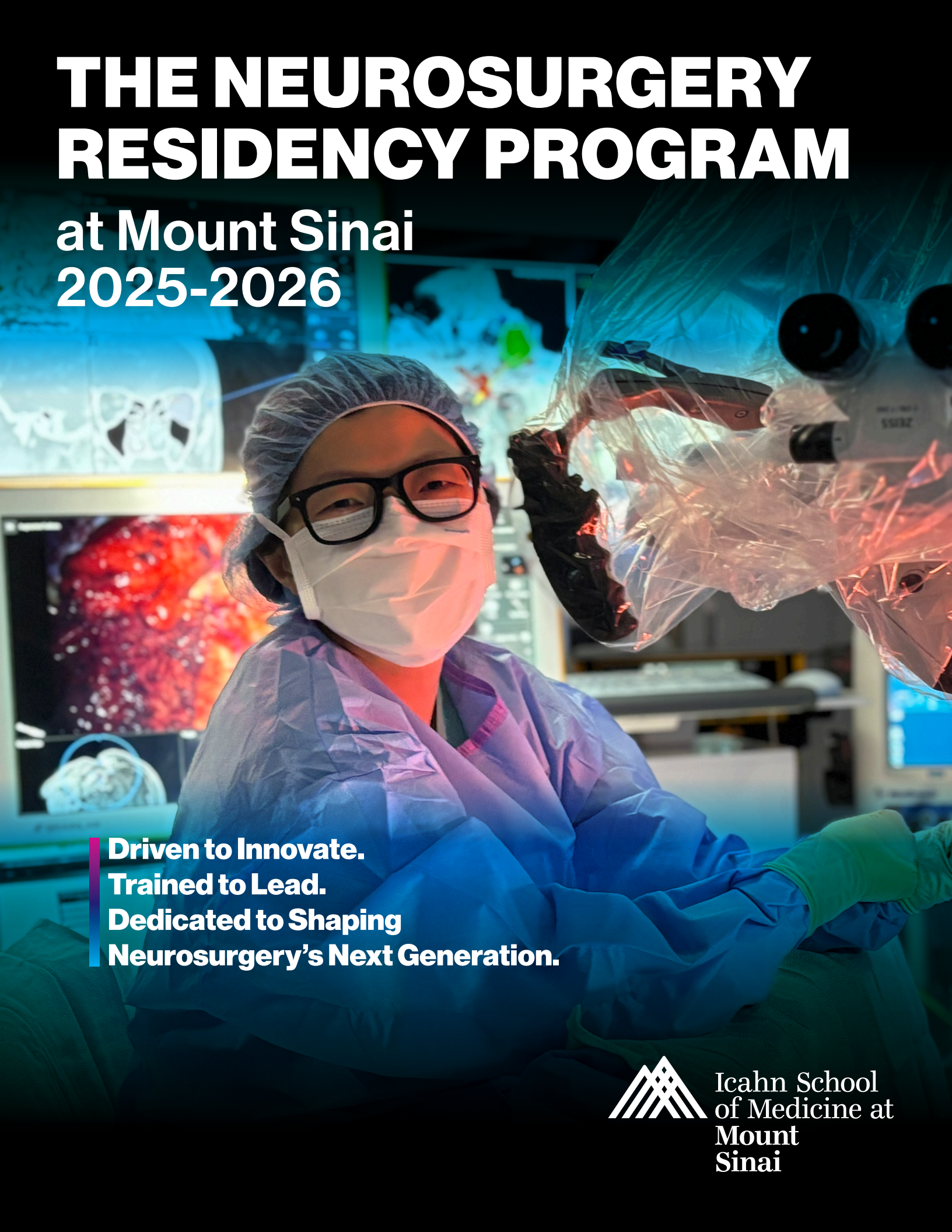
THE NEUROSURGERY RESIDENCY PROGRAM

at Mount Sinai 2025-2026



Driven to Innovate.
Trained to Lead.
Dedicated to Shaping
Neurosurgery's Next Generation.

Icahn School of Medicine at Mount Sinai

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Raj Shrivastava, MD

Christopher Kellner, MD

Peter Morgenstern, MD

Welcome to New York City, We're Excited to Have You Here!

We are proud to introduce you to the outstanding Neurosurgery Residency Program at the Icahn School of Medicine at Mount Sinai! Ours is the largest neurosurgery program in New York City, with a comprehensive breadth of subspecialty cases and research. Our faculty consists of internationally regarded clinicians and scientists. While we have a proven track record in training exceptional academic leaders, we continually strive to improve our curriculum. We are looking for applicants who likewise hope to excel and continually advance their abilities.

For over 75 years, residents have been vital members of our dynamic health care team, providing compassionate patient care while advancing medicine through unrivaled education, research, and outreach in the many diverse communities we serve. We are privileged to offer our residents robust operative volume in every aspect of modern neurosurgery. Our goal is to help you explore and develop your career, while giving you tools to face our field's rapidly evolving challenges. We will work to support your development and maximize your potential every step of the way. That's our commitment to you.

Sincerely,

Raj K. Shrivastava, MD
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Director, Neurosurgery Residency Program
Department of Neurosurgery
Mount Sinai Health System

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Associate Director, Neurosurgery Residency Program
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Peter F. Morgenstern, MD
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Associate Director, Neurosurgery Residency Program
Department of Neurosurgery
Mount Sinai Health System

Need interview tips for Mount Sinai? Hear from our residents who went through the process (and matched)!

Use the camera on your mobile device and scan this QR code to hear the residents and provide insight and advice on the interview process.

No. 1

NIH funding for Neurosurgery in New York State, according the Blue Ridge Institute for Medical Research

507

Journal publications for 2023-25

Mount Sinai Health System
Neurosurgery Faculty

Neurosurgery Administrative Leadership

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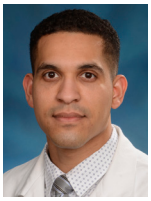

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NEUROENDOVASCULAR SURGERY FELLOW ALUMNI CLASS OF 2015

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NEUROENDOVASCULAR SURGERY FELLOW ALUMNI CLASS OF 2019

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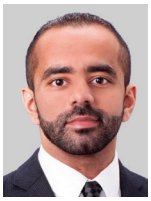

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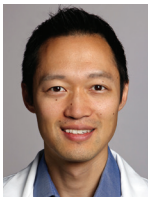
NEUROENDOVASCULAR SURGERY FELLOW ALUMNI CLASS OF 2017



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It's a Mount Sinai Neurosurgeon...

Who is researching the teaching quality in neurosurgery and quantitating outcomes over time.

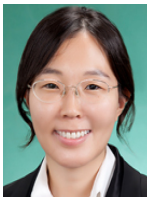
Raymund Yong, MD led a prospective cohort study, published in the *Journal of Neurosurgery*, in which a modified version of the System for Evaluation of Teaching Qualities (SETQ) instrument was administered to Mount Sinai neurosurgery trainees regularly every six months. The subscale score dynamics were analyzed to identify the strongest correlates of faculty teaching performance improvement.

Compared to the three years prior, the three years following SETQ implementation saw significant increases in written board examination and ACGME resident survey scores compared to the national mean and implementation of SETQ was associated with significant improvements in faculty teaching performance as judged by trainees over a four-year period, and guided curricular changes in the authors' training program that resulted in improved educational outcomes.

Use the camera on your mobile device and scan this QR code to read more about Dr. Yong's research in assessing faculty teaching performance and their longer-term impact on improvement and educational outcomes in the *Journal of Neurosurgery*.

Mount Sinai Health System
Neurosurgery Faculty

Assistant Professors



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CLASS OF 2025

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EPILEPSY FELLOW ALUMNI
CLASS OF 2018

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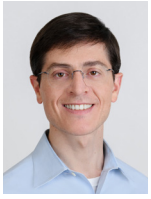

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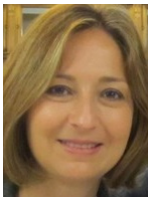
NEUROENDOVASCULAR SURGERY FELLOW ALUMNI CLASS OF 2019



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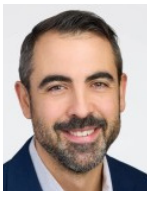

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The Department of Neurosurgery at Mount Sinai Health System

Founded in 1852 as the first Jewish hospital in the United States, the Mount Sinai Health System is now the largest non-sectarian, nonprofit hospital in New York City with eight hospital campuses. The neurosurgery program in Mount Sinai was established in 1914 by Charles A. Elsberg, MD, and stands as a single, health system-wide department. The Neurosurgery Residency Program, established in 1946, has become a nationally recognized leader in neurosurgical training.

MOUNT SINAI NEUROSURGERY IS AWESOME

Mount Sinai neurosurgeons perform the highest volume of brain surgeries in Manhattan.
Source: NYS Department of Health, SPARCS, 2024

Mount Sinai neurosurgeons perform more stroke surgeries than any other team in the United States.
Source: Acuity MD

Patients who have undergone stroke surgery at Mount Sinai have a 25 percent better chance of returning to independence, as measured by independence at three months.
Source: National Comprehensive Stroke Center and StrokeNet Benchmarks, The American Heart and Stroke Association: Get with the Guidelines Database

Mount Sinai Neurosurgery

1852 Hospital founded
1914 Neurosurgery service established
1932 Neurosurgery department established
1946 Neurosurgery residency training program established
2014 Mount Sinai merged with Continuum Health Partners

Service Lines and Divisions

Cerebrovascular Disorders & Stroke
Skull Base & Cranial Base Surgery
Neuromodulation (Movement & Psychiatric Disorders)
Pituitary Tumors
Benign Brain Tumors
Adult & Pediatric Epilepsy
Surgical Neuro-Oncology
Spinal Disorders
Neurotrauma
Neurocritical Care
Pain Management
Cranial Reconstruction
Peripheral Nerve
Pediatric Neurosurgery
Pediatric Cerebrovascular Disorders
General Neurosurgery
Biomedical Design & Engineering

Procedures and Treatments

Open Neurosurgical Procedures **3,400+**
Endovascular Procedures **2,200+**
Strokes Treated **300+**

Neurosurgery Operating Rooms

The Mount Sinai Hospital **5 - 6**
Mount Sinai West **2-3**
Mount Sinai Morningside **1**
Mount Sinai South Nassau **1**
NYC Health + Hospitals/Elmhurst **1**

Endovascular Operating Rooms

The Mount Sinai Hospital **4**
Mount Sinai West **2**
NYC Health + Hospitals/Elmhurst **1**
Mount Sinai Queens **1**
Mount Sinai South Nassau **1**

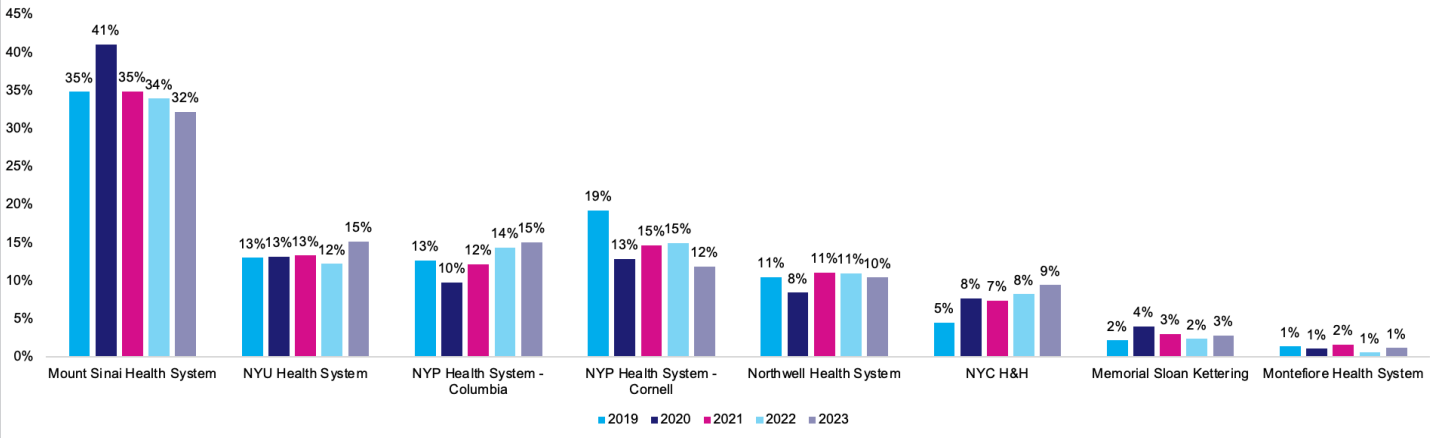
Neurosurgery Faculty

Academic and Clinical Faculty **50**
Academic Faculty **2**
Voluntary Faculty **10**
BioDesign Faculty **4**
Scientists and Researchers **2**

Neurosurgery Trainees

Neurosurgery Residents **13**
Pre-Residency Fellows **5**
Fellows **10**

Mount Sinai Performs the Most Brain Surgeries in Manhattan



Joshua Bederson, MD

Welcome from the System Chair of Neurosurgery

The Department of Neurosurgery at the Mount Sinai Health System is, first and foremost, a residency training program. It is my highest priority to develop the next generation of this nation's top neurosurgeons, and everything we do in the department is synergistic with that goal.

