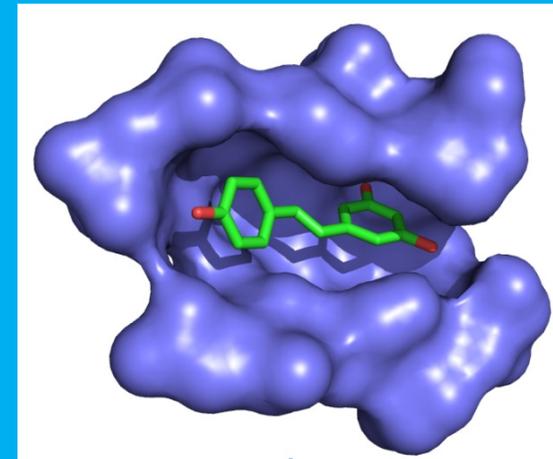
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Establish Centers of Excellence in areas of greatest potential:

1. Neuro-Therapeutics, focused on developing novel therapeutics for brain disorders
2. Discovery Medicine, which will leverage novel insights in human genetics and genomics to develop “precision medicines”
3. Immuno-Therapeutics, to develop human therapeutic antibodies and vaccines that target cancer, heart disease, diabetes, brain disorders, and others
4. Genome Editing, capturing the power of CRISPR-base high-throughput genomic screens to develop innovative therapeutics.

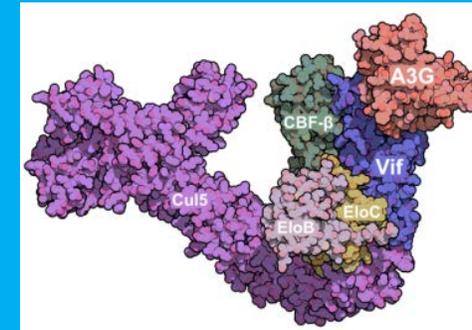
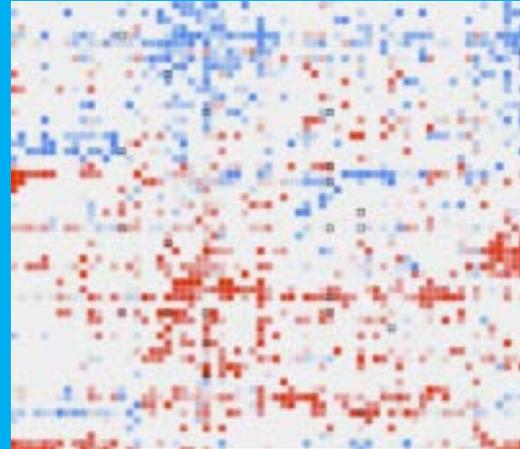


Invest Further in Current Areas of Excellence

Innovation in Science and Medicine

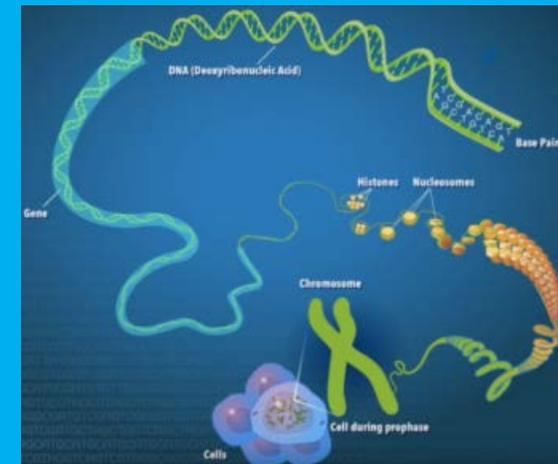
Clinical Sciences:

1. Brain
2. Cancer
3. Diabetes
4. Geriatrics
5. Heart
6. Infectious Disease
7. Others



And the Discovery & Translational Sciences that underpin them:

1. Cell & Developmental Biology (including Stem Cells)
2. Genetics and Genomic Sciences
3. Microbiology (including microbiome)
4. Neuroscience
5. Pharmacological Sciences
6. Others



Strategic Plan – Recruit New Faculty

The goals of the 2006 strategic plan were achieved through the recruitment of 150 faculty in targeted areas.

To achieve the goals of the Strategic Plan, we anticipate that we will need to recruit a similar number of Discovery, Translational, and Computational research faculty.

