

**LETTER FROM THE CHAIR**

## Rising to an Intensely Difficult Occasion: U-M Neurosurgery Remains Strong and Vital Amidst the COVID-19 Pandemic



An old Chinese proverb says, “May you live in interesting times.” Indeed, this past year has been interesting to say the least. It’s been challenging, complex, and has certainly tested the mettle of all involved with the University of Michigan Department of Neurosurgery. We began the year with a strong performance in terms of our volume of cases as well

as having several important honors for our department. You will get a chance to see some of these in our newsletter. We determined that we wanted to expand our faculty and thus, this year, we welcomed Jacob Joseph, MD, back after his fellowship and will be welcoming Todd Hollon, MD, in January 2021 after completion of his fellowship.

What has defined much of 2020, however, has been the COVID-19 pandemic. Our hospital shut down elective surgery for a period of several months, but the neurosurgery service remained busy. We had to go through the excruciating process of analyzing which patients absolutely needed surgery and which could be delayed. Obviously,

many neurosurgery patients worsen when interventions are delayed, and we had to take that into account at every turn. Despite the shutdown of the elective schedule, it was interesting to see that our neuro-intensive care unit remained relatively full. This was the result of patients showing up in our ER or in our clinics with urgent, emergent needs that had to be met. It indicates once again that even with the main focus of the hospital shifting to COVID care, the neurosurgery service was absolutely vital in addressing the patient population with neurosurgical emergencies.

We have started to recover from the COVID pandemic, yet our COVID numbers are once again surging this late fall in Michigan. Important in dealing with the pandemic has been dealing with the financial repercussions. As a department, because we shut down elective surgeries, we have had to work very diligently in our economic recovery plan to be able to develop the necessary margin to realize our visions for the future of neurosurgery at Michigan Medicine, which include the new neuroscience hospital.

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We put the development of the neuroscience hospital on hold for several months, but we are hopeful that we will be able to resume construction again in early 2021. This neuroscience hospital is important to our future and will include 20 operating rooms as well as 264 beds. It will allow us to expand our patient volumes and allow us the additional ORs that we so desperately need. Our collaborations with Metro Hospital along with Mid-Michigan, Munson, and now Trinity-Chelsea have all been going along well. Like all surgical services at Michigan, we have also begun looking at outside locations to perform surgery and to see patients. Particularly at Metro, we have seen the addition of Dr. Kevin Chen who has his clinical practice at Metro Hospital, but his research focus here at the University.

As we get past COVID, we are hopeful that we will be able to continue to grow the practice and make certain that our statewide presence in neurosurgery remains significant. This year, despite the challenges of COVID, our success in the clinical arena was only matched by our success in the research arena. Drs. Castro and Lowenstein received a very prestigious award for their brain tumor research. This award helped create a multi-center brain tumor consortium here at the University of Michigan, which dovetails well with the Chad Carr Pediatric Brain Tumor Initiative.

We have seen some of our longest-running employees retire, but we have also seen new ones come on board. Dr. Suresh Ramnath retired from the Department after 26 years here at Michigan. We spent a significant portion of this year discussing aspects of diversity, equity and inclusion and have become much more aware of our ability to show more kindness and openness in dealing with others who are different than we are. Several of our faculty have received important awards and we are happy to celebrate them.

We hope that this newsletter finds you surviving the pandemic, and our fervent wish is for you to stay safe and healthy. This next year is likely to continue with some of the challenges of the past year, but I am optimistic that with the development of various therapies, we will see that the horrible toll taken by COVID-19 will be diminished. We remain a strong, resilient department caring for a broad spectrum of all neurosurgical diseases with breakthrough research excellence, the best residents in the country, outstanding nurses and a dedicated staff that is always ready to go the extra mile.

I hope that you will reach out to us at any point, and we look forward to hearing from you in the coming year.

My personal best and please remain safe,



Karin M. Muraszko, MD

Julian T. Hoff Professor & Chair  
Department of Neurosurgery

*“Despite the difficulties brought on this year by the pandemic, we remain a strong, resilient department committed to outstanding patient care, research excellence, and world-class resident education.”*

# MEDICAL EDUCATION NEWS

## A Word from the Residency Program Director, Dr. Cormac Maher



The global pandemic of 2020 has led to innumerable changes in our workplaces and our society. The training programs in our department have adapted to this changing landscape with the goal of maintaining the highest possible standards for education, research, and patient care. While we all miss the in-person department interactions, we have maintained our didactic program through web conferencing. Our surgical volumes were below normal levels earlier in the year at the time of the COVID peak in Michigan but seem to be recovering nicely now.

Throughout these changing times, the resident group at Michigan continues to excel clinically as well as academically. Highlights of some of their recent successes are listed in these pages. We especially welcome our three newest department members: PGY-1 residents Jordan Lam, Dotun Ogunsola, and Arushi Tripathy. These new residents all come from outstanding academic backgrounds and have a great deal of potential to become leaders of our field in the future.

We are currently in the midst of application season, and the neurosurgery residency selection process for U-M will be as competitive as ever. This year, we will screen more than 300 applications from U.S. medical school graduates in order to choose the three new residents who will join the Department in 2021.

It is comforting to see that, amidst all of the changes to our society caused by the pandemic, one thing has not changed – our commitment to be the leaders and best in neurosurgery.



Susie Hines,  
Residency Program  
Administrator



# 2020 Chief Resident Graduation

Though the chief resident graduation looked different this year as compared to years' past due to the COVID-19 pandemic, a commemorative night of celebration was still held on June 17 to honor our graduating chief residents – Drs. Todd Hollon, Jay Nathan, and Brandon Smith – and to celebrate the culmination of their seven years of training in the U-M Department of Neurosurgery.

Attendees including neurosurgery faculty, residents, fellows, and advanced practice providers, as well as the honored guests themselves – our graduating chief residents – and their significant others and parents, gathered in person at the celebration, which was held in Danto Auditorium in the Cardiovascular Center, while others joined in on the celebration via Zoom, including a number of resident alumni as well as former faculty members.

The current residents prepared a video roast which included talks from several resident alumni, as well as tributes to the graduates.

With residency training now officially behind them, all three graduated chief residents have undertaken fellowships across the country. Dr. Hollon is completing a six-month skull base fellowship at the University of Utah, after which he will be returning as full time faculty to the U-M Department of Neurosurgery in January, 2021. Dr. Nathan is completing a spine fellowship at Stanford, and Dr. Smith is completing a peripheral nerve fellowship at Mayo Clinic.



Dr. Hollon



Dr. Nathan



Dr. Smith

## CONGRATULATIONS

Drs. Hollon, Nathan, and Smith.  
We wish them the very best as they continue their neurosurgical careers.



# A Farewell to Our 2020 Fellows



Dr. Ahmad

During the 2020 Chief Resident Graduation celebration, the Department of Neurosurgery's two exiting fellows – Drs. Shaz Ahmad and Kevin Swong – were also celebrated and honored for the contributions they made to the Department during their respective fellowships. Dr. Ahmad completed a two-year Neurocritical Care Fellowship and is now practicing at Southern Hills Hospital in Las Vegas.



Dr. Swong

“The Neurocritical Care fellowship provides trainees the opportunity to spend two years taking learning from the vast neurosurgical and critical care expertise across the University of Michigan. It has been a pleasure to watch Dr. Ahmad grow as a neurocritical care practitioner over the last two years. I am excited that he will continue to take excellent care of neurosurgical patients in his future career,” said Dr. Craig Williamson, Clinical Assistant Professor of Neurosurgery and Neurology and Director of the Neurocritical Care Fellowship.

Dr. Swong completed a one-year Complex Open and Minimally Invasive Spine and Peripheral Nerve Surgery Fellowship and has since joined the faculty of the Department of Neurological Surgery at Northwestern University.

“Congratulations to Kevin Swong for completing a combined CAST-Approved Peripheral Nerve and Complex Spine Fellowship. Kevin was our inaugural combined fellow who worked under the supervision of Dr. Yang as well as the spine faculty. It was quickly evident that Kevin was an outstanding clinician who was also popular among the staff and residents. As he begins his academic career in the Department of Neurosurgery at Northwestern, we wish him all the best,” said Dr. Paul Park, Director of the Neurosurgery Spine Program.

## 2020 Medical Education Awards

### Julian T. Hoff Teaching Award



The Julian T. Hoff Teaching Award is given each year to a junior faculty member within the Department with an exemplary record in teaching our residents.

**2020 Recipient:**  
Osama Kashlan, MD

### Friend of Neurosurgery Award



The Friend of Neurosurgery Teaching Award is given each year to an individual outside of the Department who is instrumental in teaching our neurosurgical residents.

**2020 Recipient:**  
Robert Fraumann, MD  
Clinical Instructor, Department of Anesthesiology

### Max Peet Resident Teaching Award



The Max Peet Teaching Award is given annually to a resident who has distinguished him/herself in the arena of teaching other residents and medical students.

**2020 Recipient:**  
Brandon Smith, MD

### McGillicuddy Resident Leadership Award



The McGillicuddy Resident Leadership Award recognizes a resident who exhibits exemplary leadership in maintaining the highest standards of professionalism.

**2020 Recipient:**  
Brandon Smith, MD

# New 2020 Neurosurgical Residents & Fellows

Despite the many unexpected events that 2020 brought with it, the event that we as a department excitedly anticipate each year fortunately still occurred; the Department of Neurosurgery welcomed three new residents – Drs. Jordan Lam, Oludotun “Dotun” Ogunsola, and Arushi Tripathy – to our residency training program.

## Residents



### Jordan Lam, MBBS

**Medical school:** University College London  
**Undergraduate:** University College London  
**Hometown:** High Wycombe, United Kingdom

**Why Neurosurgery?** Neurosurgery embodies the culmination of clinical advances, neuroscience research, and technology to further patient care. I am motivated to be part of these advances and watch the endless possibilities unfold in my lifetime.

**Why U-M?** I was drawn to the excellent clinical experience and abundance of meaningful research at U-M. Moreover, I have never experienced such a supportive team and been more confident that I will be trained to the highest level possible.

**Hobbies or Interests:** Powerlifting, opera, tea, guinea pigs, motorcycles, and guitar

**Clinical Interests:** Stereotactic and functional neurosurgery



### Oludotun “Dotun” Ogunsola, MD, MPH

**Medical school:** Case School of Medicine  
**Graduate:** Columbia University, Mailman School of Public Health  
**Undergraduate:** University of Rochester, Institute of Optics  
**Hometown:** Lagos, Nigeria

**Why Neurosurgery:** Very few fields allow you to make an impact in functional outcomes and general well-being of patients like neurosurgery. Furthermore, because of the relative dearth of global neurosurgical care, it is a field that will allow me to make an impact in global health in the context of research, education, and advocacy.

**Why U-M?** It is an institution that I am proud to represent. Coupled with residents and faculty that I would love to emulate, the abundance of resources available to residents in the context of research, stellar administrators, outstanding faculty and thus, outstanding clinical training, I know I will be part of a family that knows what it takes to ensure that I accomplish my goals.

**Hobbies or Interests:** I enjoy competing especially in mixed martial arts and more traditional martial arts. I enjoy watching and playing many sports including football, futbol, rugby, tennis etc. I also enjoy wrestling with my 2-year old son, spending time with my wife, as well as my family and friends.

**Clinical Interests:** Neurovascular, neuro-oncology, skull-base, spinal, functional, and pediatric neurosurgery



### Arushi Tripathy, MD

**Medical school:** Western Michigan University Homer Stryker MD School of Medicine  
**Undergraduate:** Johns Hopkins University  
**Hometown:** Ann Arbor, Michigan

**Why Neurosurgery:** As a neuroscience major and pre-med drawn towards surgery, neurosurgery was silently, hesitantly on my radar in college. Actually meeting a neurosurgeon in medical school, discovering the unique challenges of the neurosurgical patient population, and continuing to grow my fascination with neuroscience locked me in.

**Why U-M?** Neurosurgeons that graduated from U-M residency introduced me to neurosurgery. Faculty and residents at U-M helped me grow as an applicant and taught me everything I know about neurosurgery. My sub-internship at U-M proved to me that this was the best place and the best group of people I could hope to work with.

**Hobbies or Interests:** Travel, dessert, oil painting, reading, weight-lifting, fusion dance

# Fellows

The Department also welcomed two new fellows to our training program this year: Drs. Robert North and Samuel Carter. Dr. North will be completing a one-year Complex Open and Minimally Invasive Spine and Peripheral Nerve Surgery Fellowship, and Dr. Carter will be completing a two-year Neurocritical Care Fellowship.