Over the past several years, the department has seen unprecedented growth, making us one of the largest programs in the country. Our 16 clinical service lines focus on even the rarest neurosurgery conditions into Centers of Excellence.

We have recruited some of the nation's leading neurosurgeons who are engaging, innovative, experienced, and committed to exceptional outcomes for their patients. We are globally recognized for our pioneering approaches and breakthroughs in treatments rooted in a supportive, team-oriented environment that encourages diverse viewpoints and collaboration.

Our faculty run high-volume, research-driven clinical programs and prioritize the training and mentoring of our bright residents, encouraging all to perform at their highest level. Ultimately, our goal is to lead you towards a superb academic neurosurgery career. Thank you so much for coming to learn about the people here and our program.

Sincerely,

Joshua B. Bederson, MD
System Chair of Neurosurgery
The Leonard I. Malis, MD / Corinne and Joseph Graber Professor of Neurosurgery
Executive Director, Mount Sinai BioDesign
Mount Sinai Health System

Meet the Mount Sinai Neurosurgery Resident Physicians

Neurosurgery Chief Residents

Alexander J. Schüpper, MD
Chief Neurosurgery Resident PGY-7
@neurofitnessmd

Undergrad
Johns Hopkins University

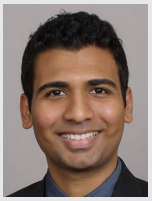
Medical Degree
University of California, San Diego
School of Medicine

Next Stop
Shriners Children's Philadelphia
Barrow Neurological Institute

"In choosing a neurosurgery residency program, Mount Sinai checked all the boxes. The institution had what I was looking for, and the faculty and residents were incredibly welcoming. The program features an incredibly busy clinical service, a great operative experience throughout all seven years of residency, innumerable research opportunities, and provides a strong foundation for training. It also offers the flexibility to tailor our residency to how we want to grow as neurosurgeons."

Use the camera on your mobile device and scan this QR code to watch Alex's video biography and hear in his own words about his residency experience.





Abhiraj D. Bhimani, MD
Chief Neurosurgery Resident PGY-7
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Undergrad
Loyola University of Chicago

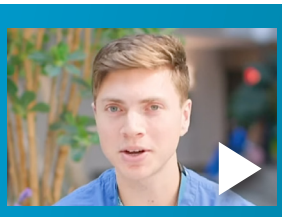
Medical Degree
University of Illinois
College of Medicine at Chicago

"Mount Sinai has extraordinary clinical training complemented by a very high patient volume. Coming from Chicago, I found New York City to be the perfect match in terms of size and diversity. It is a unique combination of a nationally recognized hospital in a world-class city, with equally exceptional neurosurgeons. Mount Sinai has outstanding faculty that are dedicated to their mentorship towards the residents. I enjoy the experience of being exposed to a diverse group of patients and a multidisciplinary team of providers."

Use the camera on your mobile device and scan this QR code to watch Abhi's video biography and hear in his own words about his residency experience.



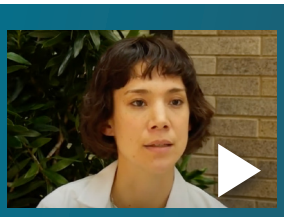

Born and raised in Laguna Beach, California, Ansley's path to neurosurgery was formed from her two passions, art and neuroscience.



Originally from Syracuse, New York, Dan spent the last 8 years studying in CA, first at USC for undergrad then completing medical school at UCSF.

Jack chose Mount Sinai's neurosurgery residency program for its high operative volume and case diversity, strong research opportunities, and culture of innovation.

Due to cultural and religious restrictions, Halima is the first woman in her family to pursue education beyond high school.



Born in Japan and raised in New York, Emily studied political science in college but realized she wanted to pursue a career in medicine after working at a VA hospital.

Neurosurgery Residents

Halima Tabani, MD | PGY-6
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Medical Degree
Aga Khan University Hospital

Skull Base Research Fellowship
University of California, San Francisco
School of Medicine

Cerebrovascular Research Fellowship
University of California, San Francisco
School of Medicine

Neurosurgery Pre-Residency Fellowship
Icahn School of Medicine at Mount Sinai

Brandon Philbrick, MD | PGY-5
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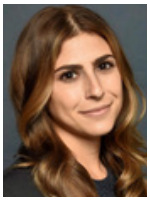
Undergrad
Georgia Institute of Technology

Medical Degree
Emory University School of Medicine



Ansley Unterberger, MD | PGY-3
@ansleyunterberger

Undergrad
Emory University

Medical Degree
University of California, Los Angeles
David Geffen School of Medicine

Maikerly Reyes, MD | PGY-2
@maikerly

Undergrad
Brown University

Medical Degree
Sidney Kimmel Medical College
Thomas Jefferson University

Charlotte Michaelcheck, MD, MPH | PGY-1
@cmichaelcheck

Undergrad
Middlebury College

Masters of Public Health
Columbia University Mailmen School of Public Health

Medical Degree
Mayo Clinic Alix School of Medicine

Matthew Carr, MD | PGY-6
𝕏 @MatthewCarrMD @matthewcarrmd

Undergrad
University of Maryland

Medical Degree
Virginia Commonwealth University
School of Medicine

Emily K. Chapman, MD | PGY-4
𝕏 @kojima_emily @emilykojima

Undergrad
Williams College

Medical Degree
Icahn School of Medicine at Mount Sinai

Daniel Cummins, MD | PGY-3

Undergrad
University of Southern California

Medical Degree
University of California, San Francisco
School of Medicine

Ziad Rifi, MD | PGY-2

Undergrad
University of California, Berkeley

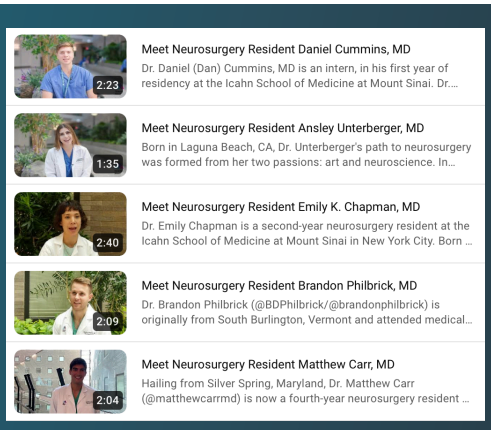
Medical Degree
University of California, Los Angeles
David Geffen School of Medicine

Jack Zhang, MD, MSc | PGY-1

Undergrad
University of Rochester

Masters of Science
Icahn School of Medicine at Mount Sinai

Medical Degree
Icahn School of Medicine at Mount Sinai



There's only so much you can learn about us from reading!

We encourage you to check out our department and personal social media channels to hear from the neurosurgery residents themselves!

Use the camera on your mobile device and scan this QR code to watch videos about our residents and the residency program.

A Diverse Community of Neurosurgery Residents

Our residency program offers comprehensive financial, training, and housing benefits to support your success and well-being.

Financial Benefits

- Pair of surgical loupes
- Annual travel fund for presenting research at and attending scholarly meetings
- Annual resident book fund
- Annual resident research grant
- Subsidized housing in hospital-owned buildings
- Monthly commute reimbursement (for unlimited OMNY)
- Free shuttle service between the Mount Sinai Health System campuses
- Complementary Uber ride-share for late night travel
- Monthly meal tickets for the hospital cafeteria
- Free meals for on-call residents
- Competitive salary to offset NYC living expenses
- Excellent health benefits

Training Benefits

- Operate almost every day during Junior years
- Limited weekday call responsibilities during Junior years
- Early chief experience at PGY-4/5 level
- Dedicated protected academic day every Wednesday

Resident Housing

- Housing options for incoming singles, couples, and families
- Housing options available throughout New York City, including residents in Brooklyn

A Residency Life in the Heart of New York City

Our neurosurgery residents come from across the United States and around the world, bringing diverse backgrounds, perspectives, and experiences that strengthen our program. This diversity fosters collaboration, innovation, and a welcoming culture where residents support one another and thrive throughout seven years of training.

Living and training in New York City means being at the center of one of the most dynamic and vibrant cities in the world. Just steps from Central Park, residents have access to world-class cultural institutions, diverse neighborhoods, incredible food, and endless opportunities to explore during time away from the hospital. It is a city full of energy and possibility, offering a lifestyle unmatched anywhere else.

Lifestyle

Our residents' diversity extends beyond geography to include a wide range of personal stories and passions. Together, we have built a community that is collaborative, supportive, and fun—helping each other navigate the challenges of training while enjoying everything the city has to offer.

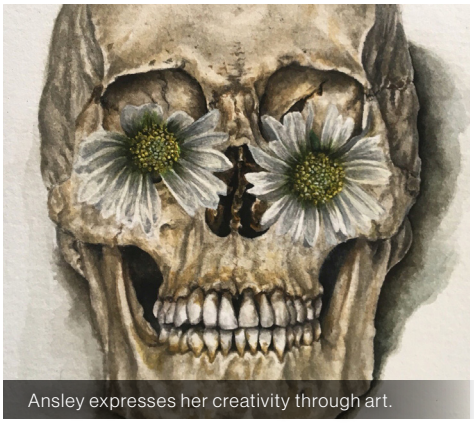
Wellness

The Department of Neurosurgery at the Icahn School of Medicine at Mount Sinai is reframing the conversation around resident wellness. We design systems to maximize education and minimize non-educational work, recognizing that peak performance requires a commitment to wellness both inside and outside the hospital.

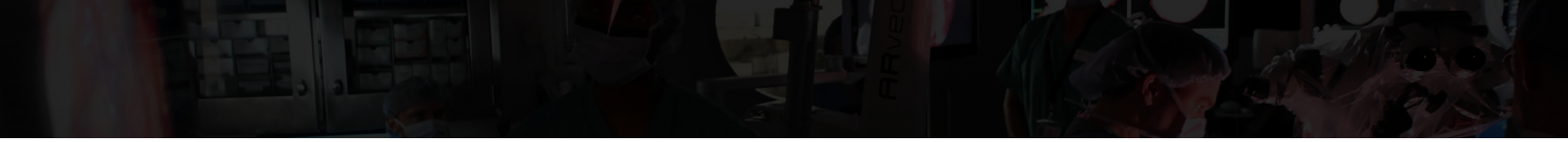
Resident Housing

Mount Sinai provides subsidized housing options for incoming residents—whether single, part of a couple, or moving with a family. Housing is available across New York City, with convenient options in both Manhattan and Brooklyn.

Charlotte enjoys making people laugh.


Ansley expresses her creativity through art.


Jack enjoys traveling and exploring new places.