	<u>Plan</u>
Discovery Science Lab-based research	90
Translational Science Patient-oriented research	50 (>50% research effort)
Computational Science Big data integration (laboratory testing, electronic medical records, etc.)	35

Strategic Plan – Space Needs

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Data Science Initiatives

3 East 101st Street renovation – 45,000 sq. ft.

New Life Science Center

- Cancer Clinical Program
- Discovery Science
- Incubator Space

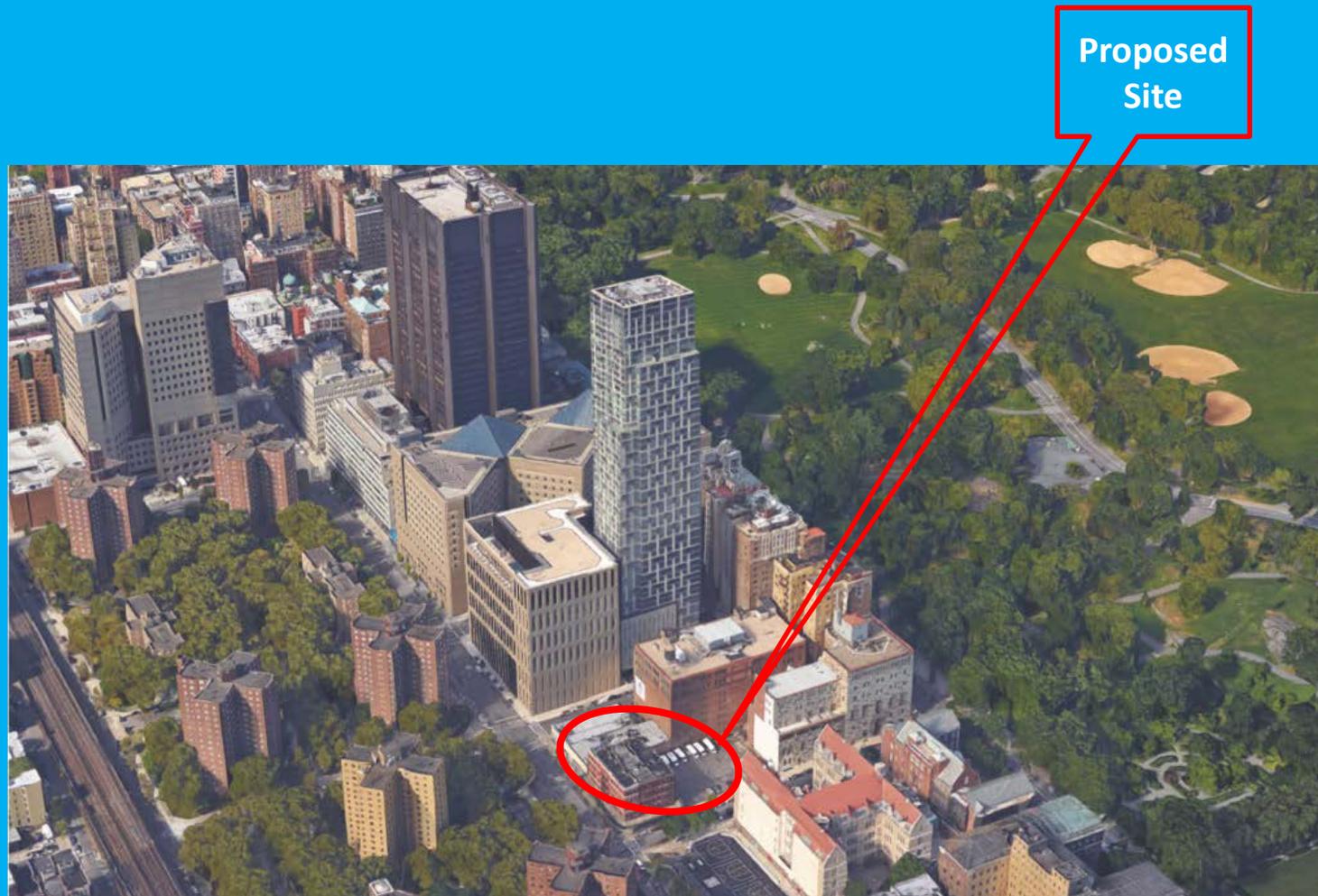
Ultimate Outcomes

Measures of Success for the Strategic Plan:

1. Outstanding publications
2. Increased NIH funding / Higher NIH Ranking
3. More IP, more collaborations with industry, more Sinai companies formed
4. **MOST IMPORTANT:** Discoveries that make the Mount Sinai Health System the nation's best, and improve the lives of our patients, both locally and around the world