## Robert North, MD

**Residency Training:** Baylor College of Medicine  
**Medical School:** Wayne State University School of Medicine  
**Graduate School:** Texas A&M University  
**Undergraduate:** Hillsdale College



## Samuel Carter, DO

**Residency Training:** Michigan State University  
**Medical School:** Lake Erie College of Osteopathic Medicine  
**Undergraduate:** Michigan State University

# Dr. Suresh Ramnath Retires from U-M Department of Neurosurgery



After 26 years in the U-M Department of Neurosurgery, Dr. Ramnath – a respected colleague, neurosurgeon, and resident educator – retired on Sept. 30, 2020; he will remain active in the department as an emeritus assistant professor. He has made significant contributions to the Department these past 26 years, especially in the realm of resident education.

Dr. Ramnath earned his MBBS degree in 1963 from Maharaja Sayajirao University in India. He began his residency at the University of Manitoba under Dr. D. Parkinson and completed

his neurosurgical residency in 1970 at Vanderbilt University under Dr. W. Meacham. He obtained his Fellowship in the Royal College of Surgeons of Canada in 1970. He was appointed Clinical Instructor in Neurosurgery at the University of North Dakota School of Medicine, where he remained until 1974. He was then appointed Clinical Assistant Professor in Neurosurgery at the Medical College of Ohio from 1975-1997.

While still practicing in Ohio, Dr. Ramnath's commitment to teaching U-M neurosurgery residents began to grow, when he became Adjunct Clinical Instructor in Neurosurgery at U-M in 1994. In 1997, he left private practice and became a full-time member of the U-M Department of Neurosurgery. Dr. Ramnath led the VA service from 1997 to 2010 and established the Ann Arbor VA as a hospital of excellence in Neurosurgery among the VA system. He was Chairman of the National VA Neurosurgery Board from 2004-2010. He was also a founding member of Project Shunt, the Department of Neurosurgery's outreach program to Guatemala, and attended annual medical missions from 1998 to 2013.

Dr. Ramnath is known by all in the U-M Department of Neurosurgery and beyond to be an exemplary teacher of medical students and neurosurgery residents. He serves as Director of the Neurosurgery Anatomy Lab and continues to teach. Dr. Ramnath has provided lectures on anatomy on a regular basis to neurosurgery residents, advanced practice providers, and medical students. He also helped organize and run a lecture series for our advanced practice providers. He provided lectures to medical students during their neurology rotation from 2002 to 2020 and, nationally, he was a member of the Neurosurgery Fundamental Skills Boot Camp, organized by the Society of Neurological Surgeons and the Congress of Neurological Surgeons.

The Department of Neurosurgery's Ramnath Student Fellowship is aptly named in honor of Dr. Ramnath and his teaching contributions; this fellowship will continue to enable select undergraduate students to be exposed to neurosurgery prior to entrance into medical school. As an active emeritus faculty member, Dr. Ramnath will continue to teach Neurosurgical Anatomy and cadaver dissection with our residents. He will also still hold a monthly myelomeningocele clinic. The Department of Neurosurgery is grateful to Dr. Ramnath for the contributions he has quietly made to the Department over these last 26 years. We wish him all the very best in retirement.



# Resident Honors & Awards

Our residents continue to receive myriad prestigious awards and honors for both their academic and clinical work; 2020 was no exception, despite the unprecedented nature of the year. Recent notable achievements include but are not limited to those listed below.



## David Altshuler, MD, MS

- Resident Ombudsman, U-M Department of Neurosurgery, July 2016 – present
- Departmental Resident Quality and Safety Representative, 2020-2021



## Amy Bruzek, MD, MS

- Best Neurosurgery Platform Presentation, Neuroscience Day, University of Michigan, June 2020



## Todd Hollon, MD

- Congress of Neurological Surgeons (CNS) Best Data Science Abstract Award, October 2019
- First author of paper entitled "Near real-time intraoperative brain tumor diagnosis using stimulated Raman histology and deep neural networks," published January 2020 in *Nature Medicine*, and highlighted in *The New York Times*, among other media outlets



## Siri Khalsa, MD

- American Association of Neurological Surgeons (AANS), Louise Eisenhardt Travel Scholarship, April 2020
- Family Feud Neuroanatomy Award – Senior Resident, U-M Department of Neurosurgery, June 2020



## Sravanthi Koduri, MD

- Resident Ombudsman, U-M Department of Neurosurgery, July 2020 – present



## Jordan Lam, MBBS

- Congress of Neurological Surgeons (CNS) Best Clinical Research Award, September 2020



## Joseph Linzey, MD, MS

- Congress of Neurological Surgeons (CNS) Samuel Hassenbusch Young Neurosurgeon Award, September 2020
- Co-authored paper entitled "Predicting poor 30-day post-operative outcomes for shunting in normal pressure hydrocephalus: a large national database analysis," which was selected as an Editor's Choice article in the June 2020 issue of *Neurosurgery*
- First author of paper entitled "Late surgical start time and the effect on rates of complications in a neurosurgical population: a prospective longitudinal analysis," which was selected as an Editor's Choice article in the August 2020 issue of *World Neurosurgery*



## Yamaan Saadeh, MD

- Spine and Peripheral Nerve Fellowship, University of Michigan, 2021-2022



## Brandon Smith, MD, MS

- John E. McGillicuddy Resident Leadership Award, U-M Department of Neurosurgery, 2020
- Max Peet Resident Teaching Award, U-M Department of Neurosurgery, 2020



## Mike Strong, MD, PhD, MPH, MS

- 2019 Society of Neurological Surgeons/RUNN Award
- Best Neurosurgery Resident Poster, Neuroscience Day, University of Michigan, June 2020
- 2020 Alpha Omega Alpha Honor Medical Society Post Graduate Fellowship
- AANS/CNS Section on Tumors Bronze Medal Award for Spine Research Abstract, 2020



## Matt Willsey, MD, PhD, MEng

- Functional Fellowship, Stanford 2022-2023
- PhD in Biomedical Engineering, conferred on August 21, 2020



## Tim Yee, MD

- Resident Ombudsman, U-M Department of Neurosurgery, July 2019 – present
- American Board of Neurological Surgery (ABNS) Neurosurgery Academic Excellence Award
- Family Feud Neuroanatomy Award – Junior Resident, U-M Department of Neurosurgery, June 2020

# Resident Presentations at National Meetings

**July 1, 2019 – June 30, 2020** Our resident trainees have continued to be productive with respect to their research and scholarly activities, even amidst the unprecedented challenges brought on by the COVID-19 pandemic. Despite travel restrictions, cancelled meetings, and meeting format changes, our resident cadre gave an impressive 23 presentations (including both oral and poster presentations) at national and regional meetings during the 2019-2020 academic year.

## 2019 Machine Learning for Healthcare Annual Meeting

8/2019 Ann Arbor, MI

**Todd Hollon, MD:** Stimulated Raman histology and deep neural networks for near real-time brain tumor diagnosis

## 2019 Congress of Neurological (CNS) Surgeons Annual Meeting

10/2019 San Francisco, CA

**Todd Hollon, MD:** Near real-time intraoperative brain tumor diagnosis using stimulated Raman histology and deep neural networks

**Jordan Lam, MBBS:** Surgical epilepsy care in a safety-net and private healthcare system: a comparative analysis

**Joseph Linzey, MD, MS:** An analysis of the predictive value of the LACE index and HOSPITAL score for a neurosurgical population

**Yamaan Saadeh, MD:** 1) Assessing occurrence of fusion in operative metastatic spine tumor patients: should we aim for fusion? 2) Association of body mass index and perioperative outcomes in surgery for metastatic spinal tumors

**Brandon Smith, MD, MS:** Neurophysiologic composition of fascicles utilized for Oberlin Transfer: the rare presence of the FCU fascicle

## 2019 Annual Meeting of the AANS/CNS Section on Pediatric Neurological Surgery

12/2019 Scottsdale, AZ

**Amy Bruzek, MD, MS:** 1) Posterior cranial vault distraction osteogenesis: surgical technique to maximize safety and optimize outcomes 2) Use of a novel, hand-held, electronic DNA analysis platform to quantify multi-gene molecular response in CSF of children with high-grade glioma

## 2020 Spine Summit: AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting

3/2020 Las Vegas, NV

**Jay Nathan, MD:** Results of an institutional ED protocol to expedite MRI for patients with suspected spinal cord compression

**Brandon Smith, MD, MS:** The current state of knowledge of providers caring for patients with neonatal brachial plexus palsy: room for improvement

**Mike Strong, MD, PhD, MPH, MS:** Differential bone marrow immune landscape may foster permissive tumor growth in the spine

**Tim Yee, MD:** Survival and fusion outcomes after surgery for spinal metastatic disease

## 2020 American Association of Neurological Surgeons (AANS) Annual Meeting

4/2020 Virtual

**Siri Khalsa, MD:** Automated intraoperative frozen diagnosis of brain tumors using machine learning

**Joseph Linzey, MD, MS:** Specialized social media team to increase online impact and presence: the *Journal of Neurosurgery* experience

## 2020 Annual University of Michigan Neuroscience Day

6/2020 Virtual

**Amy Bruzek, MD, MS:** Use of a novel, hand-held, electronic DNA analysis platform to quantify multi-gene molecular response in CSF of children with high-grade glioma

**Badih Junior Daou, MD:** Drivers of variation in 90-day episode payments after mechanical thrombectomy for acute ischemic stroke

**Siri Khalsa, MD:** Automated intraoperative frozen diagnosis of brain tumors using machine learning

## 2020 Annual Meeting of the Society of Neurointerventional Surgery in conjunction with the AANS/CNS Cerebrovascular Section

8/2020 Virtual

**Badih Junior Daou, MD:** 1) Histotripsy for intracerebral hemorrhage in a porcine model 2) Drivers of variation in 90-day episode payments after mechanical thrombectomy for acute ischemic stroke 3) Seizure prophylaxis in unruptured aneurysm repair: a randomized controlled trial

## 2020 Society for Neuro-Oncology Annual Meeting

11/2020 Virtual

**Todd Hollon, MD:** Rapid intraoperative diagnosis of glioma recurrence using stimulated Raman histology and deep neural networks

**Mike Strong, MD, PhD, MPH, MS:** Discerning the different bone marrow immune landscapes

# 2020 Visiting Professors

Each year, the Department of Neurosurgery invites renowned guest speakers and lecturers to present on various, relevant neurosurgery-specific topics. These visiting lectureships are named in honor of six U-M neurosurgeons and physicians who have helped to shape the practice of neurosurgery at the University of Michigan and beyond. This year, all of our visiting professor lectures were given virtually.

## Elizabeth Crosby Visiting Professor

Susan M. Chang, MD, Professor and Vice Chair, Neurological Surgery, UCSF Weill Institute for Neurosciences, University of California, San Francisco

**Title:** Advanced Imaging of Glioma

## Saeed M. Farhat Visiting Professor

Gail Rosseau, MD, Clinical Professor, Department of Neurosurgery, George Washington University School of Medicine and Health Sciences

**Titles:** 1) Global Neurosurgery 2) Diversity in Neurosurgery

## Julian T. Hoff Visiting Professor

Julie Pilitsis, MD, PhD, Chair and Professor, Department of Neuroscience and Experimental Therapeutics, Professor, Department of Neurosurgery, Albany Medical College

**Titles:** 1) Diversity in Neurosurgery: Patients and Providers 2) Functional Case Review

## Edgar A. Kahn Visiting Professor

Gerald E. Rodts Jr., MD, Professor, Department of Neurosurgery and Department of Orthopaedic Surgery, Emory University School of Medicine

**Titles:** 1) Failed Back Surgery Syndrome: A Missed Diagnosis 2) Surgical Treatment of Occipital-Cervical and High Cervical Pathology

## James Taren Visiting Professor

Edward Chang, MD, Chair and Professor of Neurological Surgery, University of California, San Francisco

**Title:** Toward a Speech Neuroprosthesis

## Joan Venes Visiting Professor

James Drake, MD, Surgeon, Department of Neurosurgery, Surgeon-in-Chief, Department of Surgery, The Hospital for Sick Children, The University of Toronto

**Titles:** 1) Developing Technology for Pediatric Neurosurgical Interventions 2) Pediatric Hydrocephalus: What have the last two decades shown us?