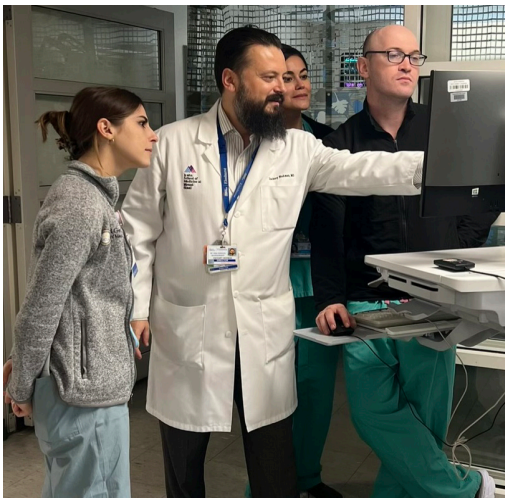
	Clinical Interest	Favorite New York City Activity	General Interests	Did You Know?
ALEX **Villanova** **Pennsylvania**	• **Fluorescence-Guided Surgery** • **Gliomas**	Eating at new brunch places on the street with my friends.	• Crossfit • Baseball	"I'm obsessed with all Philly sports. Phillies, Eagles, 76ers, Flyers, etc. All day, every day!"
ABHI **Glendale Heights** **Illinois**	• **Exosomes** • **Bioinformatics**	Going for a daily run along the reservoir in Central Park.	• Meditation • Running	"I'm a vegetarian and have a cache of menus from vegetarian and vegan restaurants."
HALIMA **Pakistan & California**	• **Cerebrovascular Surgery** • **Skull Base Surgery**	Walking in Central Park and trying out new restaurants with friends.	• Painting • Traveling	"I have an abundance of frequent flyer milers as I travel to California every alternative weekend."
MATT **Silver Spring** **Maryland**	• **Spinal Surgery** • **Neuro-Oncology**	Eating H&H Bagels, the type of "New York bagels" you always hear about.	• Golf • Dogs (Pugs!!!)	"I'm tall... like *really* tall. I sometimes need to stoop while operating."
BRANDON **South Burlington** **Vermont**	• **Skull Base Surgery** • **Medical Device Design**	Walking around all of the iconic neighborhoods and parks.	• Podcasts • Stock market	"I can watch hours and hours of TikTok videos...they're so addicting!"
EMILY **Japan & New York**	• **Cerebrovascular Surgery** • **Clinical Trials**	Going to jazz clubs and visiting the Metropolitan Museum of Art.	• Soccer • Cooking	"I'm an avid backpacker and have backpacked 80 miles through Chilean Patagonia."
ANSLEY **Laguna Beach** **California**	• **Neuro-Oncology** • **Skull Base Surgery**	Going to art exhibitions and drag shows.	• Painting • Drawing • Cats	"I have an uncanny ability to memorize song lyrics and movie quotes. Try me!
DAN **Syracuse** **New York**	• **Functional Surgery** • **Cerebrovascular Surgery**	Going to see live music and exploring new neighborhoods.	• Comedy • Running	"I eat hummus almost every day."
MAIKERLY **The Bronx** **New York**	• **Skull Base Surgery** • **Neuro-oncology**	Biking, shopping for vinyl, exploring new restaurants, live music.	• Music • Songwriting	"I went to LaGuardia performing arts and took AP environmental with Timothée Chalamet."
ZIAD **Tripoli** **Lebanon**	• **Neuromodulation** • **Chronic Pain & Disease**	Searching for the best bakeries.	• Cats • Anime	" I speak three languages! English, French, and Arabic."
CHARLOTTE **Upper East Side** **New York**	• **Pediatric Neurosurgery** • **Functional Neurosurgery**	Meeting family and friends at home and all of our favorite restaurants.	• Painting • Comedy	"I did shark research that led to a publication protecting the Exumas' sharks from overfishing."
JACK **Manhattan & Queens** **New York**	• **Neuro-oncology** • **Spine-oncology**	Chelsea gallery opening nights for free art, wine, and parties.	• Physics • The Knicks	"I bumped into Action Bronson outside the Flushing Library. He was eating lamb skewers."

Neurosurgery Presence Throughout New York

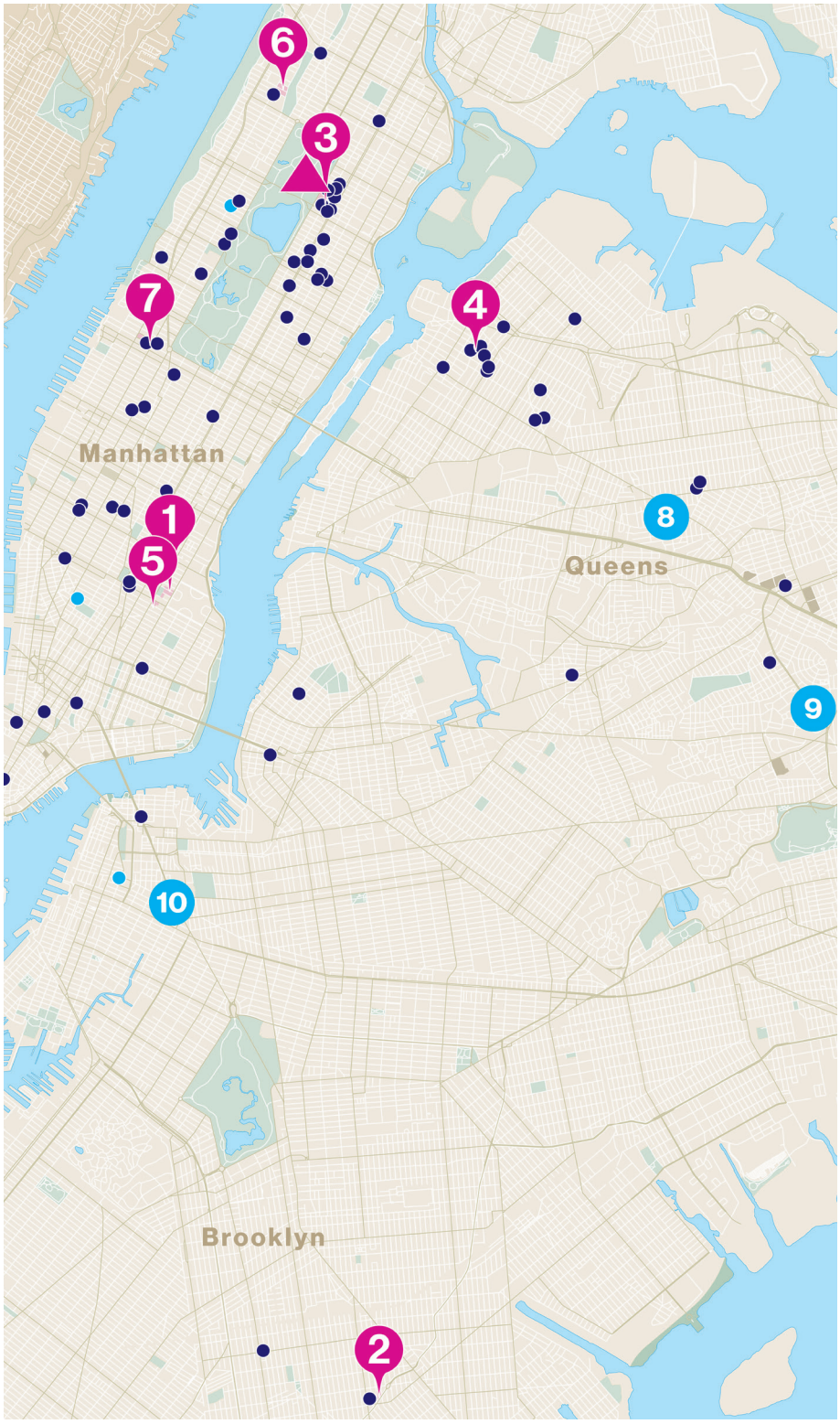
Serving a broad and diverse community across New York, Mount Sinai provides residents with exposure to patients from a wide range of backgrounds, medical conditions, and socioeconomic settings. This diversity enriches training, fostering culturally competent care and preparing residents to manage complex neurosurgical cases in any population.

Mount Sinai Health System
The Mount Sinai Hospital
Mount Sinai Brooklyn
Mount Sinai Queens
New York Eye and Ear Infirmary of Mount Sinai
Mount Sinai Morningside
Mount Sinai West
Mount Sinai South Nassau
Icahn School of Medicine at Mount Sinai

Department of Neurosurgery Member Hospitals
NYC Health + Hospitals/Elmhurst
NYC Health + Hospitals/Queens
The Brooklyn Hospital



With more than 5,300 neurosurgical procedures per year, Mount Sinai's neurosurgery program offers one of the largest neurosurgical caseloads in New York. This allows our residents to receive a significant neurosurgery operative experience. The large-scale ambulatory network and a range of inpatient and outpatient services, from community-based facilities to tertiary and quaternary care, provides an extensive referral base for neurosurgical care.



Neurosurgery Residency
Rotation Schedule

FIRST YEAR **PGY-1**	**Intern** NYC Health + Hospitals/Elmhurst The Mount Sinai Hospital	**Three Months Research Elective** **Six Months Clinical Neurosurgery and Neurotrauma** NYC Health + Hospitals/Elmhurst **Three Months Neurosurgical Intensive Care Unit** The Mount Sinai Hospital
SECOND YEAR **PGY-2**	**Junior Resident** The Mount Sinai Hospital	**Twelve Months Junior Resident** The Mount Sinai Hospital ***LIMITED CALL RESPONSIBILITIES (Other than Weekends)***
THIRD YEAR **PGY-3**	**Junior Resident** The Mount Sinai Hospital	**Twelve Months** The Mount Sinai Hospital ***LIMITED CALL RESPONSIBILITIES (Other than Weekends)***
FOURTH YEAR **PGY-4**	**Enrichment Elective**	**Twelve Months Elective and Research Time** Academic research vs focused clinical experience ***PROTECTED TIME***
FIFTH YEAR **PGY-5**	**Chief Resident Elective** Mount Sinai West	**Twelve Months Epilepsy, Endovascular Surgery, Pediatrics, and Radiosurgery** Mount Sinai West
SIXTH YEAR **PGY-6**	**Senior Resident** The Mount Sinai Hospital **Chief Resident** NYC Health + Hospitals/Elmhurst	**Six Months Senior Resident** The Mount Sinai Hospital **Six Months Chief Resident** NYC Health + Hospitals/Elmhurst
SEVENTH YEAR **PGY-7**	**Chief Resident** The Mount Sinai Hospital **Fellowship/Elective**	**Twelve Months Chief Resident** The Mount Sinai Hospital **Six Months Transition to Practice Fellowship/Elective**

Resident Spotlight

Alex Schüpper, MD

Wellness-driven and performance-focused

Alex Schüpper shows that even in the most demanding training environments, residents can prioritize balance and wellness. An avid runner, he has competed in races from local 5Ks to world-class marathons, achieving a personal best of 1:15:41 at the Brooklyn Half Marathon and training for the London Marathon. His commitment to endurance sports reflects not only physical strength but also the resilience needed for neurosurgery. Outside of running, Alex embraces a well-rounded lifestyle, whether snowboarding in Vermont, cooking at home, working out with co-residents, or exploring New York City with his dog. His approach demonstrates that residency doesn't have to mean burnout; instead, it can be a time to cultivate both professional excellence and personal fulfillment.

Academic Enrichment Experience
For Neurosurgery Residents

Imagination Allows Infinite Opportunities

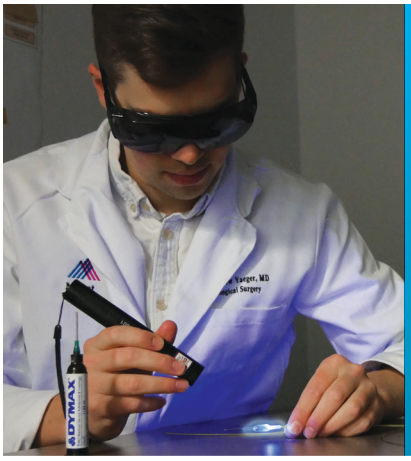
Every neurosurgery resident completes at least one dedicated academic "enrichment" year. This tailored experience, whether pursued at Mount Sinai or beyond, provides protected time, resources, and mentorship to explore individual passions and develop future career paths.