Strategic Plan - Proposal

New Life Science Center at 102-103 St and Madison Ave



MSHS Comprehensive Capital Campaign

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1st

Comprehensive Capital Campaign for Mount Sinai Health System

\$1.5 Billion

Initial Goal

\$2.0 Billion

Challenge Goal

2017-2019

Nucleus Phase

2020-2023

Expanded Campaign Phase

7th SINAINnovations

Celebrating 50 years of Contributions to Medicine

Celebrating
50
years
1968-2018



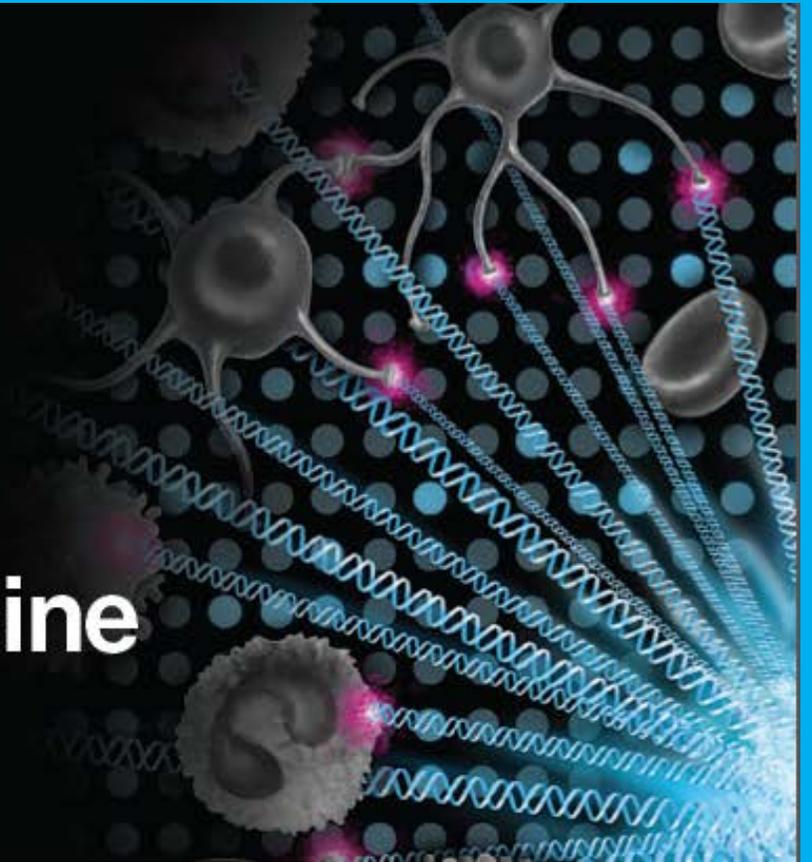
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SINAINnovations

Leading a New Era of Discovery

Innovation in Science and Medicine

October 23-24, 2018
Stern Auditorium



We thank Terry Krulwich, PhD for her Service

- Outstanding scientist, educator, humanist and leader
- First incumbent in the Sharon and Frederick Klingenstein/Nathan Kase, M.D. Professorship
- Joined Mount Sinai in 1970
 - Her research has been continuously supported by NIH for over 40 years
 - Bacteriologist by training – she has a bacterium named for her- *Bacillus krulwichiae*
 - Her work has applications for a wide array of resistant strains environmental pathogens
 - Groundbreaking publications in leading journals
 - Elected Fellow of American Academy of Microbiology and American Association for Advancement of Science
- Dean of the Graduate School from 1981 – 2002
 - One of the first women in US in this role
 - Established a core curriculum for PhD students
 - Created Multi-disciplinary Training Areas (MTAs)
 - Founded and directed the MD-PhD program and secured the federal funding that continues today
- Director, Post Baccalaureate Research Program (PREP)
 - Funding from NIH since 2001 to give recent URM college graduates research experience prior to pursuing STEM careers
 - Over 100 students have participated with a majority continuing onto careers in STEM.
- Dr. Krulwich’s mentoring and support of PREP scholars have been particularly fulfilling to her

In Remembrance

Innovation in Science and Medicine



Pamela Sklar –
Psychiatrist who sought the genetic roots of
mental illness.¹



James F. Holland-
*Physician who helped show
chemotherapy could treat cancer²*



Courtesy Kateri Moore

Ihor Lemischka-
*“Ihor loved science and life, and to him they were
two sides of the same coin*
—Phillip Sharp, Ph.D., Nobel Laureate, MIT³

Sources:
1-Nature
2-Medscape and Washington Post
3-Cell

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