# FACULTY NEWS

## Dr. Muraszko Elected to the National Academy of Medicine



U-M Neurosurgery Chair, Dr. Karin Muraszko, was elected this year to the National Academy of Medicine – the highest honorary society in the United States for researchers in medicine and health. Notably, with the addition of Dr. Muraszko, there are just 12 neurosurgeons who are members of the Academy, and Dr. Muraszko is the second female neurosurgeon to be elected. Election to the Academy is considered one of the highest honors in the fields of health and medicine and recognizes individuals who have

demonstrated outstanding professional achievement and commitment to service. New members are elected by current members through a process that recognizes individuals who have made major contributions to the advancement of the medical sciences, health care, and public health. Dr. Muraszko was elected for her expertise on the treatment of individuals with brain tumors and congenital neurologic anomalies. She pioneered localized injection therapy with immunotoxin for leptomeningeal

disease, presented the first prospective analysis of cerebellar mutism after posterior fossa surgery, and characterized development of syrinx spinal cord cavities with Chiari 1 malformation.

In addition to this honor, Dr. Muraszko received the 2019 Exceptional Women in Medicine Award and the 2020 Top Doctors Award, both from Castle Connolly. She was also named to the 2020 America's Most Honored Doctors list by the American Registry. Dr. Muraszko sat on the 2019-2020 U.S. News & World Report Best Children's Hospital Working Group as the C.S. Mott Children's Hospital Representative and she currently sits on the 2019-2022 AANS Professional Conduct Committee. She also sits on various institutional committees, including the U-M UH/CVC Ops Plan Oversight Committee (as Chair Sponsor), the U-M, C&W 7 Day Hospital Committee, and the U-M Data/Inpatient Modeling Committee (as Chair Sponsor).



NATIONAL ACADEMY OF MEDICINE

## Welcome New Faculty Member, Dr. Jacob Joseph



Dr. Jacob Joseph, who graduated from the U-M Department of Neurosurgery's Residency Program in 2019, joined the U-M Neurosurgery faculty as Clinical Assistant Professor in August this year.

Dr. Joseph specializes in the treatment and management of traumatic brain and spine injuries. He grew up in Plano, Texas and attended the University of Texas at Austin, where he graduated with Highest Honors. He

then earned his Doctor of Medicine from Baylor College of Medicine in Houston, Texas. After completing his residency at U-M, he accepted an additional fellowship in Neurotrauma and Complex Spine Surgery at the University of Pittsburgh. Dr. Joseph's clinical interests are in the prevention, diagnosis, and treatment of traumatic brain injury (TBI), concussion, and spinal cord injury.

He is also dedicated to the treatment of patients with spinal disorders requiring complex spinal reconstructive surgery or minimally invasive spinal surgery. His research focuses on understanding the biomechanics of traumatic brain injury in sports, diagnosing concussion using novel biomarkers and imaging techniques, and developing new therapeutics for victims of TBI and spinal cord injury. Dr. Joseph serves as an Unaffiliated Neurotrauma Consultant for the National Football League and is committed to the prevention of brain and spine injuries in athletes.

Dr. Joseph has extensively published in peer-reviewed journals and has written multiple book chapters on spinal disorders as well as TBI. He is an active member of the Congress of Neurological Surgeons, American Association of Neurological Surgeons, AANS/CNS Section on Disorders of the Spine and Peripheral Nerves, and AANS/CNS Section on Neurotrauma and Critical Care. He is a member of the U-M Concussion Center, U-M Injury Prevention Center, and U-M Center for Integrative Research in Critical Care (MCIRCC).

## 2020 Promotions Effective Sept. 1, 2020.



**Dr. Anuska Andjelkovic-Zochowska** was promoted to Professor, with tenure, in the Department of Pathology and to Research Professor in the Department of Neurosurgery.



**Dr. Mark Oppenlander** was promoted to Clinical Associate Professor in the Departments of Neurosurgery and Orthopaedic Surgery.

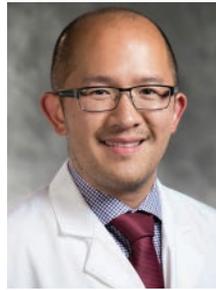


**Dr. Aditya Pandey** was promoted to Professor, with tenure, in the Department of Neurosurgery and to Professor, without tenure, in the Departments of Otolaryngology-Head & Neck Surgery and Radiology.

# ALUMNI NEWS



**John Cowan, MD, (2008)** was elected president of the Georgia Neurosurgical Society from 2020-2021. Dr. Cowan currently practices at Harbin Clinic in Rome, Georgia.



**Khoi Than, MD, (2014)**, Associate Professor of Neurosurgery and Orthopaedic Surgery at Duke University, was named to the Congress of Neurological Surgeons Executive Committee (Ex-Officio) in 2020 and was also named to the North American Spine Society's SpineLine "20 Under 40" list this year. Dr. Than also became a dad (to daughter Ayla) in May, 2020.

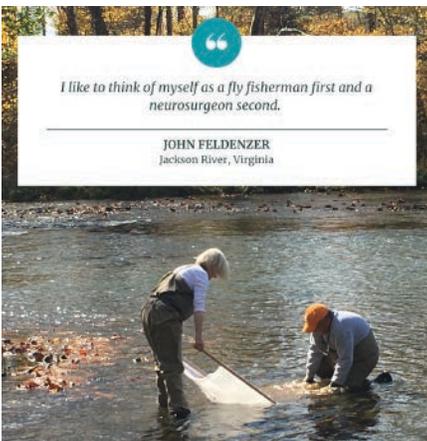


**Jennifer Strahle, MD, (2015)** was recently promoted to Associate Professor of Neurosurgery, Orthopedic Surgery and Pediatrics at Washington University in St. Louis, St. Louis Children's Hospital. She also serves as Director of the Pediatric Neuro Spine Program and Director of Pediatric Cerebrovascular Surgery.

## Alumni Feature: Outside the Operating Room

**John Feldenzer, MD, (1989): Neurosurgeon Turned Entomologist**  
Now retired from active neurosurgical practice (with the exception of an occasional clinic at the Salem, Virginia Veterans Medical Center), U-M Neurosurgery alumnus John Feldenzer, MD, (1989) and his wife, Karen, enjoy spending time monitoring the health of the Jackson River, where Dr. Feldenzer can often be found fly fishing. He and his wife became certified benthic macro-invertebrate stream monitors five years ago through the Virginia Save Our Streams program developed by the Izaak Walton League of America.

As Dr. Feldenzer shared, "One can tell the health of a stream by its water quality and that quality is reflected in the types of "critters" that live all or part of their lives on the river bottom (thus, aquatic benthic macro-invertebrates). The situation is analogous to the canary in the coal mine (the canary detects air pollution early). So we sample the Jackson River's bottom for the types and numbers of bugs (mayflies, stoneflies, caddis flies etc.) and group them based on their pollution tolerance. We then develop a multi-metric index score and, in this way, we monitor the biological health of the stream. We report our data to the VA SOS program and the Virginia Department of Environmental Quality. We do it several times per year and even have had some local high school Natural Resources classes come to learn about water quality and what we do. We are basically amateur entomologists or citizen scientists!"



**Joseph Stern, MD, (1996): Neurosurgeon, Speaker, and Author**  
In addition to his active neurosurgical practice at Carolina Neurosurgery & Spine Associates, U-M Neurosurgery Alumnus Joseph (Jody) Stern, MD, (1996) is also a speaker and author with a growing repertoire. Propelled by the loss of his younger sister in 2015 after a diagnosis of acute leukemia and, just one year later, the loss of his brother-in-law to a brain hemorrhage from a ruptured aneurysm, Dr. Stern's writing and speaking engagements focus on the power and importance of empathy and compassion in neurosurgery. Through these avenues, Dr. Stern shares how his own practice as a neurosurgeon has been transformed by the experience of grief and loss. He has written a book on the subject titled "Grief Connects Us: A Neurosurgeon Learns about Love, Loss, and Compassion," which will be released in May of 2021. Dr. Stern's writing on this topic has also been featured in several *New York Times* articles, including "Dying in the Neurosurgery I.C.U.," "Moral Distress in Neurosurgery," and "Grief as My Guide: How My Sister Made Me a Better Doctor." He also published an invited opinion piece in the December, 2019 issue of *World Neurosurgery* entitled "Compassion Belongs in the Operating Room."



This year, Dr. Stern gave a virtual TED Talk in September, again focusing on the importance of empathy and compassion in neurosurgery. His talk can be viewed on the TEDx YouTube channel and on [www.tedxgreensboro.com](http://www.tedxgreensboro.com).

# THE COVID-19 PANDEMIC

## The U-M Department of Neurosurgery Rises to the Occasion

The COVID-19 pandemic has required the world to rise to an unforeseen occasion in ways it never has before; it has stretched and tested us all. The ways in which we live, work, and interact with one another have been drastically altered. And yet, encouraging examples of rising to this intensely difficult occasion have been found all around us, including many within the U-M Department of Neurosurgery.

From the massive effort it took to quickly enable as many staff members as possible to work from home at the beginning of the pandemic through the procurement of laptops and necessary software, to the swift and successful implementation of virtual patient visits (since the start of the pandemic, the Department has shifted a significant number of outpatient clinic care visits to virtual care visits, with a current average of about 800 virtual care visits per month, compared to 3-5 per month before the pandemic) each and every one of our department members has played an important role in rising to the occasion – ultimately for the good of our patients and for the good of those who are most vulnerable among us.

There are myriad ways members of our own department have risen – and continue to rise – to the occasion, stepping up to meet this challenge head-on with courage, grace, and compassion.



# Perspectives from Deployed Neurosurgery Faculty and Clinical Staff

## Neurointensivist Krishna Rajajee, MD



Dr. Rajajee reflects on his experiences in both the Neuro ICU and the RICU leading up to and amidst the peak of the COVID crisis this spring.

"The Regional Infection Control Unit (RICU) was created very early when it became clear that Michigan Medicine would be swept up in the pandemic. This was done quickly and with

remarkable efficiency, led by extraordinary individuals like Vineet Chopra, the head of hospitalist medicine. During the initial days, this unit was very much the front line, and continues to be the primary focus of the institution's response. It's a multi-professional, multidisciplinary unit with nurses, respiratory therapists, and providers from a variety of backgrounds and specialties working together in ways we rarely see. While the RICU is predominantly staffed by nursing and providers from pulmonary critical care and anesthesia, many individuals from the Department of Neurosurgery and the Neurointensive Care Unit served there [at the peak of the pandemic this spring].

First and most important to mention are our nurses. It is important to understand why I single out our nurses. Along with our respiratory therapists, their level of contact and exposure is exponentially higher than that of physicians, as they often spend hours in very close contact with these patients. Nationally, many more nurses have fallen ill than physicians. Many of our Neuro ICU nurses asked about volunteering in the RICU even before the call for volunteers went out. Several inpatient advanced practice providers from Neurosurgery also volunteered early, before anyone asked, including Jana Barkman, Alicia Berger, Carina Brake, Diane Gorham, and Jennifer Reynolds. Alongside dozens of our intensivist colleagues from pulmonary medicine, anesthesia and surgery, Craig Williamson and I completed volunteer shifts in the RICU.

In this intense environment, filled with the desperately ill, surrounded by unfamiliar faces, it is difficult to describe the comfort of a familiar face, when Neuro ICU nurses and providers run into each other. One particular encounter almost moved me to tears, and I think of it every day. I ran into one of our most senior nurses from the night shift at a PPE training session – specifically, a training session on how to re-use, PPE with as little risk as possible, because without re-use, our institution, and every other, might run out. I assumed she was there because we were soon going to see COVID patients on our unit. In fact, she had volunteered to serve on one of the newer COVID surge units. This nurse is in a high risk category herself, and has family members at even higher risk. I knew she would have to virtually quarantine at home while re-using PPE at work. However, the new surge unit would be staffed with nurses with limited experience and her many decades of ICU experience and caring for those with special needs would be invaluable. She believed the needs of the many were greater than her own.

Pretty quickly, however, COVID patients had to be placed in every ICU in the hospital, including the Neuro ICU. I cannot sufficiently express the pride I feel in every nurse, tech, respiratory therapist, environmental services employee, advanced practice provider, house officer, and intensivist on our unit.

There are too many individuals to name, it would take pages. However, I would especially like to mention a couple of people. Our neurocritical care fellows Lauren Ottenhoff and Shaz Ahmad [Dr. Ahmad has since completed his two-year fellowship] who – after volunteering to serve in the RICU and being turned down – immediately switched to in-house call at night, because these desperately ill patients would become unstable at all hours. Every nurse and provider present in the unit during those nights told me how valuable it was to have these two skilled critical care providers on hand, whether a central line needed to be urgently placed for a patient whose blood pressure was collapsing or a COVID patient suddenly extubated themselves, placing both patient and healthcare staff at high risk.