Technology and Innovation
- Biomedical design
- Device development
- Artificial intelligence
- Enfolded fellowships

Research
- Clinical
- Basic science

Internships
- Industry
- Policy
- Government

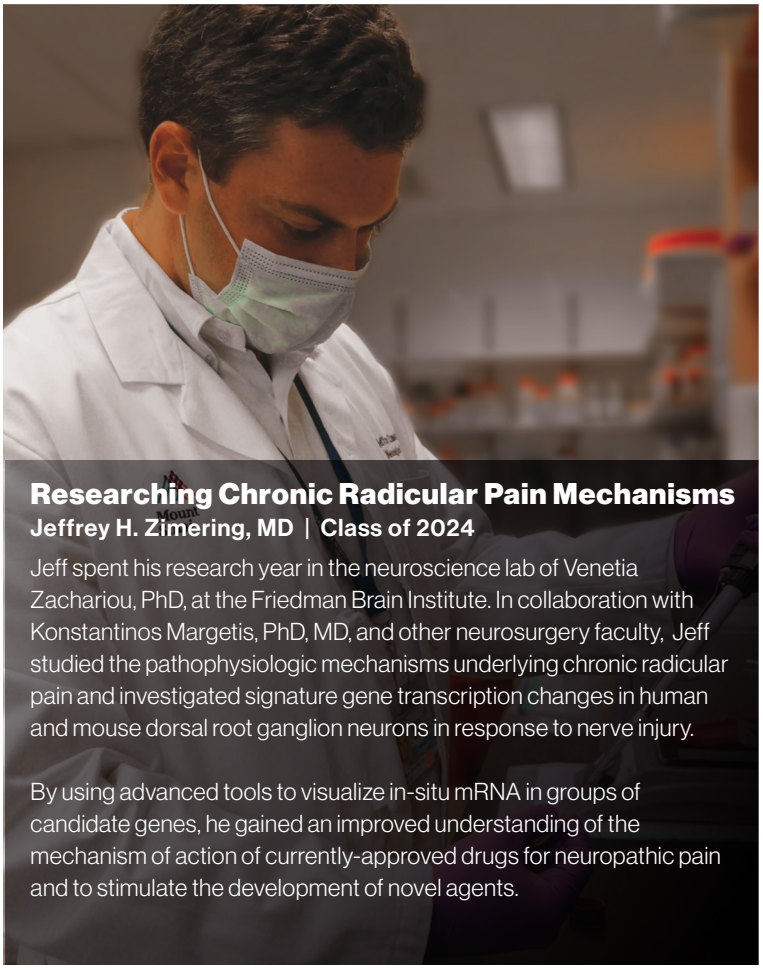
Graduate Programs
- Public health
- Global health
- Business
- Administration
- Health science
- Clinical science



Designing and Patenting Cerebrovascular Medical Technology

Kurt A. Yaeger, MD | Class of 2022

During his elective time, Kurt split the year completing both a fellowship in neuroendovasuar surgery and a fellowship in medical device development with Mount Sinai BioDesign. As an endovascular fellow, he performed 450 endovascular cases (both diagnostic angiograms and advanced treatment procedures) and served as the on-call endovascular fellow for the Mount Sinai Health System. During his biodesign fellowship, Kurt assisted in the development of a novel detachable balloon microcatheter for the treatment of cerebrovascular pathology requiring distal embolization, resulting in the submission of two patents and collaboration with manufacturers to develop a prototype. Additionally, he engaged industry partners to commercialize this invention.

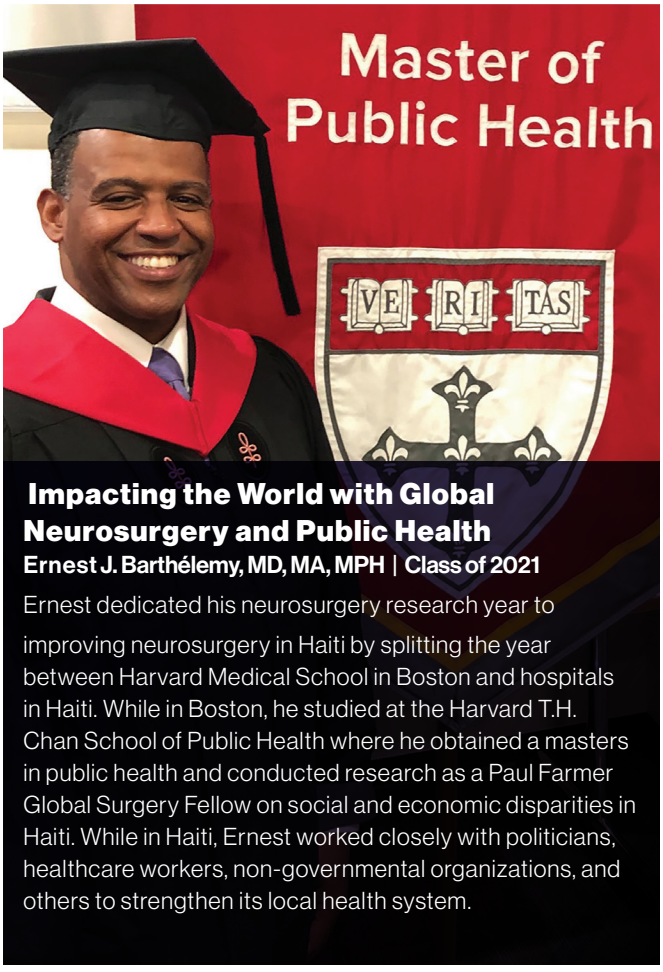


Researching Chronic Radicular Pain Mechanisms

Jeffrey H. Zimering, MD | Class of 2024

Jeff spent his research year in the neuroscience lab of Venetia Zachariou, PhD, at the Friedman Brain Institute. In collaboration with Konstantinos Margetis, PhD, MD, and other neurosurgery faculty, Jeff studied the pathophysiologic mechanisms underlying chronic radicular pain and investigated signature gene transcription changes in human and mouse dorsal root ganglion neurons in response to nerve injury.

By using advanced tools to visualize in-situ mRNA in groups of candidate genes, he gained an improved understanding of the mechanism of action of currently-approved drugs for neuropathic pain and to stimulate the development of novel agents.



Impacting the World with Global Neurosurgery and Public Health

Ernest J. Barthélemy, MD, MA, MPH | Class of 2021

Ernest dedicated his neurosurgery research year to improving neurosurgery in Haiti by splitting the year between Harvard Medical School in Boston and hospitals in Haiti. While in Boston, he studied at the Harvard T.H. Chan School of Public Health where he obtained a masters in public health and conducted research as a Paul Farmer Global Surgery Fellow on social and economic disparities in Haiti. While in Haiti, Ernest worked closely with politicians, healthcare workers, non-governmental organizations, and others to strengthen its local health system.

Neurosurgery Resident
Publications, Research, and Awards

No. 1 U.S. NIH Funding for Neurosurgery in New York State
Blue Ridge Institute for Medical Research

No. 15 U.S. NIH Funding for Neurosurgery in United States
Blue Ridge Institute for Medical Research

507 Journal Publications
2023 - 2025

Celebrating Nearly 80 Years of Neurosurgery Residency Training

READ THE ARTICLE

In 2022, we published a paper to highlight achievements in surgical growth, outcomes, research, recruitment, technology, and diversity in Mount Sinai's residency training.

Seventy-Five Years of Neurosurgery Residency Training at The Mount Sinai Hospital
Journal of Neurosurgery
Carr MT, Zimering JH, Beroza JM, Melillo A, Kellner CP, Mocco J, Post KD, Bederson JB, Shrivastava RK (2022)

Our research team provides residents with assistance for everything; including submission, data acquisition and analysis, funding requests, and compliance while offering weekly virtual office hours to support them along the way. This gives you the opportunity to engage more deeply in these fields, build robust academic research portfolios, and translate your work into peer-reviewed journal publications that advance neurosurgical knowledge.

Selective Representation of High-Impact Publications

Journal of Neurosurgery

Somatic AKT1 Mutations May Confer Increased Risk of Preoperative Seizures in Meningiomas
Unterberger A, Chapman EK, et al (2025)

5-Aminolevulinic Acid for Enhanced Surgical Visulization of High-Grade Gliomas: A Prospective, Multicenter Study
Schupper AJ, et al (2021)

World Neurosurgery

Total Uncinatectomy in Cervical Disc Replacement.
Schupper AJ, et al (2025)

Surgical Management of Thoracic Dorsal Arachnoid Webs: A 10-Year Single-Institution Experience
Carr MT, Bhimani AD, Schüpper AJ, et al (2025)

Delayed Screw Migration Following Anterior Cervical Discectomy and Fusion.
Carr MT, et al (2025)

Comparison of Surgical Outcomes of Microdiskectomy Procedures by Patient Admission Status
Chapman EK, et al (2021)

Clinical trials in spinal tumors: a two-decade review
Chapman EK, et al (2022)

External Ventricular Drain Placement Teleproctoring using a Novel Camera-Projector Navigation System: A Proof-of-Concept Study
Philbrick BD, et al (2023)

Augmented Reality in Spine Surgery
Schupper A, et al (2021)

Journal of Neurointerventional Surgery

Clinical evaluation of pulsitile tinnitus: history and physical examination techniques to predict vascular etiology
Cummins DD, et al (2024)

Cerebrovascular pulsitile tinnitus: causes, treatments. and outcomes in 164 patients with neuroangiographic correlation
Cummins DD, et al (2023)

Journal of Neuroimaging

MRI and MR angiography evaluation of pulsitile tinnitus: a focused, physiology-based protocol
Cummins DD, et al (2022)

Clinical Spine Surgery

Controversies in the Management of Type II Odontoid Fractures.
Bhimani, et al (2024)

It was a Mount Sinai Neurosurgery Resident...

Who conducted the first study to utilize Artificial Intelligence for detecting a wide range of acute neurologic events and to demonstrate a direct clinical application.

While Eric K. Oermann, MD (Class of 2020) was a resident at Mount Sinai, he was recognized as a leader in innovation for laying the framework in applying deep learning and computer vision techniques. He was recognized as a finalist for 2018 Congress of Neurological Surgeon's Innovator of the Year for his research in artificial intelligence, in *Forbes Magazine*'s 30 Under 30 in Health Care, and was the very first Verily (Google Life Sciences) Clinical Fellow. His research was in developing an artificial intelligence platform designed to identify a broad range of acute neurological illnesses, such as stroke, hemorrhage, and hydrocephalus, was shown to identify disease in CT scans in 1.2 seconds, faster than human diagnosis, and published in the journal, *Nature Medicine*.

Historic Milestones at Mount Sinai Neurosurgery

The Department of Neurosurgery was established in 1914, during a major reorganization of the Surgery Department at The Mount Sinai Hospital, by Charles A. Elsberg, MD, Mount Sinai's "Father of Neurosurgery." Since our inception in 1914, our Department has been leading the way in neurological research and surgical care. Dr. Elsberg's pioneering work laid the foundation for a legacy of innovation that has persisted for over a century. Throughout the decades, the Department has consistently pushed the boundaries of neurosurgical techniques, contributing significantly to advancements in areas such as skull base surgery, neuro-oncology, and complex spinal procedures.

1965

Achieved the world's first microneurosurgical operaton.

1998

Perfermormed the first GPi Deep Brain Stimulation for dystonia in teh U.S.

2005

Introduced gene delivery in the nouse brain using embyonic stem cell, derived astrocytes, the first in the U.S.

2015

Developed and began clinical trials for the application and use of High Field 7T MRI imagingin the planningand operative guidance in complex endoscopic skull base surgery.

2016

Implemented real-time augmented reality overlaid on the brain during microscopic surgery, the first in the world.

2018

Led NYC in using Gliolan (5-ALA) for flouresecence-guided brain tumor surgery. Applied artifical intelligence to detect acute neurological events, the first clincial demonstration of its kind.

2019

Implemented advanced neuroinformatics platforms linking patient data, surgical planning, and research discoveries.

2022

Performed the first endovascular human brain-computer interface (BCI) procedure in the U.S.

Became the first U.S. site to implant Stentrode in opatients with paralysis and later implanted multiple patients as part of the NIH-funded COMMAND trial.

2023

Adopted multiple "machine-vision" systems for open spine and brain surgery across a health system, a world first

Performed fully robotic anterior and posterior circumferential spinal fusion surgery, a pioneering achievement.

2024

Set a world record by placing 4,096 electrodes in and recording cortical data from a human brain.
Hosted the inagural New-York BCI Symsposium convening global leaders in BCI, surgery, ethics, AI, and industry.

2025

Used Precison Neuroscience's FDA-cleared Layer 7 Cortical Interface for temporary implantation up to 30 days, enabling advanced brain mapping and intraoperative support, the first hospital to do so.

TO BE CONTINUED ...

Resident Spotlight

DANIEL CUMMINS, MD

Class of 2030

As a resident, Dan had the rare opportunity to participate in a landmark surgical case involving the implantation of Precision Neuroscience's FDA-cleared Layer 7 Cortical Interface at Mount Sinai.

He observed the surgery firsthand, engaged with patient research, and assisted with the device's removal after the study concluded. This case represented a historical milestone: it marked the first use of a fully FDA-cleared wireless brain-computer interface system that can record and stimulate neural activity for up to 30 days, providing unprecedented access to high-quality data for patients with severe paralysis.

Dan described the experience as both inspiring and unique, highlighting the chance to be directly involved in a historic moment in neurosurgery.

Our Neurosurgery Resident Alumni

Many alumni have hosted events at their homes during society meetings and conventions and invited current and past faculty members, alumni, and residents.

We continue to build a legacy and advance the field. For over 75 years, our Neurosurgery Residency Program has established a legacy of transforming its driven and visionary resident interns into superior and compassionate clinical neurosurgeons, pioneers in advancing the field, and exceptional leaders in academia.