The same with our Neurosurgery PGY-1s [now PGY-2s] Drs. Joey Linzey, Ayobami Ward, and Jaes Jones who were part of the ICU team when 4D filled with COVID patients. Dr. Linzey in particular was on night shift in the first and most intense week of the crisis on our own unit, when Craig Williamson was the attending intensivist. The many respiratory therapists in the ICU deserve special mention. They enter these rooms without hesitation multiple times a day, sometimes multiple times an hour, as ventilator alarms go off and oxygen levels drop. They, as I have heard described in a recent newspaper article, are working "closest to the nuclear reactor" as they deal with disconnected ventilator circuits and clogged endotracheal tubes.

Communication in and out of rooms with COVID patients was very difficult because the doors have to stay closed. One of our nurses, Kala Husby, set up a donation to purchase walkie-talkies that the nurses and providers in full PPE within the room could use to ask for supplies or urgent assistance. Eventually we were able to acquire a pair for each room in the unit. The system worked so well that the RICU adopted it from us, outfitting every room with a walkie-talkie.

One of the most traumatic things about this crisis is that our patients are alone, as family are prohibited from being at their side. Our nurses, house staff, and clinical social worker, Meghan Wind, were extraordinary at calling family members every day, often multiple times per day, and arranging FaceTime calls whenever possible. This is in addition to their many other clinical responsibilities. I share all this not only to recognize the contributions of these extraordinary people but also because I believe strongly that people are motivated by those who set an example. Every junior nurse and provider should know about these examples within our own unit and department."

CONTINUED...

## Pediatric Nurse Practitioner Tara Egnor



Tara completed a three-week long deployment in the RICU at the peak of the COVID crisis this spring and volunteered to help on weekends in the RICU as needed following her deployment.

“The whole experience was amazing. Terrifying and heartbreaking definitely, but also inspiring and revitalizing. It was such a pleasure to work with such smart, dedicated, caring health care professionals. I volunteered because it just seemed like the right thing to do. I am single and my family doesn’t live here in Michigan so I didn’t have worries about bringing something home to a loved one. As a pediatric NP who has only ever worked with kids I didn’t know if they would have much use for me but I just wanted to be of help. I thought they would have a need for me as a tech or a bedside, but they had me working as a provider. It was definitely a humbling experience as I have never seen so many of the sickest people I have cared for in one group. I was happy that I was able to get up to speed relatively quickly and like to think I was an asset, not a burden, to my team. The good news is that we did not surge to as many patients as we had anticipated and I was able to come back to Neurosurgery after three weeks. I offered to help on weekends if needed after my deployment but things have remained steady. That is the good news. The tragic news is that every day I worked in that unit, I saw someone who died. That is the reality of this illness and it is not done ravishing the lives of people we all know and love. I would like to share two particular stories from my time in the RICU:

**Story 1** My second day on the unit I had a full load of four patients and was feeling a bit overwhelmed. I sat down to call the designated family members of my patients. My first call was to a daughter of a man who was very sick but stable. It was uncertain what his course would be as he was very sick. I explained to her what was going well and what I was concerned could be difficult coming up. She thanked me. I asked her how she was doing and she shared that her mother was in another hospital but had not needed to be intubated so she was thankful for that. I asked her how she was feeling physically and reviewed what she should do to keep herself well. I was sure to explain to her she should be in quarantine as she had been exposed to her parents. She said she would. I then asked her, do you have any other questions? And she said, “How are you dear?” It brought tears to my eyes that during this extremely difficult time she was asking about my health. I told her I was well and thanked her for asking. And although I continued worrying about that woman’s father long after the call because he was extremely ill, I knew that whatever happened she would be okay because she was able to look past her own pain and still offer kindness to others.

**Story 2** During my second week in the RICU, I had a patient who had been successfully intubated the day before. He did extremely well the first day I took care of him and by the second day he was ready to transfer out to the general care floor. I felt that was a big win so we gathered about 20 people to line the hallway and clap him out. As he got to the end of the hallway he gave a big thumbs-up and said, “Wasn’t that a happy ending.”

## Adult Clinic Nurse Practitioner Jane Elenbaas



Jane was deployed as part of an APP effort to team up with the hospitalist service on the inpatient units during the COVID surge.

“I was paired with a hospitalist (internal medicine attending) and was assigned a group of patients localized to one unit, sometimes two adjacent units.

The majority of the patient population was COVID+, but some were not and just needed medical care. All of the attending physicians and APPs were very welcoming, patient, and accommodating to me – someone who had not worked inpatient or internal medicine for more than eight years! It was a pleasant and rewarding experience, and I was happy to be able to contribute in an active “frontline” manner. The patients and their family members – who we communicated with daily – also helped make the experience more enjoyable due to their grace, gratitude, and kindness.”

## Adult Clinic Nurse Practitioner Tom Ferguson



Tom was also deployed as part of the APP effort to support inpatient units during the COVID surge.

“I was redeployed to Medicine Family Health service on the inpatient side to help with admitted medicine patients for many health problems including COVID-19. I was there for just a couple

of days before being released along with many other APPs. At that point, it appeared the curve was thankfully flattening and the feared large influx of patients would not materialize.

We (APPs from various units all over MM) were all welcomed to our new roles graciously and helpfully by the inpatient teams. I was impressed with the team effort and enormous planning to which everyone contributed to prepare for the crisis. I am especially thankful for our Neurosurgery admin, MA, and APP staff members for all the extra coverage and resiliency.”

## Inpatient APPs

Inpatient APPs Carina Brake, Jennifer Reynolds, and Diane Gorham were all redeployed to staff the RICU in April as well, but after additional resource assessments, were soon released back to Neurosurgery to resume their duties in the Neuro ICU.

Carina Brake, lead inpatient APP, praised the entire inpatient APP team for their tireless efforts and flexibility through the pandemic, saying, “The entire inpatient APP team has been tremendous and flexible during this whole pandemic. We have all changed our work schedules to block our days together and work 13-hour shifts to avoid hospital exposure. Individuals have adapted to what feels like our new normal and without complaint, offering to work extra shifts, working midnight shifts and always remaining flexible with a schedule that has been changing day to day and week to week. I am so proud of the team we work with.”

## Perspectives from our Deployed Administrative Staff Members

A number of Neurosurgery administrative staff members were deployed this spring to support the COVID efforts at Michigan Medicine as well, and even more individuals within the Department volunteered to be deployed.

Administrative staff members who were redeployed at the crisis peak:

- **Melissa Matthews**, Administrative Assistant to Dr. Patil
- **Dee Dee Peck**, Administrative Assistant, Referral Office
- **Heather Revels**, Senior Administrative Assistant
- **Sara Smith**, Administrative Assistant to Dr. Park

Others who volunteered but were not called upon for redeployment:

- **Marti Cotner**, Senior Administrative Assistant
- **Kelsey Fearer**, Clinical Outcomes Data Specialist
- **Brandye Hill**, Senior Administrative Assistant
- **Jennifer Nordin**, Pediatric Nurse Practitioner
- **Leda Stimac**, Administrative Assistant to Dr. Pandey
- **Kait Verbal**, Brain Tumor Program Coordinator

**Melissa Matthews, Dee Dee Peck, Heather Revels, and Sara Smith** were all redeployed to Michigan Medicine's COVID-19 Hotline Call Center and supported the Call Center during the peak of the crisis, beginning in early April. The hotline was available for Michigan Medicine employees and established Michigan Medicine patients for questions about symptoms, home management, whether medical treatment was required and what specific steps needed to be followed to receive care or testing.

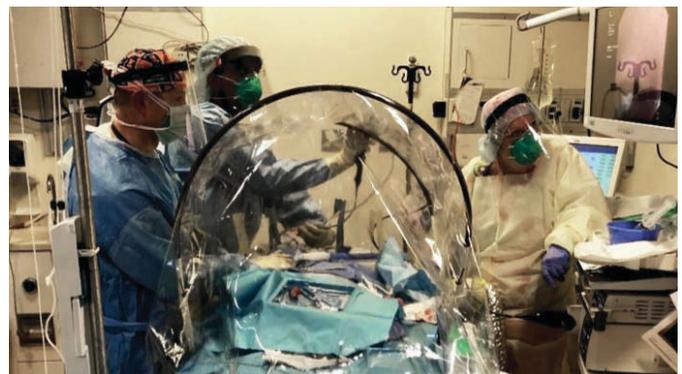
Below, each staff member shares a bit about their experiences during redeployment.

**Melissa Matthews:** "I volunteered for the hotline because I wanted to contribute in some way to our community recovering from this crisis. Even though I knew I was doing my part by staying home, it still made me feel a little helpless at times. Being part of the Michigan Medicine Covid-19 Hotline meant I could still do my part by working from home, but I was also involved in the progress being made to limit spread of the virus and make sure patients recovered from it. The hotline allowed patients and staff to call a single number and get directed to the appropriate teams for further screening. I did my small part by being calm and comforting with anyone who called in, and getting them connected to the resources that would help them find answers. I was (and am) grateful for all the providers working 24/7 to make sure patients get the help they need."

**Dee Dee Peck:** "I am glad I volunteered to help out the COVID-19 Call Center. I answered calls from patients and employees and routed them appropriately. Most calls were people wanting to be tested because they had symptoms or had been around someone who had been diagnosed. Others called for information or because they were not sure. I was blessed to be able to continue working when there were (and are) so many who are not."

**Heather Revels:** "I volunteered right away because I wanted to walk the walk of what Michigan Medicine stands for – patients first. I have said throughout my eight years in Neurosurgery that I don't have the ability to save lives, but I can support the people who do. I knew with volunteering that I may have ended up in the COVID unit, but instead ended up in the COVID Nursing Hotline Call Center. We triaged calls to the appropriate nursing staff, and answered routine questions. Being able to assist was an experience, both challenging and rewarding. The phone calls at times were difficult; the fear in patients' voices and their quest for reassurance and answers could be mentally difficult at times, but to help one patient, one front line worker, one family member was worth it. It was a smooth transition with other neurosurgery administrative team members helping with neurosurgery tasks; their support and encouragement helped on the difficult days, as well as knowing that I had a great neurosurgery family to come home to!"

**Sara Smith:** "This pandemic has touched everyone's lives in some way, creating stress and anxiety. The COVID-19 Hotline was open 24/7 and served as an important resource for Michigan Medicine patients and employees. I am grateful that we have the technology to be working from home and happy that I was able to help out in some way while still being safe at home with my children."



## Necessity as the Mother of Invention: Covid Crisis Breeds Innovation

Tracheostomy and bronchoscopy, which are aerosol generating procedures (AGPs), are among the higher-risk procedures for healthcare workers, when performed on COVID patients. The Michigan Center for Integrative Research in Critical Care (MCIRCC) in association with faculty in the Department of Mechanical Engineering at the University of Michigan developed a negative-pressure clear plastic tent using low-cost materials that can be used on COVID patients when AGPs are performed. This tent rapidly exchanges the air within through a HEPA filter thereby decreasing risk to healthcare workers. Our neurointensive care faculty pioneered the clinical use of this tent in the Regional Infection Control Unit (RICU) and then in the Neurointensive Care Unit, on COVID patients who required these procedures.

# STAFF NEWS

## Notable Achievements

### Susie Hines Receives 2019 Peggy Hoag Staff Excellence Award



Residency Program Administrator Susie Hines was chosen as the recipient of the 2019 Peggy Hoag Staff Excellence Award and received the award in March this year.

Awarded for the first time in 2018 to longtime Department member Peggy Hoag, who faithfully served the Department as an Administrative Assistant for nearly 40 years and retired in 2018,

this award is now given annually to the administrative staff member in the Department of Neurosurgery who best exemplifies the qualities of service excellence, teamwork, and professionalism.

Susie has been a member of the Department for 17 years and has been at Michigan Medicine since 1999. Among much high praise for Susie's dedication and commitment expressed by her nominators, a few statements of note from her nomination included:

"Susie is the most important ingredient for the continued success of our residency program. She has an apparently limitless capacity for hard work. Many of her own ideas for the residency program have been implemented to the great benefit of our department."

"From Susie, the answer is never "no," but rather, "how can we make this possible." She absorbs an ever-increasing burden, proactively thinking of ways to make our lives easier and the residency program more fulfilling. There is no problem too big or too small for Susie, as her mission is to allow us to focus on learning."