There are over 120 neurosurgery resident alumni at Mount Sinai, with most establishing themselves into faculty positions at academic departments and private practices. We are proud to update and engage them by regularly scheduling networking events throughout the year, newsletters, and quarterly meetings with our Alumni Advisory Board.

The Director of Neurosurgery, Ira S. Cohen, MD, established the formal residency program in Neurosurgery in 1946. He appointed two residents before his retirement; the first resident was Aaron J. Beller, MD, who later became the Chair of the Department of Neurosurgery at Hadassah Hospital in Israel. The second appointed was Leonard I. Malis, MD, who later became Chair of the Department of Neurosurgery at The Mount Sinai Hospital.

When Leo Davidoff, MD, became Director of Neurosurgery in 1956, the AMA approved The Mount Sinai Hospital for a three-year residency training program. In 1958, he expanded the training to four years. In the early 1960s, the addition of the City Hospital Center at Elmhurst, with its busy trauma service, expanded the exposure of the residents' clinical experience.

Our Graduates, First Year Out of Residency

Rui Feng, MD, MSc
Brain Tumor Fellowship
Thomas Jefferson University

Trevor Hardigan, MD, PhD
Neuroendovascular Surgery Fellowship
Icahn School of Medicine at Mount Sinai

Alejandro Carrasquilla, MD
Neuro-oncology Fellowship
Moffitt Cancer Center

Jeffrey Zimering, MD
Spine Fellowship
Northwell Health

Travis R. Ladner, MD
Neurosurgical Associates of Los Angeles

Frank K. Yuk, MD
Orthopedic Spine Fellowship
Hospital for Special Surgery

Kurt A. Yaeger, MD
Neuroendovascular Surgery Fellowship
Icahn School of Medicine at Mount Sinai

Jeffrey T. Gilligan, MD
Elite Brain & Spine of Connecticut

Ernest J. Barthélemy, MD, MA, MPH
Neurotrauma Fellowship
University of California, San Francisco

Robert J. Rothrock, MD
Director of Spinal Oncology
Department of Neurosurgery
Baptist Health South Florida

Ian T. McNeill, MD, MS
Spine Surgery Fellowship
University of California, San Francisco

Eric K. Oermann, MD
Assistant Professor of Neurosurgery
NYU Langone Health

Margaret E. Pain, MD
Pediatric Neurosurgery Fellowship
Stanford University School of Medicine

Jonathan J. Rasouli, MD
Spine Surgery Fellowship
Cleveland Clinic

Jeremy M. Steinberger, MD
Spine Surgery Fellowship
Hospital for Special Surgery

Christopher A. Sarkiss, MD
Neurosurgical Oncology Fellowship
University of Miami

Justin R. Mascitelli, MD
Cerebrovascular Surgery Fellowship
Barrow Neurological Institute

Asha M. Iyer, MD, PhD
Spine Surgery Fellowship
Stanford Medical Center

Farid Hamzei-Sichani, MD, PhD
Functional Surgery Fellowship
University of Toronto

2025 Trevor Hardigan, MD, PhD
2025 Rui Feng, MD, MSc
2024 Alejandro Carrasquilla, MD
2024 Jeffrey Zimering, MD
2023 Travis R. Ladner, MD
2023 Frank K. Yuk, MD
2022 Kurt A. Yaeger, MD
2022 Jeffrey T. Gilligan, MD
2021 Ernest J. Barthélemy, MD, MA, MPH
2021 Robert J. Rothrock, MD
2020 Eric K. Oermann, MD
2020 Ian T. McNeill, MD, MS
2019 Jonathan J. Rasouli, MD
2019 Margaret E. Pain, MD
2018 Jeremy M. Steinberger, MD
2018 Christopher A. Sarkiss, MD
2017 Asha M. Iyer, MD, PhD
2017 Justin R. Mascitelli, MD
2016 Branko Skovrlj, MD
2016 Farid Hamzei-Sichani, MD, PhD
2016 Hekmat K. Zarzour, MD
2015 Sharona Ben-Haim, MD
2014 Fedor E. Panov, MD
2014 Soriaya Motivala, MD
2013 Yakov Gologorsky, MD
2013 Emanuela Binello, MD, PhD, ScD
2012 Zachariah M. George, MD
2012 Kenneth De Los Reyes, MD
2012 Erin E. Biro, MD
2011 Abilash Haridas, MD
2010 Scott Meyer, MD
2010 Harshpal Singh, MD
2009 Arien J. Smith, MD
2009 Ronit Gilad, MD
2008 Alexander F. Post, MD
2008 Harlan Bruner, MD
2007 Brian J. Snyder, MD
2007 Paul S. Saphier, MD
2006 Chirag D. Gandhi, MD
2006 Ronald Benveniste, MD, PhD
2005 Chun S. Chen, MD
2005 Simone Betchen, MD
2004 Daniel Walzman, MD

2003 Kevin C. Yao, MD
2003 Raj K. Shrivastava, MD
2002 Caleb Lippman, MD
2002 Harel Deutsch, MD
2002 David Chang, MD, PhD
2001 Amit Y. Schwartz, MD
2001 Naresh P. Patel, MD
2000 Arthur L. Jenkins III, MD
1999 Michael W. Groff, MD
1999 Marc S. Arginteanu, MD
1998 Sumit Das, MD
1998 Michael Brisman, MD
1997 John Shiau, MD
1997 David H. Segal, MD
1997 Joseph Queenan, MD
1997 Joan F. O'Shea, MD
1996 Jamie Sue Ullman, MD
1995 Alleyne B. Fraser, MD
1994 Jeffrey S. Oppenheim, MD
1994 Jay More, MD
1994 Mark Bruce Eisenberg, MD
1993 Richard C. Strauss, MD
1992 Michael J. Harrison, MD
1991 Kathryn Ruth Ko, MD, MFA
1991 Jordan Carel Grabel, MD
1991 Andrew S. Glass, MD
1990 Perry B. Hoeltzell, MD, PhD
1990 Rosemaria A. Gennuso, MD
1989 Frank M. Moore, MD
1989 James R. Adamson, MD
1988 Scott W. Strenger, MD, MMM, CPE
1988 Bruce R. Rosenblum, MD, PC
1987 Stephanie Rifkinson-Mann, MD
1987 Peter Henry Hollis, MD
1987 Raphael Davis, MD
1986 Michael C. Overby, MD
1986 Allen Bernard Kantrowitz, MD
1985 Bruce G. Witkind, MD
1984 Daniele Rigamonti, MD, FAHA
1983 Melvin Prostkoff, MD
1983 Mitchell Edward Levine, MD
1982 Hamilton C. Goulart, MD

1982 Fernando Delasotta, MD, FACS
1981 Richard Radna, MD
1980 Mark S. Klein, MD
1980 Luiz De Araujo, MD
1979 Allen Rothman, MD
1979 William L. Klempner, MD
1979 Allan J. Drapkin, MD
1978 Robert A. Brodner, MD
1977 Rosario "Russ" A. Zappulla, MD, PhD
1976 Jaime G. Wancier, MD
1975 Joseph Mormino, MD
1975 Marc A. Letellier, MD
1974 Pedro R. Dominguez, MD
1974 Alonso V. Correa, MD
1973 Jae M. Noh, MD
1973 Ved P. Sachdev, MD
1973 Rafael O. Quinonez, MD
1973 Hiroshi Nakagawa, MD
1973 Hang S. Byun, MD
1972 Jerome B. Kaufman, MD
1971 James B. Sarno, MD
1971 Manuel Cacdac, MD
1970 Martin H. Savitz, MD
1969 Michael H. Sukoff, MD
1969 Gerald Sherman Freifeld, MD
1968 Robert E. Decker, MD
1968 Richard L. Cohen, MD
1967 Wen-Chen Wei, MD
1967 Songsant Panichavatana, MD
1967 Antonio Marti, MD
1967 Omar Espinosa, MD
1964 William M. Cohn, MD
1963 Melpakkam D. Kasy, MD
1961 Alcides C. Pomina, MD
1961 Sidney A. Hollin, MD
1959 Christos A. Papatheodorou, MD
1953 M. Bernard Winkler, MD
1953 Yun Peng Huang, MD
1952 A. Hyman Kirshenbaum, MD
1951 Paul Teng, MD
1951 Bernard J. Sussman
1950 Leonard I. Malis, MD
1950 Aaron J. Beller, MD

Academic Research and Clinical Trials

Top Rankings for Mount Sinai in National Institutes of Health Funding

No. 2 Neurosciences ($35.9M in 2024)
No. 15 Neurosurgery ($5.5M in 2024)

No. 1 **U.S. NIH Funding for Neurosurgery in New York State**
Blue Ridge Institute for Medical Research

271 **Current, Active Neurosurgery-Led Trials**

Neurosurgery Clinical Trials Since 2014

$24.5M Funding
2,800+ Patients Enrolled
140+ Contracted Trials
17 Large Multicenter Tiral Coordinating Centers through the Academic Research Organization
3 Active IDEs/INDs Held by Faculty
28 Full-time Employees

Active Neurosurgery Clinical Trials and Studies Open for Accrual

271 Active research projects across the Department of Neurosurgery
117 Externally funded projects
154 Supported by department

- Cerebrovascular Disorders: 132
- Brain Tumors: 36
- Neurocritical Care: 34
- Spine: 32
- General Neurosurgery: 15
- Epilepsy: 9
- Neuromodulation: 6
- Simulation: 5
- Pediatric Neurosurgery: 4
- Pediatric Cerebrovascular Disorders: 3

Academic Neurosurgery Research Mentorship

Our faculty and research team support innovative and bold-thinking residents who are involved in high-quality research that will change the face of neurosurgery and medicine. We encourage residents to be curious and pose questions, and then take steps to investigate the answers. At Mount Sinai, we encourage residents to identify faculty mentors who can help guide them through their research projects. Several neurosurgery faculty members head up NIH-funded laboratories that are constantly pushing out pioneering research and running clinical trials.

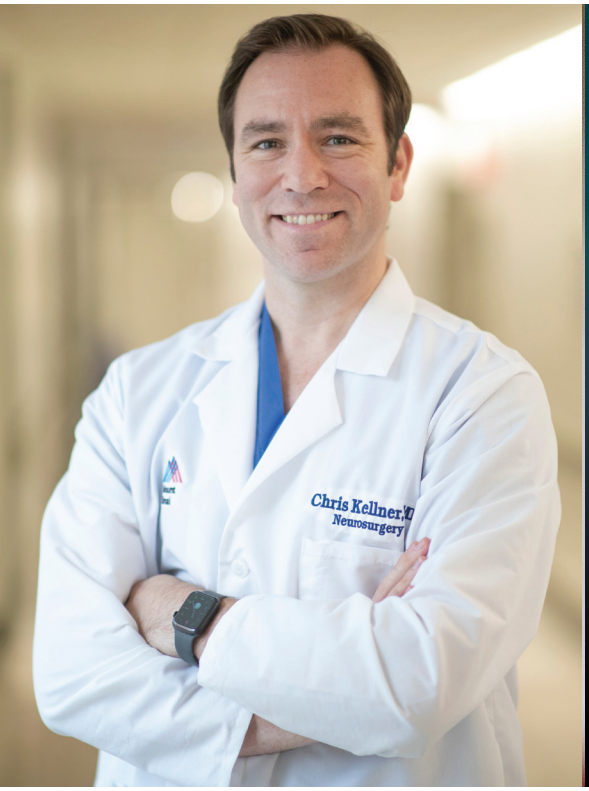
To foster and empower resident research activity, Mount Sinai Neurosurgery allocates programmed educational time on a weekly basis. Academic Day consists of grand rounds, planned didactics, and elective time dedicated to activities conducive of furthering the residents' academic careers, including board studying, research pursuits, and grant writing.

Neurosurgery Clinical Research Group and Academic Research Organization
The Department of Neurosurgery at the Icahn School of Medicine ranks No 1. In New York State and No. 15 in the United States by the Blue Ridge Institute for Medical Research, with $5,550,653 in NIH funding.

The Clinical Research Group within Mount Sinai Neurosurgery is structured around three core pillars: participation in local site trials (including both investigator-initiated and industry-sponsored studies), the Academic Research Organization (ARO), and comprehensive grant management, spanning both pre- and post-award phases.

The ARO specializes in the startup and execution of clinical trial protocols across a range of neurosurgical subspecialties, including both endovascular and open procedures. It manages multicenter trials and functions similarly to a pharmaceutical Contract Research Organization (CRO), but with an academic lens. This unique positioning allows for greater scientific oversight, enhanced flexibility in trial design, cost efficiencies compared to industry-run trials, and the cultivation of strong collaborations between Mount Sinai and other leading medical institutions nationwide. Our ARO is sponsored by a plethora of high-profile industry sponsors such as: Penumbra, Integra, Kaneka, IRRAS, Stryker, MicroPort NeuroTech, Genentech.

The program also encompasses data coordinating centers and core laboratories. Currently, the group oversees 191 active neurosurgery-led trials and has secured more than $24.5 million in research funding.



Faculty Spotlight

Christopher P. Kellner, MD

A Visionary Surgeon Who Transforms Lives

Dr. Kellner is a cerebrovascular neurosurgeon and global leader in minimally invasive treatment for brain hemorrhage and stroke. As an expert in neurotechnology and neurosurgical innovation, he has secured over $4.5 million in NIH and industry research funding, developed the globally adopted Stereotactic Intracerebral Hemorrhage Underwater Blood Aspiration (SCUBA) technique for minimally invasive brain hemorrhage removal, and founded two neurotechnology companies. He has authored more than 130 peer-reviewed publications, holds four patents, and serves as Principal Investigator on five large multicenter clinical trials in ischemic and hemorrhagic stroke.

Dr. Kellner is passionate about expanding access to minimally invasive neurosurgical techniques and improving cerebrovascular care. He regularly presents at national and international conferences and collaborates with institutions worldwide to advance training in cerebrovascular treatment. He is committed to addressing the need for increased access to high-quality stroke and hemorrhage care in underserved communities.

Cerebrovascular Center Research

The Cerebrovascular Center at Mount Sinai is one of the most active research programs in the country with more than 115 ongoing externally funded research projects and over $7 million in NIH, non-NIH, and industry funding.

One of the busiest pediatric cerebrovascular disorders program in the world, and one of few to treat rare arteriovenous malformations of the brain like vein of Galen malformation in children. Researchers are conducting a multitude of thrombectomy trials, including exploring the safety and efficacy of new devices, technologies, and strategies.

Notably, Mount Sinai became the first US site to enroll into the ATHENA trial, a pivotal study examining the safety and effectiveness of mechanical thrombectomy using the ANACONDA ANA5 funnel catheter in combination with a stent retriever. In addition to thrombectomy trials, the Cerebrovascular group has also brought on exciting new trials in the realms of aneurysm treatment, MMA embolization, and stroke neuroimaging. The Cerebrovascular research focus has even extended to NPH treatment, through active participation in the STRIDE clinical trial (Evaluation of the Safety and Effectiveness of the CereVasc eShunt System in Normal Pressure Hydrocephalus).

The group has also had great success with patient enrollment and recruitment, achieving status as top enroller in both the Imperative trial (safety and efficacy of the Zoom 0.088" guide catheter for direct aspiration) and the MEMBRANE trial (safety and efficacy of Trufill nBCA for MMA embolization in cSDH).

So far in 2025, there have been over 40 actively enrolling clinical trials running under the Cerebrovascular division, with even more coming through the pipeline. Mount Sinai is one of three institutions that lead the New York City Collaborative Regional Coordinating Center (NYCC-RCC) of the NIH StrokeNet. The primary aims of the network are to advance acute stroke treatment, stroke prevention, and recovery through the conduct of clinical trials operated across 27 funded RCCs throughout the US and internationally.

StrokeNet partnerships also lead to the development of TESTED, a groundbreaking PCORI-funded observational trial. TESTED aims to examine the efficacy of endovascular treatment (EVT) vs. medical management for the treatment of AIS-LVO in a cohort of patients with moderate-to-severe baseline disability pre-stroke. TESTED's design addresses critical gaps in our current clinical framework for the treatment of AIS; currently based on trials that have largely excluded patients with pre-existing disabilities.

Mount Sinai Health System has established one of the first intracerebral hemorrhage (ICH) centers in the world, positioning us at the forefront of innovative treatments for ICH, including evacuation devices and innovative methods for rapid diagnosis. Our ARO is running the largest national registry of minimally invasive ICH evacuation procedures, the MIRROR Registry, overseeing 20 centers across the country. Over 350 procedures of Stereotactic Intracerebral Hemorrhage Underwater Blood Aspiration (SCUBA), a minimally invasive treatment for intracerebral hemorrhage, have been performed under the direction of Christopher P. Kellner, MD, making it the largest ICH program in the world, one of the only multidisciplinary Enhanced Stroke Recovery Programs in the world incorporating new FDA-approved stroke recovery technologies into clinical practice.

Faculty Spotlight

Brian Kopell, MD

Committed to Advancing Brain Health

Brian H. Kopell, MD, is a global authority in neurosurgery and neuromodulation, committed to advancing brain health. As Director of the Center for Neuromodulation, one of the world's busiest centers, and Co-Director of the Bonnie and Tom Strauss Center for Movement Disorders, he has transformed DBS. Passionate about brain wellness, he spoke at the 2025 Aspen Ideas Health discussion on healthspan, highlighting how neuromodulation supports mood, stress resilience, and adaptability, linking brain health to overall quality of life.

With over 2.5 million views on Wired's "Neurosurgeon Answers Brain Surgery Questions," Dr. Kopell is a sought-after expert shaping the future of neuromodulation while promoting a holistic approach to brain health. He also spoke at SXSW 2025 on revolutionizing mental healthcare with implantable devices.

Center for Neuromodulation at Mount Sinai Health System

The Center for Neuromodulation at Mount Sinai, led by Brian H. Kopell, MD, is the largest program of its kind on the East Coast and one of the top five nationally. The program has pioneered therapies that are redefining brain health, including a Focused Ultrasound (FUS) program at Mount Sinai West for movement disorders and advanced use of deep brain stimulation (DBS) for both neurological and psychiatric conditions.

Mount Sinai investigators achieved the first in vivo recording of dopamine and serotonin in the subgenual anterior cingulate cortex of a human, a breakthrough in understanding mood regulation, and continue to lead research such as the 2024 Living Brain Project study on molecular brain processes, recently published in *Molecular Psychiatry* and *Nature Communication*.

The Center has also been at the forefront of advancing neuromodulation for psychiatric conditions. Helen S. Mayberg, MD, a pioneer in mapping brain circuits underlying treatment-resistant depression, has driven landmark studies, including work published in *Nature* identifying neural activity patterns tied to recovery in DBS patients. In addition, Mount Sinai performed the first FDA-approved vagus nerve stimulation implant for stroke survivors, demonstrating how neuromodulation can restore function and quality of life.

Beyond psychiatry and movement disorders, the Center leads nationally in epilepsy innovation, having implanted more than 130 responsive neurostimulation (RNS) devices in patients with drug-resistant epilepsy. Ongoing research, including studies on how meditation may reduce anxiety and depression in this population, reflects the breadth of the Center of Neuromodulation's clinical and scientific impact. It's about to get better.

The Clinical Neurosciences Center at Mount Sinai West will open in Winter 2025.

Opening of the Clinical Neurosciences Center

In winter 2025, the Center for Neuromodulation will move into the new Clinical Neurosciences Center, Mount Sinai's flagship destination uniting neurosurgery, neurology, psychiatry, and rehabilitation in one integrated hub. Alongside the Nash Family Center for Advanced Circuit Therapeutics, the Bonnie and Tom Strauss Movement Disorders Center, the Epilepsy Center, and the Interventional Psychiatry Program, the Center for Neuromodulation will anchor a collaborative model that breaks down silos, accelerates innovation, and expands access to the most advanced brain health therapies available.

For patients, this means comprehensive, seamless care spanning diagnosis, treatment, and long-term management. For residents and trainees, it offers unmatched exposure to high-volume complex cases, pioneering research, and cross-disciplinary mentorship from leaders shaping the future of neuroscience. Together, the Clinical Neurosciences Center and the Center for Neuromodulation position Mount Sinai as a national powerhouse in brain health, advancing care, accelerating discovery, and transforming lives.

Faculty Spotlight

Helen Mayberg, MD

Revolutionary for the Treatment of Depression

Helen S. Mayberg, MD, is a pioneering neurologist and psychiatrist who revolutionized the treatment of depression by mapping brain circuits and developing deep brain stimulation for treatment-resistant cases. As Director of Nash Family Center for Advanced Circuit Therapeutics (C-ACT), she leads efforts to translate neuroscience and neuroengineering discoveries into precision treatments that restore mood, cognition, and motor function. Her work identified critical brain circuits, especially Brodmann area 25, whose modulation via deep brain stimulation can relieve severe depression.

At Mount Sinai, she collaborates closely with Brian H. Kopell, MD, integrating neurosurgery, neurology, psychiatry, and neuroengineering to advance individualized, circuit-based therapies for neuropsychiatric disorders.

Brain-Computer Interfaces at Mount Sinai Neurosurgery

Mount Sinai and its faculty are a leaders for brain-computer interface clinical trials, pioneering first-in-human procedures and breakthrough innovations that restore independence for patients.

Benjamin Rapoport, MD, PhD
Scientific Director, Mount Sinai BioDesign
Co-Founder and CSO, Precision Neuroscience

Tom Oxley, MD, PhD
Director of Innovation Strategy, Mount Sinai BioDesign
Founder and CEO, Synchron

2021
Mount Sinai joins the national multicenter clinical trial for Synchron's Stentrode.

July 2022
Mount Sinai becomes the first U.S. site to implant the Stentrode in a patient with paralysis.

2022- 2024
Mount Sinai implants 10 patients with the Stentrode as part of the NIH-funded COMMAND trial.

September 2023
Synchron completes patient enrollment in the U.S. COMMAND trial, with Mount Sinai as one of three clinical sites.

March 2024
Mount Sinai neurosurgeons participate in the first New York feasibility study of Precision Neuroscience's Layer 7 Cortical Interface.

April 2024
Mount Sinai sets a world record by placing 4,096 electrodes on a patient's brain during surgery.

September 2024
Synchron announced positive results from the COMMAND study, evaluating the safety and efficacy of its endovascular brain-computer interface (BCI) device in six participants over a 12-month period.

November 2024
Mount Sinai BioDesign hosts the inaugural New York Brain-Computer Interface Symposium, convening global leaders in BCI, surgery, ethics, AI, and industry.

May 2025
Mount Sinai became the first center to use Precision Neuroscience's FDA-cleared Layer 7 Cortical Interface for temporary implantation of up to 30 days, enabling advanced brain mapping and intraoperative support as part of the company's long-term BCI program.

Only a few decades ago, the idea of connecting the human brain directly to a computer was pure science fiction. The thought that a person could send a message or control a device simply by imagining the action was dismissed as fantasy. Today, that vision is becoming reality, and Mount Sinai is helping lead the way. Brain-computer interfaces (BCIs) are creating new possibilities for people once considered untreatable, and Mount Sinai is home to two of the world's most influential companies developing this technology.