"Susie tirelessly advocates for our needs and is well-known throughout the hospital as thorough, effective, and efficient."

As the 2019 recipient, Susie received a certificate, a monetary award, and her name will be added to the plaque that hangs in the Neurosurgery Administrative Suite.

### Denise Justice Writes and Publishes Two Children's Books on Neonatal Brachial Plexus Palsy



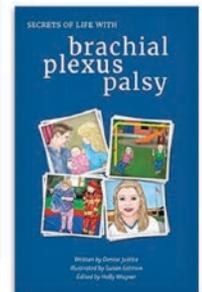
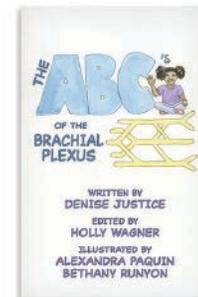
This year, Denise Justice, occupational therapist for the U-M Brachial Plexus Program, wrote and published two children's books about Neonatal Brachial Plexus Palsy (NBPP). The books are entitled *The ABC's of the Brachial Plexus* and *Secrets of Life with Brachial Plexus Palsy*.

Denise's work on these initiatives in the context of her broader interest in patient education has distinguished U-M's Brachial Plexus Program among its peers. Both books can be purchased directly from Amazon at the links listed below:

The ABC's of the Brachial Plexus: <https://amzn.to/2LJ138o>

Secrets of Life with Brachial Plexus Palsy: <https://amzn.to/2WKK1z3>

Additionally, Denise received a Distinguished Service Award this fall for her work within the Michigan Occupational Therapy Association. This award honors a member of the MiOTA for extraordinary service to the Association who has made continuing and outstanding contributions to the development, growth, and process of MiOTA.



### Steve Napolitan Elected as President-Elect/Vice President of Nerves



Neurosurgery Chief Department Administrator Steve Napolitan was elected President-Elect/Vice President of the Neurosurgery Executives' Resource Value & Education Society (NERVES) this year after completing a one-year term as Treasurer. His term took effect upon being elected during the NERVES Annual Business Meeting, which was held virtually in April. His term as

President-Elect/Vice President will last one year, concluding at the 2021 Annual Meeting, which is scheduled to take place in Vancouver, British Columbia April 14-16, 2021.



# Memorable Retirements

## Charlotte Gunden, NP, Retires After Nearly 40 Years at Michigan Medicine



Charlotte Gunden, NP, retired from the Department of Neurosurgery in June this year; her original planned retirement date was in April but she graciously agreed to stay until June to provide support through the COVID-19 pandemic. Charlotte, who was the first-ever nurse practitioner to be hired by the Department of Neurosurgery back in 1987, provided expert, compassionate care to our neurosurgical patients for 33 years.

She began her nursing career at U-M in the Neuro ICU in October, 1981. Upon completion of the U-M School of Nursing NP program in 1987, Charlotte was hired as the first NP for the adult neurosurgery service in the Department of Neurosurgery, at which time there were six adult neurosurgeons. The number of NPs and PAs has grown steadily over the years within the Department, as has the number of faculty, and Charlotte was here to witness myriad changes and growth in her 39 years of service at Michigan Medicine (with 33 of those being spent within the Department of Neurosurgery).

“I was fortunate to work with outstanding clinicians and others in the department and nearly 100 neurosurgery residents. I learned so much working with Dr. Sullivan and the pituitary/skull base population,” she said. Charlotte also helped lead the Department of Neurosurgery’s Brain Tumor Support Group since 1995, playing an integral role in this group for 25 years.

“I will miss many things – the MAs, front desk staff, administrative assistants, department administrators, phone nurses, NPs, PAs, physicians and patients, quick trips to the gift shop, good lectures and learning new things (hopefully that won’t end),” Charlotte said. In retirement, Charlotte is enjoying “lingering over morning coffee, reading, gardening, seeing my house and yard every day in the daylight, traveling, and spending time with family.” We wish Charlotte all the best in retirement, and we thank her for the innumerable contributions she made to the Department of Neurosurgery over the last 33 years.

## Neurosurgery Coder Nancy Howard Retires After Nearly 44 Years at Michigan Medicine



Long-time neurosurgery coder Nancy Howard retired in May this year after nearly 44 years at Michigan Medicine. Our department is grateful to Nancy for her many years of dedicated service.

Upon completion of the Medical Record Program at Schoolcraft College and passing the Accredited Record Technical exam, Nancy joined Michigan Medicine’s Department of Surgery Coding Department in September of

1976. In the ensuing 44 years, Nancy spent time as both a coder and a supervisor, and as both a part-time employee and a full-time employee (she notes that she is forever grateful to have had the opportunity to work part time while raising her four children).

Nancy saw tremendous change in both the methods and technologies used in the world of medical coding from the beginning of her career in 1976 through her retirement. As Nancy shared, coding was done manually in the 1970s and 1980s; coders sent a pink sheet copy of the codes to the surgeons by courier to review and the surgeons manually sent back approval to coders by checking “I agree” or “I disagree” on the forms. From 1996-2014, the “STAR” system was used, which featured messaging between coders and surgeons (a big step up from manual communication). Even greater changes took place in 2014 when the OpTime coding system was implemented. Through the years and the myriad changes, Nancy remained steadfastly devoted to her craft. During Nancy’s 44-year career at Michigan Medicine, she spent 34 of those years doing neurosurgery coding.

In retirement, Nancy plans to travel more with her husband (these plans are currently delayed due to the pandemic, as is a 40th wedding anniversary trip). She is also enjoying spending time with her four grown children and their families, including her two granddaughters.

Nancy shared that she misses working with the neurosurgeons and administrators she had the pleasure of getting to know through her coding work, as well as her colleagues in the KMS Revenue Cycle office. “I coded for almost every surgery department at various times over the years and was always happy to spend the majority of my time coding neurosurgery cases. I sincerely appreciated the opportunity to code for Dr. Muraszko and the entire Department of Neurosurgery.”

# PATIENT STORIES

## Benign Brain Tumor Sets Extensive Health Challenges in Motion

Despite a brain tumor and serious, ongoing complications, one woman is determined to face challenges head on and live life her way.

Terry Kennedy begins her days giving thanks for her health. The 55-year-old takes nothing for granted after facing significant challenges just a few years ago.

March 27, 2017, was a fairly routine day for the Ann Arbor resident until she began to feel something wasn't right. "I wondered if I was having a stroke or a heart attack," Kennedy recalls. Alone upstairs, she was able to call out to her husband, Tim, who raced upstairs to find his wife in the middle of a tonic-clonic seizure, also known as a grand mal seizure. Kennedy was taken by ambulance to the Michigan Medicine Emergency Department, where an MRI revealed a golf ball-size tumor identified as a meningioma. This benign, slow-growing tumor forms on membranes surrounding the brain and spinal cord. Common warning signs include seizures, dementia, difficulty with speech or vision, and weakness on one side of the body. Until her seizure that day, Kennedy had no indication of the tumor growing inside her head. And now she found herself facing brain surgery.

The operation was performed the following week by Michigan Medicine neurosurgeon B. Gregory Thompson, MD. "Dr. Thompson performed a difficult but successful surgery," says a grateful Kennedy. But four weeks later she began to feel exhausted, off balance and nauseous. When her arm began to droop and her right leg became weak, she was directed by Thompson to go to the emergency room for another MRI. "The MRI showed fluid in the area where the tumor had been removed," Kennedy says. "I was diagnosed with an infection and was told by Dr. Thompson that I needed surgery immediately."

Neurosurgeon Aditya Pandey, MD, performed Kennedy's surgery on April 21, 2017, removing the graft implanted during the first surgery as well as the area known as the bone flap as a precaution in case the infection had spread. The plan was to replace the bone flap with a titanium plate at a later date. Until then, Kennedy would need to wear a helmet to protect her head. Kennedy remembers the moments following her operation as somewhat surreal. "As I was being wheeled from the operating room, someone kept saying, 'Mrs. Kennedy, move your right side.' I realized then that I couldn't move my right arm or leg. I was told there was a 1% chance of something like this happening," she says. "I knew I had to handle it."

Follow-up MRIs and X-rays didn't reveal the reason for what was diagnosed as paresis, a partial loss of voluntary movement that can occur following a surgical procedure such as Kennedy's. "We prayed it was temporary," she says. Kennedy began a physical therapy program within Michigan Medicine and worked diligently each day with the goal of being home in time to celebrate Mother's Day with her family.



Terry Kennedy and her husband, Tim, are grateful for her remarkable recovery.

"Eventually, my toes began to move, then my leg," she says. "My arm wasn't complying, but I kept working at it. I never thought I would not recover. I knew I'd get there." The determined Kennedy met her remarkable goal. "Much to everyone's surprise, I did it," she says. "I came home for Mother's Day walking with an intravenous antibiotic in my arm 24/7 for the next four weeks." At home, Kennedy continued to work on her arm strength, which was eventually regained.

On July 24, Thompson performed Kennedy's third surgery, a cranioplasty, by inserting a contoured graft made of titanium to replace her bone flap. Her goal this time was to be home to celebrate her 31st wedding anniversary on July 26th with her husband. "And I was," she says proudly. She was also able to return to work at Gift of Life Michigan, an organization that facilitates organ tissue donation. However, after experiencing several seizures, Kennedy was diagnosed with epilepsy, which led to her retirement. The seizures are likely being caused by swelling in the tissue that surrounded her tumor, says Michigan Medicine neurologist Yu Wang, MD, PhD, who is currently treating Kennedy. "This swelling changes the circuitry of the brain forever. There's no way to predict if she'll have more seizures."

Despite her challenges, she continues to volunteer for Gift of Life Michigan, Wolverines for Life and Donate Life Coalition of Michigan — all organizations focused on promoting successful transplantations by educating the public about the importance of the Michigan Donor Registry. Kennedy will likely be on seizure medication for the rest of her life, but says that's a small price to pay for the life she's living today. She credits her family's sense of humor and her art projects as therapy that has gotten her through the difficult times, along with a positive outlook and perseverance. She says she is beyond grateful for caring doctors, nurses, friends, family and coworkers. "In all the challenges we faced, our family felt so blessed and cared for."

For more patient stories, please visit  
[michiganhealthblog.org](https://michiganhealthblog.org)

# Living with Brain Cancer: Embracing a Difficult Diagnosis

## How one Mid-Michigan patient has found new opportunities to give back.

Andrea Passmore learned she had a brain tumor four days before her 51st birthday. Yet she has ultimately come to see the diagnosis as a kind of gift, an opportunity to share the outpouring of support that she has received during her cancer journey. Friends, family, and those that she barely knew from as far away as Africa stepped forward to help, and she says she has felt more love and appreciation than ever before. “I’ve come to see it as a sort of blessing,” she says of her tumor — an oligodendroglioma, a rare, usually slow-growing tumor that can develop in the brain or spinal cord. More than 1,200 people are diagnosed with oligodendroglioma every year, most often between the ages of 35 and 44 years, according to the National Cancer Institute. It’s considered a malignant primary brain tumor. The cause is unknown, but radiation exposure and certain gene changes have been linked to a higher chance of developing it. No one else in Passmore’s family has had it. Because there is no cure, Passmore, now 53 and living in Gaines, Michigan, is being monitored by Denise Leung, MD, a neuro-oncologist with the University of Michigan Rogel Cancer Center and a clinical assistant professor of neurology at the U-M Medical School. That monitoring will continue for the rest of her life. “She stands out because she is a really positive person,” Leung says. “She has a great attitude and that goes a long way in terms of quality of life and how she receives her treatment.”

## Symptoms emerge

Passmore believes her tumor started growing in the temporal lobe on the left side of her head around January 2011. That’s when Passmore — whose family includes her husband, two adult children, five stepchildren and nine grandchildren — had a migraine for 14 days straight. After an MRI in nearby Flint, a physician told her she’d had a stroke. A neurologist got the migraines under control, but to this day Passmore believes she didn’t have a stroke, but actually the damaged area doctors saw on the MRI was her tumor, which was discovered in the same area of her brain six years later. (Headaches are one of the symptoms of oligodendrogliomas.) The next symptom emerged on a shopping trip in mid-March 2017. She grabbed a bottle of peanuts off the shelf and was reading its label when one part of the label appeared in triplicate and moved to the left. “My vision was weird but I could still see okay,” she says. She called her doctor the next day and an MRI was ordered on March 24. “I thought I needed a vision exam and new glasses. It didn’t register in my brain that something serious was going on,” Passmore says. Three days later, she got a hint of the challenges ahead.