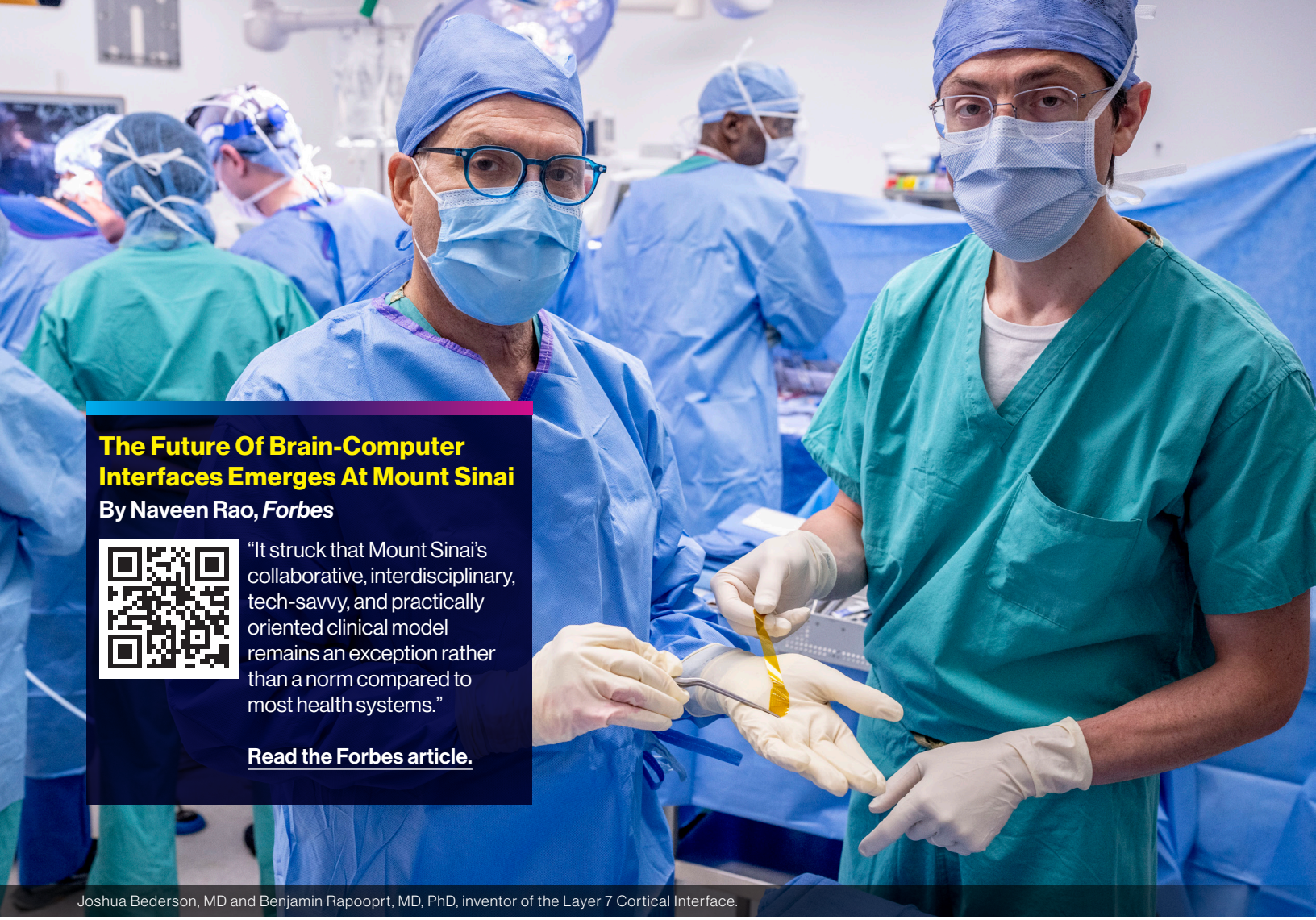
At the center of this effort is Joshua B. Bederson, MD, System Chair of Neurosurgery and Executive Director of Mount Sinai BioDesign. Under his leadership, Mount Sinai has become a hub for innovation, bringing together neurosurgeons, engineers, and scientists committed to transforming patients' lives. "Mount Sinai is now home to some of the world's leading experts in brain-computer interface," says Dr. Bederson.

Two of those experts are faculty members Thomas J. Oxley, MD, PhD, founder of Synchron, and Benjamin Rapoport, MD, PhD, co-founder of Precision Neuroscience. Both are developing novel implantable devices designed to restore independence to people living with paralysis from conditions such as ALS, stroke, and spinal cord injury. Their companies are independent, but both conduct clinical trials at Mount Sinai, placing the institution at the forefront of global BCI research.

In July 2022, Mount Sinai made history as the first U.S. site to implant Synchron's Stentrode™, a minimally invasive BCI placed inside brain blood vessels without open brain surgery. Participants in the early trial learned to perform daily tasks—such as sending text messages and managing finances—using only their thoughts. This groundbreaking trial, funded by the NIH, is now expanding into a larger multicenter study, with Mount Sinai playing a central role.

Precision Neuroscience has taken a different approach with its Layer 7 Cortical Interface, an ultra-thin electrode array that rests on the brain's surface. This design captures brain signals with extraordinary clarity while avoiding penetrating brain tissue. In 2024, Mount Sinai neurosurgeons set a world record by placing four Layer 7 arrays, totaling 4,096 electrodes, on a single patient's brain—producing the most detailed real-time map of brain activity ever achieved.

Tom Oxley, MD, PhD speaks at a TED talk on his endovascular, implantable brain-computer interface, the Stentrode.



Joshua Bederson, MD and Benjamin Rapooprt, MD, PhD, inventor of the Layer 7 Cortical Interface.

The Future Of Brain-Computer Interfaces Emerges At Mount Sinai

By Naveen Rao, *Forbes*

"It struck that Mount Sinai's collaborative, interdisciplinary, tech-savvy, and practically oriented clinical model remains an exception rather than a norm compared to most health systems."

Read the Forbes article.

These advances are not limited to paralysis. By mapping brain activity with unprecedented resolution, Precision's technology is also helping surgeons more precisely remove tumors and avoid damaging critical areas responsible for movement, speech, and cognition. This dual application highlights Mount Sinai's ability to translate BCI discoveries into better outcomes across neurosurgery.

Mount Sinai's leadership extends beyond the operating room. In November 2024, Mount Sinai BioDesign hosted the inaugural New York Brain-Computer Interface Symposium, bringing together the world's leading experts in surgery, neuroscience, AI, ethics, and industry. The event showcased not only Mount Sinai's scientific leadership but also its role in shaping the ethical and clinical framework for BCIs worldwide.

The promise of BCI goes beyond restoring communication and movement. Mount Sinai researchers are already envisioning the next generation of implants that will provide sensory feedback, allowing patients to "feel" through prosthetic limbs. This bidirectional interface would give prosthetics the realism and control needed to restore independence in a profound new way.

"The brain has evolved to be far more powerful than what our bodies can express," says Dr. Oxley. "BCI technology has the potential to close that gap." Dr. Bederson agrees, noting that future applications may extend to vision, hearing, movement disorders, epilepsy, and beyond.

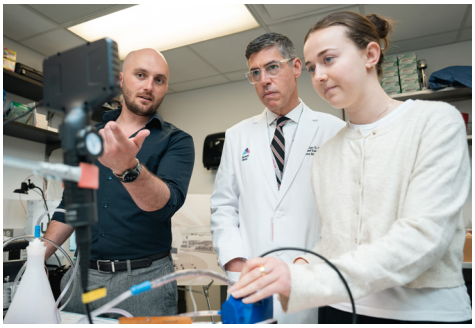
Mount Sinai has also become a national leader in training the next generation of neurosurgeons in BCI innovation. Residents are exposed not only to the latest surgical techniques but also to an environment where research, device development, and patient care intersect. This gives them the opportunity to be part of groundbreaking clinical trials and to work alongside the very pioneers advancing this technology.

Looking to the future, Synchron and Precision Neuroscience are preparing for FDA approval of their devices, each having already received Breakthrough Device designation. Mount Sinai's role as both a trial site and an innovation hub ensures that its patients will be among the first to benefit from these life-changing therapies.

By uniting expertise across neurosurgery, neurology, psychiatry, rehabilitation, and engineering, Mount Sinai is leading the effort to turn the science of thought-driven technology into everyday reality. For patients, it represents hope; for trainees, it represents opportunity; and for the future of medicine, it represents a new frontier that is only beginning to unfold.

Dr. Bederson is System Chair for the Department of Neurosurgery at the Mount Sinai Health System. Drs. Rapoport and Oxley are faculty members in the Department of Neurosurgery. Dr. Bederson serves in a supervisory role for them within the Health System. Dr. Rapoport is an equity owner in Precision Neuroscience, serves as their Chief Scientific Officer, and is a member of their board of directors. Neither Dr. Bederson nor Mount Sinai has a financial interest in Precision Neuroscience. Dr. Oxley is an equity owner in Synchron, serves as their Chief Executive Officer, and is a member of their board of directors. Dr. Bederson and other faculty members at Mount Sinai are equity owners in Synchron. All Precision Neuroscience and Synchron research at Mount Sinai is conducted by investigators without financial ties to either company.

Biomedical Engineering and Device Design



Opportunity to Explore Medical Device Design

Our residents have the unique opportunity to explore medical device design through Mount Sinai BioDesign, an incubator within the Department of Neurosurgery, that takes ideas and concepts and transforms them into actual medical tools and devices to use in clinical practice.

Mount Sinai BioDesign is the center of rapid medical device innovation within the Mount Sinai Health System, with a mission to systematically transform the expertise and insights of physicians and surgeons into commercializable products. Mount Sinai BioDesign is a multidisciplinary institute and incubator for the innovation, design, and translation of novel medical technologies. Working with both internal and external innovators, Mount Sinai BioDesign removes and reduces the hurdles of translating medical devices from concept to adoption.

In 2015, Joshua B. Bederson, MD, founded the Neurosurgery Simulation Core with Anthony B. Costa, PhD. In 2018, the group developed further to form Mount Sinai BioDesign, and has continually overseen the expansion of its scope and capabilities while optimizing its structured approach to clinical technology innovation. The core team is led by Scientific Director Benjamin I. Rapoport, MD, PhD, and Iden Kurtaliaj, PhD. Team members include six professional engineers and project managers, four PhD students, and numerous physician entrepreneurs.

Mount Sinai BioDesign enables physicians and surgeons to translate the medical needs of their patients into commercially valuable, technology-based solutions. Our process helps clinicians refine the need, design, and iteratively prototype prospective devices, while protecting intellectual property. The team specializes in minimally invasive surgical technologies and has developed devices for open and endovascular neurosurgery and other disciplines. Successful technologies are licensed directly to industry and manufacturing partners or launched as new startups with partnering entrepreneurs.

Industry Partnerships

Mount Sinai BioDesign's strong affiliations with industry facilitate testing, validation, and adoption of products in our portfolios. The team leverages our vast network of clinicians and key opinion leaders to efficiently identify clinical champions, build dedicated translational teams, and gather action-oriented feedback. Our established processes ease the process of creating companies and improve outcomes of academic return on investment for commercial partners.

$11.6 Million Grant for The Comprehensive Center For Surgical Innovation

Mount Sinai BioDesign continues to grow and was recently awarded an $11.6 million grant from the New York Economic Development Council to launch the Comprehensive Center for Surgical Innovation. This new center will expand the prototyping and manufacturing capabilities and establish dedicated space for product testing and training in simulated OR environments, and clinical trials.

It's a Mount Sinai Neurosurgeon...

Leading the way with innovation

Uniquely trained as a neurosurgeon, engineer, and scientist, Benjamin Rapoport, MD, PhD, serves as the Scientific Director of Mount Sinai BioDesign. He has extensive scientific training, receiving Master's degrees in Physics from Harvard University and Mathematics from Oxford University, a PhD in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology and has a track record of technology translation in the areas of digital health, including serving as co-founder of Simbionics (acquired by Apple), and of neurotechnology, including serving as a co-founding member of Neuralink. Dr. Rapoport has authored over 30 peer-reviewed scientific publications and obtained 10 patents, many of which are related to brain-computer interfaces and other innovations in medical technology.

Residents and Mount Sinai BioDesign engineers work together to “dissect” the device.

Neurosurgery Resident Involvement

With Mount Sinai BioDesign, residents interested in medical device development are encouraged to solve problems and innovate ideas. From start to completion, Mount Sinai residents are involved in every step of the process from idea generation, to using the prototyping and design resources available, to patenting products.

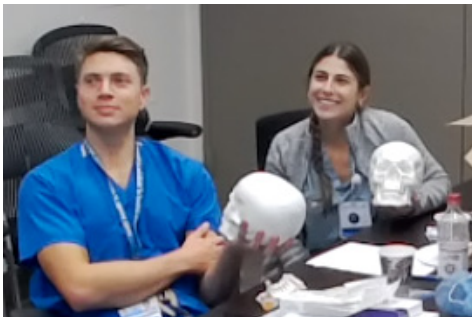
Available Resources

- A dedicated facility, equipped with advanced design software, 3D printing, and custom anatomical phantom models, is staffed with professional engineers to assist in transforming concepts into prototypes
- Means to produce end-use models and products at scale
- Facilitating the application and commercialization of discoveries and the development of research partnerships with Mount Sinai Innovation Partners (MSIP)
- Refined processes and expertise efficiently expedite the rate of translation, streamlining prototyping and commercial strategy development, and ultimately bringing successful medical devices to market
- Assistance to turn ideas into disclosures, patents, technology startups, and direct licenses
- Support services are available to recruit federal and private grant funding, develop commercial plans, recruit established entrepreneurs, and connect with industry leaders

Mount Sinai BioDesign Fellowship

For innovative and entrepreneurial neurosurgery residents, Mount Sinai Neurosurgery offers a unique opportunity to become a part of Mount Sinai BioDesign. During their elective time they may work alongside our experienced professional engineers, project managers, and key opinion leaders, where they can actively develop innovations or serve as key participants in existing product development. BioDesign participants can expect hands-on experience in prototyping, intellectual property development, commercialization strategy, and startup operations.