## Treatment begins

Passmore learned that the first treatment would be surgery to safely remove as much of the tumor as possible, and to obtain tissue to determine precisely what type of tumor she had. On June 1, 2017, neurosurgeon Jason Heth, MD, and his team performed a 13-hour operation to remove the tumor. Passmore was awake the whole time to help avoid damaging important brain areas. During the procedure, the surgical team questioned her and she performed simple tasks, like singing or wiggling the toes, to check those language and motor functions.

Next came radiation from July to September and chemotherapy from October to May 2018. She resumed working at a heating and cooling company nearly six months after surgery. The only issue involved forgetting an occasional word in her writing. She returned to the operating room in August 2018 after repeatedly experiencing a sensation from ear to ear that caused her to grit her jaw tight. Michigan Medicine neurosurgeon Oren Sagher, MD, diagnosed the condition as seizures, a sign that the tumor could be growing again. She had more of her left temporal lobe removed and was cautioned that there was some risk of increased language issues or weakness. “I will never forget about 6 a.m., waking up and ringing the nurses because I needed to use the restroom and I was really hungry,” she says. “When the nurses came into my room they were crying — in happiness — because I was still walking, talking and really wanted something to eat. They took such good care of me.”

## Giving back

Passmore is currently doing well and doctors are monitoring her cancer for any sign of recurrence. Instead of being caught up in the uncertainty of the future, Passmore says she’s focused on being a gift to others. She stopped working in January 2019 and is an active volunteer, sharing her experience with other cancer patients, visiting homebound ill members of her church, where she’s a deacon, and lending a helping hand whenever she can. For Passmore, it’s about sharing and giving back.

“I think going through surgery and radiation and chemo really showed to me how precious life is and how blessed I am,” she says. “I had so many people that helped me out in simple to major ways.” And she wants to return that favor. “I know that I am still here on earth for a reason,” Passmore says.

For more patient stories, please visit  
[michiganhealthblog.org](http://michiganhealthblog.org)

Andrea Passmore (left) has formed close bonds with fellow Michigan Medicine brain tumor patients, including Katie Dorr.  
*Note: Photo taken before COVID pandemic.*



# Young Woman's Brain Aneurysm Leads to Remarkable Outcomes

When one young woman suffered a life-threatening brain aneurysm, her family went above and beyond to raise money for research to aid in her recovery.

Sarah Walton's brain hemorrhage at age 22 nearly ended her life. As she reflects on her experience three years later, she acknowledges the roles that fate, pride, and gratitude have played in her remarkable recovery and the life she's living today. Her story begins on October 30, 2016, when she awoke with the worst headache of her life. As a teenager who experienced migraines, she was accustomed to headaches, but none as debilitating as this.

## Undeniable fate

"I was physically ill from the headache and stayed in bed that morning," Walton says. As her condition deteriorated, it was by fate she says that her fiancé, Zack, returned home early from a hunting trip. His unexpected arrival and quick action were monumental in saving her life. Walton was taken to the local hospital in her hometown of Clare, Michigan, and immediately put on life support after being diagnosed with a brain aneurysm that resulted in a brain bleed, also known as a hemorrhagic stroke. The outlook was grim, with doctors giving her only a 10% chance of survival without significant disability. She was transported to a hospital 30 minutes away for treatment. Once there, it was discovered she would need the expertise of a skilled neurosurgeon. Walton was then air lifted to Michigan Medicine in Ann Arbor via its Survival Flight.

Because aneurysms similar to Walton's are sometimes the result of a blood infection, the Michigan Medicine neurosurgery team decided to begin treatment with antibiotics. Surrounded by family, Walton seemed to improve, although her condition was still dangerous. "Any time there is a brain aneurysm bleed, time is of the essence as a fraction of patients will die before reaching the hospital," says Michigan Medicine neurosurgeon Aditya S. Pandey, MD. "Fifty percent of those who do make it to the hospital may become disabled for life." Walton recalls being awake and fairly alert on some days during her antibiotic treatment, but "I knew I might not make it."

Twelve days after being put on antibiotics, imaging tests revealed Walton's aneurysm had grown. "We decided it was time to perform surgery as the antibiotics had failed," says Pandey. Possible treatment strategies included open surgery to snap shut the aneurysm, or a minimally invasive approach in which coils are placed in the aneurysm via a catheter inserted through an artery in the leg or arm. "In Sarah's case, open surgery was the best approach given the location and shape of the aneurysm and our ability to close the aneurysm while maintaining blood flow within the vessel," says Pandey. On November 11, a few hours after surgery, Walton was eating a cookie and walking, says her sister, Laura Crawford. "They were calling her the 'Miracle Girl.'" But recovery would take months of dedication on Walton's part as she struggled to

speak. Therapy included her own initiative to work as a waitress and communicate with customers. Eventually, she was once again able to form her words and speak clearly.

## Family pride

During Crawford's time at her sister's bedside, she learned a troublesome statistic about brain aneurysms: "The federal government funds only 83 cents for each afflicted patient," says Crawford. "I was so frustrated that I decided to organize a fundraiser for brain aneurysm awareness and research."

That fundraiser, the Michigan Brain Aneurysm Awareness 5K, held in the family's hometown of Clare, has proved enormously successful, says Walton, who couldn't be any prouder of her sister, Laura, and parents for their commitment to brain aneurysm awareness. "Lots of people came from around the state," says Crawford. "We raised \$17,000 in the first race in 2018 and an additional \$12,000 in 2019." The 3rd Annual Michigan Brain Aneurysm Awareness 5K was held as a virtual race in May of 2020 due to the COVID pandemic and raised nearly \$10,000.

## Immeasurable thanks

The success attracted the attention of Pandey, who gives tremendous credit and thanks to Laura Crawford and her family for their work in establishing the fundraiser. "The Walton family experienced what it's like have a loved one on the edge of not surviving. They recognized how much effort goes into the recovery of a patient with a brain aneurysm and understood the complexities involved. They understood that nearly 50% of all brain bleed patients become disabled for life and wanted to change this grave reality," Pandey says.

The family's support is helping to develop certain medications to make the recovery process easier for these patients, Pandey says. "Such medications have potential in reducing human suffering from brain bleeds worldwide." Walton couldn't agree more as she is back to living a full life. Married to Zack and mother to daughter, Lena, she understands firsthand the need for enhanced awareness and research surrounding brain aneurysms. She knows how fortunate she is to have overcome insurmountable odds and is thankful to her healthcare professionals and to her family for their commitment to helping those with life-threatening brain aneurysms.



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# Teen Athlete Undergoes Brain Surgery During Pandemic

A high school volleyball player didn't know her episodes of nausea were seizures caused by a tumor in her temporal lobe. But when she finally got cleared for surgery, COVID-19 struck.

Emily Langlois, 17, doesn't remember what happened before she woke up with her volleyball team around her. She knows that before passing out she felt nauseous, like she did at every practice, and that was often blamed on not eating enough during the day. But this time her L'Anse Creuse North coach was more concerned.

## The diagnosis

After telling her team the right side of her body was numb during a practice, the Macomb teenager was rushed to the hospital where she learned her episodes of nausea were actually seizures from a low-grade brain tumor. Certain stimuli, like the smell of buttered popcorn, particular drills at practice and brushing her teeth would trigger a seizure. It made sense now why she felt nauseous passing the concession stand to enter the gymnasium or setting the ball during a game. In September 2019, Langlois received her first seizure medication, but it didn't help control the number of seizures. In November, the family was referred to C.S. Mott Children's Hospital, where Julie Ziobro, MD, PhD, a pediatric neurologist, found the exact location of the tumor on an EEG and recommended a different medication. Langlois was willing to try the new medication, but only after she got to play in her team's regional championship game. "She's a wonderful athlete and was determined her epilepsy wouldn't stop her," Ziobro says. "Her coaches worked with her and would look for signs of seizures, which were often subtle for Emily." At the big game, the team lined up on the court. When each player was called, they'd step forward and wave to the crowd. Because the strobe lights triggered seizures, Langlois kept her eyes closed until her teammate tapped her arm to tell her it was her turn to wave. "I played the game, and I guess God had a plan because we won," Langlois says. "And I didn't even miss a point."

## Tests, tests and more tests

After a few months with the new medication, Langlois still wasn't seeing a decrease in seizures. "It was unlikely a third medication would work," Ziobro says. "It was time to discuss other options." Among those options: brain surgery. "Not everyone is a good candidate for surgery. We needed to make sure the seizures were localized and in an area of the brain that posed less risk of serious complications," Ziobro says. She adds that it takes an extensive network of health care professionals to get someone with epilepsy to a point where surgery can be scheduled. After a multitude of tests and a five day observational study with electrodes stuck to her head, Langlois underwent a Wada test in February. It tested her object and word recognition, speech, language, muscle strength and short-term memory by putting various areas of her brain "to sleep" with anesthesia. Following the Wada test, speech pathology and neuropsychological evaluations, Ziobro determined Langlois was a good candidate for a temporal lobectomy in March.



Emily posing with her team's championship trophy.

Emily posing in PPE with Superman at C.S. Mott Children's Hospital.

## Having brain surgery during a pandemic

"While an open brain operation, a craniotomy, does carry real risk, for a young, healthy, cooperative patient with a lesion where Emily's tumor is located, there should be a low overall risk of permanent harm," says Mott pediatric neurosurgeon Hugh J. L. Garton, MD, MHSc. When asked if she was nervous about surgery, Langlois says she wasn't at all, and was actually excited. But soon after the decision was made, COVID-19 struck Michigan and non-essential surgeries were postponed. After a few weeks with more seizures and much discussion, Langlois' care team felt the surgery was essential and should proceed as planned. The day before the surgery, Langlois' teammates held a 35-car parade in her neighborhood. "My friends and family got me through the tough days," Langlois says.

## "Having seizures doesn't mean your life stops"

On April 16, a Mott surgery team, led by Garton, removed the tumor completely. Langlois hasn't experienced any complications so far, and Garton says she has a 70-80% chance of long-term seizure freedom. "It's only been a few months, so we can't guarantee that Emily won't ever have another seizure," Garton says. "But she's doing great, without any of the complications we thought she may have. I'm so happy for her." Langlois has had a smooth recovery, practicing setting a volleyball with her dad in the yard, running, doing yoga and beginning to lift weights again – all seizure free. She graduated high school in June with plans to attend Concordia University on an athletic scholarship and to study nursing. Today, Langlois says she feels like a new person. "Having seizures doesn't mean your life stops. It'll be a time out maybe, but it won't just stop," she says. "It's a process of a lot of unknowns, but when the answer does come, and it will, it'll be better. When you get an answer, it feels like Christmas morning. You just have to wait for Christmas. Don't stop living your life because you're afraid of what might happen."

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# RESEARCH NEWS

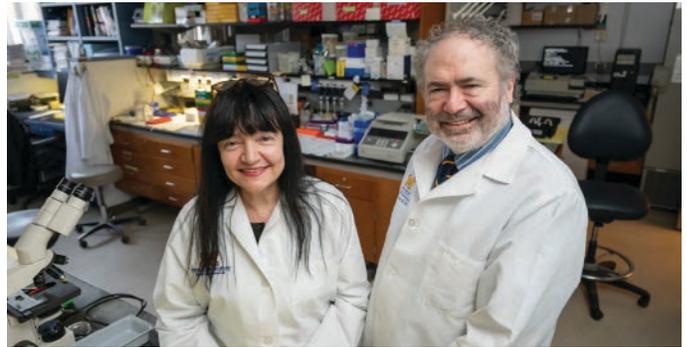
## News from the Castro-Lowenstein Laboratory: Adjustments for COVID-19 and More

Meeting COVID-19 requirements and safety regulations in the Castro-Lowenstein Laboratory has been challenging. Scientists, however, are used to working under stringent safety conditions and protocols, so it has largely been a matter of tweaking what we were already doing. The most challenging aspect has been social distancing, as science involves close interactions. This is especially critical in training new staff on microsurgical techniques in rodents. Fortunately, with new safety protocols in place, we've been able to resume training. Overall, these safety protocols and the diligence of our lab workers and the team within the Unit for Laboratory Animal Medicine (ULAM) have enabled us to safely continue our research and make steady progress in meeting our scientific goals.