Neurosurgery Resident Education and Academic Learning



Neurosurgery Academic Day

To foster and empower resident research activity, Mount Sinai Neurosurgery allocates programmed educational time on a weekly basis. Academic Day consists of grand rounds, planned didactics, and elective time dedicated to activities conducive of furthering the residents' academic careers, including board studying, research pursuits, and grant writing.

Directed Research Mentorship

Preparing for NIH funding opportunities, PGY-1 through PGY-4 neurosurgery residents participate in an all day didactic and research program that fosters collaborative studies in both translational and clinical departments. This research setting promotes collaboration and provides the opportunity to not only learn from and work alongside Neurosurgery Faculty, but also for residents to chart their own, personal course.

Neurosurgery Grand Rounds

Held virtually, Neurosurgery Grand Rounds focuses on continuing medical education and resident education. Formal lectures are presented by faculty, visiting professors, residents, and students, with the ultimate goal of improving the quality of care in Mount Sinai Health System's Department of Neurosurgery and reviewing neurosurgical cases. Topics include neurosurgery, neurology, neuropathology, neuroradiology, spine, neurocritical care, neuro-oncology, Self-Assessment in Neurological Surgery (SANS) Lectures, M&M, Q&A, basic and translational research, and special lecture series.

Faculty-Led Didactic Curriculum

Our newly implemented didactic curriculum includes two to four sessions weekly encompassing the core subject areas in neurosurgery, as well as topics that are critical to starting a successful neurosurgical career. These include surgical anatomy, each neurosurgical sub-specialty, neurology, neuropathology, neuroradiology, infectious disease, the business of neurosurgery, innovation in medicine, grant writing, designing a research study, and many more. Additionally, two annual mock oral board exam sessions are designed to prepare our graduates for the rigors of the exam.

Formal Written/Oral Board Simulation Course

Mount Sinai Neurosurgery Residents perform mock examinations with faculty members as examiners. This regular simulation develops skills at responding accurately and completely on the spot, which is a core skill in residency and beyond.

Visiting Professors Lecture Series

Throughout the year, the Mount Sinai Health System Department of Neurosurgery hosts nationally and internationally recognized physicians and figures in the neurosurgery field to present a lecture on an area of their interest. Visiting professor days include a one-hour lecture followed by dedicated time between the visiting professor and the residents to review cases, discuss clinical and research topics, and engage in career mentorship.

Annual Memorial Lectures

- Ved P. Sachdev, MD, Memorial Lecture
- Sidney A. Hollin, MD, Memorial Lecture
- Leonard I. Malis, MD, Memorial Lecture
- Jeannette & Bernard S. Post, MD, Memorial Lecture

Neurosurgery Research Day

Neurosurgery Research Day is an annual event that includes selected presentations of original and breakthrough research conducted by faculty, residents, fellows, and medical students. The first Research Day was held in June, 1996, and originally titled "Basic Science Research Day." The Research Day program now includes the annual Ved P. Sachdev, MD, Memorial Lecture.

Boards and Conferences

Multidisciplinary Cerebrovascular Board

Cerebrovascular Board is held weekly with cerebrovascular and endovascular attendings, residents, fellows, and researchers to discuss cases for the Cerebrovascular Center.

Multidisciplinary Neuro-Oncology Tumor Board

Neuro-Oncology Tumor Board is held bi-weekly with neurosurgeons, neuro-oncologists, neuropathologists, radiation oncologists, neuro-radiologists, neuro-ophthalmology, neurosurgery residents, fellows, and researchers to discuss cases brain and spine tumor cases for the Neurosurgery Oncology and Neuro-oncology Program across the Mount Sinai Health System. The conference also serves as Mount Sinai's Cancer Registry for neurosurgery.

Multidisciplinary Pituitary Conference

The Multidisciplinary Pituitary Conference is a clinical conference where pituitary and neuroendocrine cases are presented and discussed in a multi-disciplinary setting with input from our endocrine, neurosurgery, and neuroradiology colleagues (among others). This interesting and educational discussion facilitates a collaboration throughout the Mount Sinai Health System on pituitary cases.

Multidsiciplinary Spine Tumor Board

Multidisciplinary Spine Tumor Board is held bi-weekly with spine neurosurgeons, orthopedic surgeons, radiation oncologists, neuroradiologists, medical oncologists, neuropathologists, nurse practitioners and fellows to discuss complex spine tumor cases.

Neuroradiology Conference

Neuroradiology Conference is held weekly with neurosurgeons, neuroradiologists, neurosurgery residents, neuroradiology fellows, and researchers to discuss cases.

Multidisciplinary Skull Base Conference

The Multidisciplinary Skull Base Conference is held monthly with neurosurgeons, otolaryngologists, radiation oncologists, neuro-ophthalmologists, and neuroradiologists where complex skull base cases are presented for discussion and surgical planning.

Lecture Series

Mount Sinai BioDesign Science Series

Mount Sinai BioDesign is a multidisciplinary hub for innovation, creation, and fabrication of novel medical technologies. Using the academic principles of biodesign, the program enables visionary physicians and surgeons with extensive clinical experience to communicate and translate medical problems and inefficiencies from concept into material solution. The Mount Sinai BioDesign Science Series Seminar allows for the sharing of ideas and research projects through informal presentations that are relevant to the Mount BioDesign process. These lectures are interactive and include multidisciplinary invited speakers who are experts in topic areas or innovations in bioengineering.

Neurocritical Care Lecture Series

To cover all United Council for Neurologic Subspecialties (UCNS) recommended neurocritical care core topics, the Neurocritical Care Core Lecture series is updated every year by our senior neurocritical care fellows. This lecture series includes reviews and updates of evidence-based neurocritical care clinical protocols, morbidity-mortality conferences, system-wide neurocritical care case conferences and lectures by our core and interdisciplinary faculty.

Healthcare Economics Lecture Series

A healthcare economics curriculum was designed by neurosurgery MBA faculty in collaboration with the residents to cover fundamental aspects, including the driving forces of the healthcare market, changes in healthcare delivery, metrics and indicators, strategies to decrease healthcare cost, social determinants of health, and fundamentals of medical malpractice.

Journal Clubs

Neurosurgery Journal Club

Neurosurgery Journal Club is scheduled once monthly and allows Mount Sinai's neurosurgery residents to discuss recently published neurosurgery articles and their merits. The club is directed by a neurosurgery attending faculty member with a specific specialty interest and expertise.

"At Mount Sinai, I trained with some of the leaders in the field of each subspecialty within neurosurgery.

My mentors here pushed the boundaries of operative neurosurgery, particularly in the incorporation of cutting-edge technologies."

Sharona Ben-Haim, MD
Class of 2015

"I look back very fondly on my neurosurgical training at Mount Sinai.

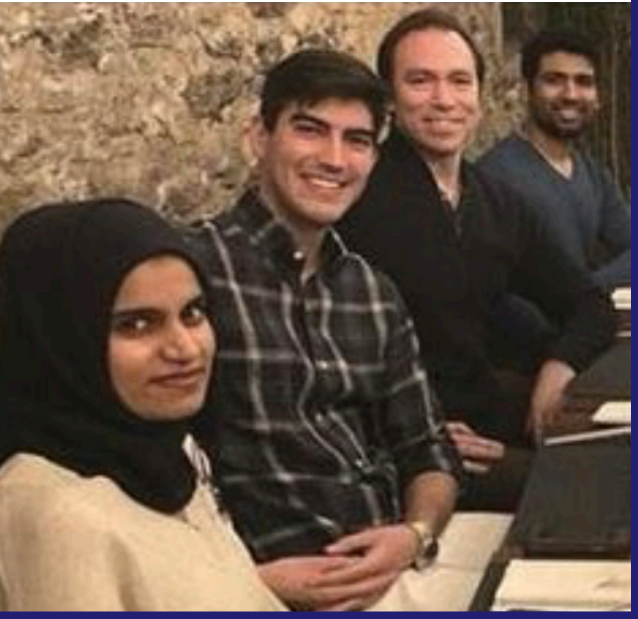
I constantly draw on my neurosurgical and endovascular experiences at Mount Sinai to guide patient management and surgical decision making. I am still in touch with numerous faculty members and residents as we pursue multicenter research endeavors."

Justin R. Mascitelli, MD
Class of 2017

"My residency at Mount Sinai provided me an outstanding foundation for my career in academic neurosurgery.

Throughout my training I was so fortunate to have faculty dedicated to my education and growth who I work to emulate to this day in how they cared for their patients, perfected their technical skills, and advanced our field through high-quality research."

Chirag D. Gandhi, MD
Class of 2006




PHYSICIAN


DEPARTMENT OF
NEUROSURGERY
MOUNT SINAI
SATX


OUNT SINAI


PIZZA


Jack & Charlotte
FIRST DAY OF
NEUROSURGERY RESIDENCY
PGY-1
Mount Sinai Health System

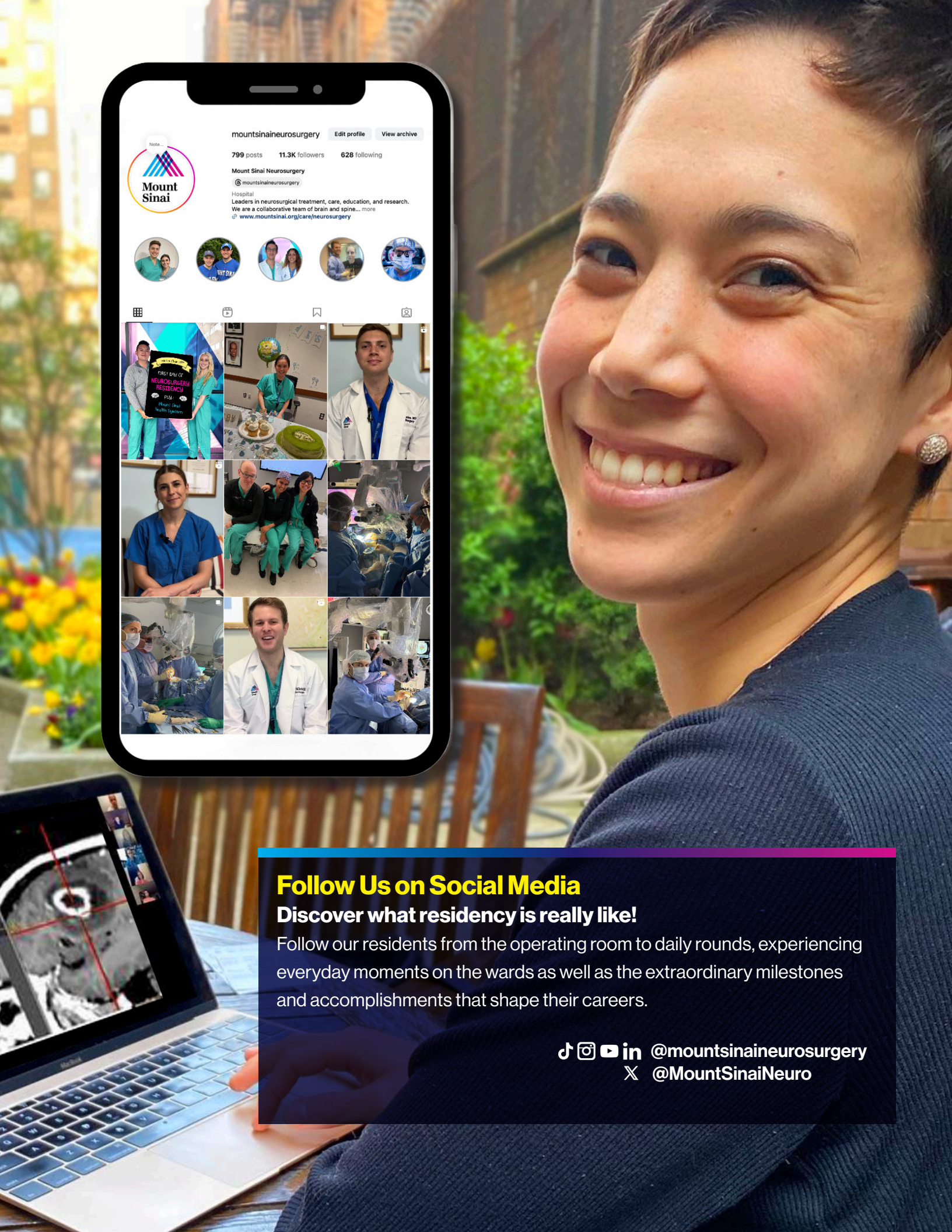

I Won't
ADULT
TODAY


Medtronic
PIZZA
PIZZA
PIZZA









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- Visionary Innovators
- Enthusiastic Teachers
- Skilled Surgeons
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