Our lab maintains a longstanding record of excellence and innovation in the development of genetically engineered preclinical mouse models of adult and pediatric malignant brain cancer. These models are used to develop and test novel therapeutic modalities, to uncover the cellular, molecular, and mathematical bases underlying tumor growth patterns, and to study cancer-immune cell interactions in the tumor microenvironment. Dr. Maria Castro, R.C. Schneider Collegiate Professor of Neurosurgery, and Dr. Pedro Lowenstein, Richard C. Schneider Collegiate Professor of Neurosurgery, have a vision to develop transformative, novel treatments for both adult and pediatric patients with brain tumors. In 2020, the lab continued to make unprecedented advances, despite COVID-19.

In a five-year study recently published in *Neuro-Oncology*<sup>1</sup>, Comba et al., from the Castro-Lowenstein Lab team, combined computational tools, transcriptional profiling, a number of genetically engineered mouse glioma models, and functional studies to uncover how glioma cells make their microenvironment more favorable for growth. The work focused on Fyn tyrosine kinase, which is a downstream target of the tyrosine kinase signaling pathway and had been shown to be overexpressed in human gliomas. Blocking Fyn resulted in inhibition of tumor growth and anti-tumor immunity. An important finding is that even though *in vitro* evidence suggests that Fyn works in a cell-intrinsic manner, mouse models and context matter, and detailed investigations into tumor cell-microenvironment interactions can be much more illuminating. This work has laid the foundation for understanding how glioma cells engage with the host immune microenvironment. Inhibiting this signaling mechanism may lead to new strategies to treat glioblastoma (GBM).

Another recent study, published in *Neuro-Oncology Advances*<sup>2</sup>, analyzed the effect of tumor mutational burden (TMB) in glioma on patients' survival using the clinical and genomic data of 1,199 glioma patients from The Cancer Genome Atlas. We discovered that TMB can predict survival only in glioma patients harboring a mutation in IDH1 (astrocytoma and oligodendroglioma). In patients diagnosed with the most aggressive form of glioma, GBM, TMB does not affect prognosis. In addition, high TMB was associated with the activation of DNA-repair machinery. This may improve the stratification of low-grade glioma patients and provide a more accurate assessment of personalized treatment in the clinic.



In another paper, in press in *Nature Communications*<sup>3</sup>, the team, in collaboration with Dr. Joerg Lahann's laboratory in the U-M Department of Chemical Engineering and the Biointerface Institute, reported the use of brain tumor-targeted nanoparticles to deliver an inhibitor of a transcription factor (STAT3) required by brain tumor cells to grow and invade throughout the normal brain. Systemic delivery of these nanoparticles to glioma-bearing preclinical mice resulted in sustained delivery of the therapeutic moiety at the tumor site while avoiding adverse off-target toxicity. Median survival and tumor-free long-term survival both increased. Importantly, the treated mice developed immunological memory, which protected them from tumor recurrence. These findings represent a powerful new approach for glioma immunotherapy. Systemic drug delivery during surgery may treat residual disease, and the anti-glioma immunological memory response may delay recurrence.

Enrollment of adult glioma patients at U-M was completed for the Phase I clinical trial of a novel immunotherapy approach pioneered by the Castro-Lowenstein team that uses gene therapy-mediated delivery of therapeutic genes into GBM. This approach elicits the reprogramming of the patient's own immune system and uses a combination of two viral vectors that encode (1) a gene that induces tumor cell death and (2) another gene that trains the immune system to recognize and kill any remaining tumor cells. The viral vectors are delivered into the tumor cavity to trigger an effective anti-tumor immune response. We are now moving onto Phase 2 with this promising gene therapy approach.

1. Comba A, Dunn PJ, Argento AE, Kadiyala P, Ventosa M, Patel P, Zamler DB, Núñez FJ, Zhao L, Castro MG, Lowenstein PR. Fyn tyrosine kinase, a downstream target of receptor tyrosine kinases, modulates anti-glioma immune responses. **Neuro Oncol.** 2020;22(6):806-818. doi: 10.1093/neuonc/noaa006. PMID: 31950181.

2. Alghamri MS, Thalla R, Avvari RP, Dabaja A, Taher A, Zhao L, Ulintz PJ, Castro MG, Lowenstein PR. Tumor mutational burden predicts survival in patients with low-grade gliomas expressing mutated IDH1. **Neurooncol Adv.** 2020;2(1):vdaa042. doi: 10.1093/oaajnl/vdaa042. PMID: 32642696

3. Gregory J, Kadiyala P, Doherty R, Cadena M, Habel S, Ruoslahti E, Lowenstein P, Castro M, Lahann J. Systemic brain tumor delivery of synthetic protein nanoparticles for glioblastoma therapy. **Nat Commun.** 2020 (in press).

# News from the Crosby Neurosurgical Laboratories in the Time of COVID-19 and Beyond

COVID-19 has had seismic effects on so many facets of life, so it is to be expected that it has had major impacts on clinical and preclinical research at the University of Michigan, including the Crosby Neurosurgical Laboratories. That started with the ramp-down of research in March to the first tentative ramp-up in May and the implementation of a shift system to allow as many researchers as possible to perform experiments while maintaining social distancing. The return toward normal has been a gradual process with stringent safety guidelines, but strides continue to be made in cerebrovascular and brain tumor research. The help of all within the Crosby Labs and without in dealing with this difficult situation has been much appreciated.

Like all, we have learned to adapt. It has been the time to catch up on manuscripts. In-person lab meetings have been replaced with the ubiquitous conferences via ZOOM (the new four-letter word). Trips to national or international meetings to discuss science have been replaced by virtual meetings or a walk around the park waiting for Newton's apple to fall and spark new ideas. These are tough times, but we will get through them. Despite the challenges created by the pandemic, the Crosby Laboratories have progressed on several important research fronts.



Dr. Guohua Xi

Dr. Ya Hua

Dr. Richard Keep

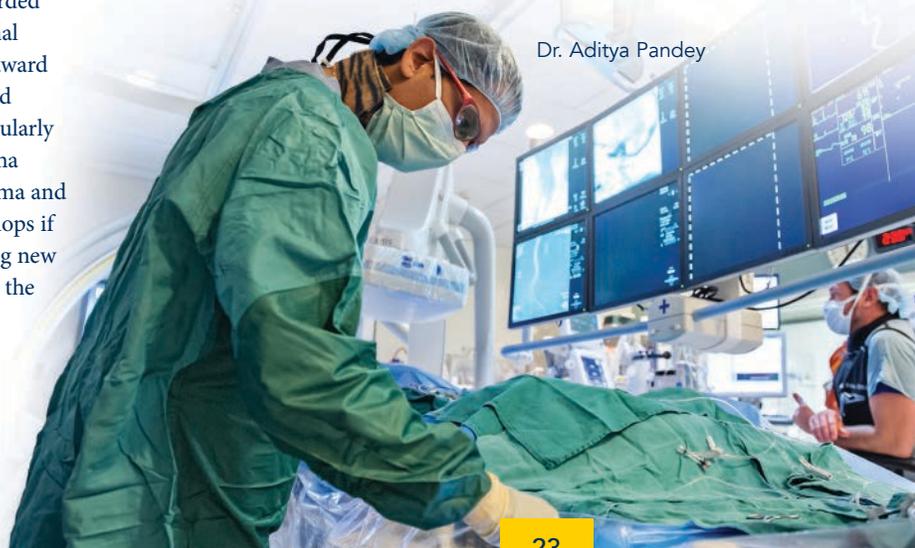
Dr. Guohua Xi, Richard C. Schneider Research Professor of Neurosurgery and Associate Director of the Crosby Laboratories, has been awarded a prestigious \$8.4 million R35 grant from NIH (NINDS – National Institute of Neurological Disorders and Stroke). This eight-year award allows him to extend his work studying mechanisms of injury and potential therapeutics for cerebral hemorrhage. The award particularly focuses on what regulates red blood cell lysis within the hematoma (and, thus, the release of hemoglobin and iron), how the hematoma and hemoglobin are cleared from the brain, why hydrocephalus develops if the hemorrhage extends to the ventricular system, and developing new therapies (including potential combination therapies) to mitigate the devastating effects of cerebral hemorrhage.

Translating animal data on neurological disorders to the clinic is very difficult. For example, are there species differences? Is the proposed therapeutic reaching the human brain at appropriate concentrations? Drs. Guohua Xi, Ya Hua and Richard Keep in the Crosby Laboratories have examined the role of clot-derived iron overload in brain injury in multiple animal models of intracerebral hemorrhage. They have shown that targeting iron can reduce brain injury. To examine the extent and time course of iron overload in human intracerebral hemorrhage, Drs. Xi and Keep collaborated with Dr. Aditya Pandey, Professor of Neurosurgery, and Drs. Neeraj Chaudhary and Thomas Chenevert in Radiology to show that T2\* MRI can be used to quantify tissue iron around the intracerebral hematoma<sup>1</sup>. They found that iron overload occurred in patients and that the iron concentrations reached were similar to those found in animal models. This should help facilitate translation of animal studies to the clinic and it provides a novel method to assess the effectiveness of iron chelator therapies in intracerebral hemorrhage and other iron-related neurological conditions.

While much attention has focused on red blood cell iron as a mediator of damage in hemorrhagic stroke, Drs. Hua, Xi and Keep have also brought attention to the role of peroxiredoxin-2, the third most prevalent protein in erythrocytes and a potent inflammatory agent. Their recent evidence implicates the release of peroxiredoxin-2 from the hematoma as a potential cause of hydrocephalus after intraventricular hemorrhage<sup>2</sup>. Hemorrhagic stroke, whether intracerebral, subarachnoid or intraventricular, is in desperate need of new therapeutic approaches.

1. Wei J, Novakovic N, Chenevert TL, Xi G, Keep RF, Pandey AS, Chaudhary N. Perihematomal brain tissue iron concentration measurement by MRI in patients with intracerebral hemorrhage. **CNS Neurosci Ther.** 2020;26(9):896-901. doi: 10.1111/cns.13395. PMID: 32436273

2. Tan X, Chen J, Keep RF, Xi G, Hua Y. Prx2 (peroxiredoxin 2) as a cause of hydrocephalus after intraventricular hemorrhage. **Stroke.** 2020;51(5):1578-1586. doi: 10.1161/STROKEAHA.119.028672. PMID: 32279622.



Dr. Aditya Pandey

# PHILANTHROPY NEWS & IMPACT

## Michigan Medicine Development and COVID-19: An Update from our Development Colleagues

Michigan Medicine's Office of Development hit the ground running in response to COVID-19, working hard to address the myriad urgent needs stemming from the pandemic. Together, we raised \$2 million for COVID-19 related research, ran the #HAILtotheFrontLine Crowdfunding campaign to bring in more than \$38,000, and collected more than one million pieces of personal protective equipment. In addition to supporting Michigan Medicine's COVID-19 response, our efforts to support the Department's mission and to honor our donors' generosity have remained a top priority for our team. During the unprecedented challenges brought on by the pandemic, we have seen firsthand the importance and impact of philanthropy within the Department of Neurosurgery.

This year, our faculty have been able to continue providing the best and most innovative care to patients; they have also continued to move groundbreaking research forward. Perhaps the area where we have felt the most profound impact from philanthropy has been in resident education. The Resident Wellness and Resident Sponsorship Funds have enabled the Department of Neurosurgery to continue providing an exceptional learning experience for each and every neurosurgical resident. While financial challenges swept Michigan Medicine and diminished many departments' ability to support their teams in the same ways they previously had, we were able to leverage these funds to continue providing equipment, education, and team-building opportunities to our residents. Surgical loupes for first-year residents were still provided, as was Thanksgiving dinner for residents and their families, and many residents were able to take advantage of virtual learning experiences and conferences throughout the pandemic. Without generous supporters of the Resident Wellness and Resident Sponsorship Funds, the impact of the pandemic on our residents' and their learning experience would have been much greater.

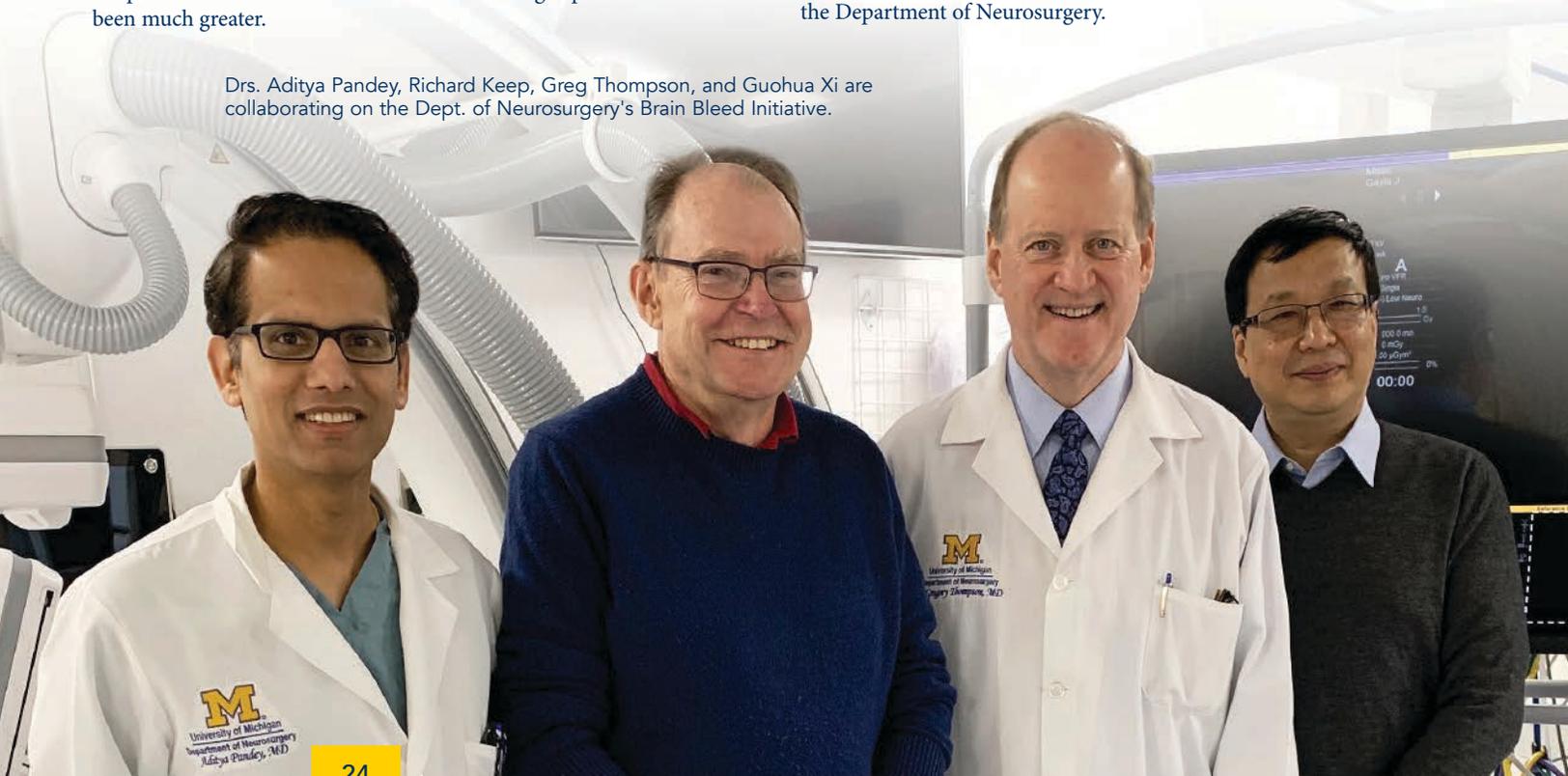
As faculty and staff across Michigan Medicine have begun to resume in-person appointments, conduct surgical procedures, and return to the lab, we, too, have shifted our attention. While COVID-19 research and patient care remain important missions for Michigan Medicine, our team is once again fully focused on the needs of the Department of Neurosurgery. Recently, we met to discuss our ambitious plans for the year ahead to raise funds in support of the Department's mission. We are energized in our efforts to help ensure that the promising research being conducted continues and that the programs that patients and their families depend on remain available with capacity for growth. To that end, we are committed to building even stronger ties with our existing donors while making inroads with new ones.

We hope you will enjoy reading about just a few of the upcoming fundraising priorities within the Department of Neurosurgery and feel inspired by the ways in which you and your colleagues contribute to improving and saving lives every day.

### Brain Bleed Research

Every year, 35,000 people in the U.S. — 500,000 worldwide — experience bleeding in the brain due to ruptured brain aneurysms — weak spots on brain blood vessels prone to breaking. Bleeding in the brain can result in blood clots, swelling in the brain, and fluid build-up. Toxins released during brain bleeds can lead to serious injury, disability, and even death. Exploring the causes of brain bleeds and identifying potential medications to prevent their subsequent devastating injuries have long been areas of focus of the Brain Bleed Initiative led by a dedicated team of physicians and researchers across the Department of Neurosurgery.

Drs. Aditya Pandey, Richard Keep, Greg Thompson, and Guohua Xi are collaborating on the Dept. of Neurosurgery's Brain Bleed Initiative.



The team has identified the likely toxins that can lead to these injuries and is now investigating medications that could potentially neutralize them. The team is also exploring another drug to determine whether it can be used to prevent the fluid build-up in the brain that occurs after a bleed. Reducing fluid build-up and swelling can help stave off other serious health implications resulting from brain bleeds. The brain bleed team is committed to transforming care for brain bleed patients everywhere. Breakthroughs in the use of these medications could save lives, eliminate the need for surgery, and improve the recovery odds for hundreds of thousands of patients annually, here and around the world. We are grateful for the support received from a number of donors and volunteers who have committed financially and who have shared expertise as we strategize future steps in taking this initiative to the next level.

## Brain Tumor Tissue Bank

Michigan Medicine has long been a leader in the diagnosis and treatment of brain tumors. We are also on the cutting-edge of brain tumor research. This critical area of discovery relies on the study of central nervous system (CNS) tissue. Studying human brain tumors can be complicated because tumors are often in close proximity to parts of the brain that have vital functions. To address this, our

scientists took the lead in establishing the Brain Tumor Tissue Bank — a biorepository of CNS or human brain tissue which includes diseased tissue samples, control samples, and whole brains donated by patients hoping to propel life-saving research. Our patients are essential for the success of our research efforts in this area and are often willing to donate a sample of their tumor tissue for the repository. Growing the collection of brain tissue samples is of utmost importance for our researchers' ability to pursue ground-breaking studies. Much of their work, such as using gene therapy to treat brain tumors, is extremely promising from both a scientific and clinical standpoint, and the Brain Tumor Tissue Bank provides material that is vital to these efforts.

Our philanthropic partners play an important role in our ability to maintain and expand our Brain Tumor Tissue Bank. Donor support helps our physician-scientists advance their work, allows us to build our collection, and acts as a powerful recruiting tool, helping us attract the most skilled neurosurgeons and scientists to Michigan Medicine. This tremendous resource is vital to our ability to build on our excellence in the diagnosis and treatment of brain tumors, while creating hope for our patients.

# Get to know your development team...

## And join us in transforming patient lives today and into the future.

The Michigan Medicine Office of Development supports the fundraising priorities of faculty and staff with the goal of accelerating breakthrough discovery, transforming patient care, developing leaders, recruiting and retaining extraordinary minds, and creating innovative environments for all.

As members of the Neurosciences Development Team at Michigan Medicine's Office of Development, we are all dedicated to ensuring that the needs of the Department of Neurosurgery are met. We are passionate about supporting the Department's mission in every way that we can. Please take a moment to read more about our team and let us know how we can work together.



**Kirsten Petriches** has led the Department of Neurosurgery's development efforts for the last four years, with a focus on increasing both grateful patient fundraising and donor engagement, while working with faculty to keep donors connected through their philanthropy. She is a University of Michigan alumna and she holds a master's degree from Eastern Michigan University. Kirsten lives in Brighton with her husband and two daughters.

Contact me: 313-231-0230 | [kagwiz@umich.edu](mailto:kagwiz@umich.edu)



**Allison Mayer** joined the Neurosurgery Development team one year ago, bringing an immense amount of experience in discovery work focused on identifying and cultivating new donors to the Department. She is also leading our efforts in alumni philanthropy and engagement. She is a University of Michigan alumna and lives in Plymouth with her fiancé.

Contact me: 734-678-3981 | [ajmayer@umich.edu](mailto:ajmayer@umich.edu)



**Trisha Langkos** has worked at Michigan Medicine Development for nearly nine years, providing support and leadership across all aspects of our fundraising efforts. She brings an important focus and commitment to the donor experience, while working tirelessly to ensure that our faculty and team members have everything they need to be successful. Trisha lives in Saline with her husband and three daughters.

Contact me: 734-323-0360 | [tlangkos@umich.edu](mailto:tlangkos@umich.edu)



**Michael Harders** has served as the senior director for the neurosciences, cardiovascular, and mental health fundraising programs for two years. He brings a wealth of fundraising and leadership experience to our team, and helps drive the vision and strategy of our fundraising efforts. He is also leading our fundraising efforts for the new adult inpatient hospital. Mike is a Kansas State University alumnus and lives in Toledo, Ohio with his wife and two children.

Contact me: 417-894-2826 | [miharder@umich.edu](mailto:miharder@umich.edu)

If you would like to learn more about philanthropy, engagement opportunities, the fundraising priorities of the Department of Neurosurgery, or how you can make a gift, please contact us.

# Publications & Grants

## 2020 PUBLICATIONS\*

**Adapa AR, Linzey JR, Daou BJ, Mehta UV, Patel T, Ponnaluri-Wears S, Washer LL, Thompson BG, Park P, Pandey AS.**

**Evaluating the role of methicillin-resistant *Staphylococcus aureus* (MRSA)-specific antibiotic prophylaxis for neurosurgical patients.** *Clin Neurol Neurosurg.* 2020;106353. Epub 2020/11/11. DOI: 10.1016/j.clineuro.2020.106353

**Agrawal D, Raghavendran K, Zhao L, Rajajee V. A prospective study of optic nerve ultrasound for the detection of elevated intracranial pressure in severe traumatic brain injury.**

*Crit Care Med.* 2020. Epub 2020/10/14. DOI: 10.1097/CCM.0000000000004689

**Al-Hasani H, Khan NW, Branham KH, Heckenlively JR, Sullivan SE, De Lott LB, Fahim AT.**

**Rapid visual field constriction in a patient with retinitis pigmentosa and pituitary adenoma.** *Am J Ophthalmol Case Rep.* 2020;19:100762. Epub 2020/06/23. DOI: 10.1016/j.ajoc.2020.100762

**Alghamri MS, Kamran N, Kadiyala P, Lowenstein PR, Castro MG.**

**Functional assay to assess T-cell inhibitory properties of myeloid derived suppressor cells (MDSCs) isolated from the tumor microenvironment of murine glioma models.** *Methods Enzymol.* 2020;632:215-228. DOI: 10.1016/bs.mie.2019.05.047

**Alghamri MS, Nunez FJ, Kamran N, Carney S, Altschuler D, Lowenstein PR, Castro MG.**

**Functional characterization of tumor antigen-specific T-cells isolated from the tumor microenvironment of sleeping beauty induced murine glioma models.** *Methods Enzymol.* 2020;631:91-106. Epub 2020/01/18. DOI: 10.1016/bs.mie.2019.05.032

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## 2020 ACTIVE SPONSORED AWARDS / GRANTS\*

**Engineering stem cells as diagnostic and therapeutic agents for glioblastoma**

**Calinescu A-A, Clines G**

NIH R21 NS 10787902 6/1/2018 – 11/30/2020

**Cancer Biology Training Program**

**Castro M**

NIH T32 CA00967628 9/1/2018 – 8/31/2023

**Cancer hematopoiesis immunology**

**Castro M**

Rogel Cancer Center 4/1/2019 – 4/31/2020

**Immune-mediated therapies in a genetically engineered murine model of diffuse intrinsic pontine glioma**

**Castro M**

NIH R21 NS 10789401A1 4/1/2019 – 3/31/2021

**Immune-suppressive myeloid cells in the glioma microenvironment: Signaling mechanisms and novel therapeutic strategies**

**Castro M, Lowenstein P, Muraszko K**

NIH R37 NS 09480406 7/1/2019 – 6/30/2022

Immunotherapeutic approach for DIPG; pre-clinical testing

**Castro M, Lowenstein P**

Chad Tough Foundation and Sophie's Smile  
7/1/2019 – 6/30/2029

Impact of H3G34R mutation in reprogramming the glioma immune microenvironment

**Castro M, Belen-Fabiani M**

American Brain Tumor Association  
10/1/2019 – 9/30/2021

Interactions between the tumor cells and the neuro-immune microenvironment in mutant IDH1 gliomas: Implications for therapeutics

**Castro M, Lowenstein P**

NIH R01 NS 10555603S1 4/1/2018 – 2/28/2023

Novel combined immunotherapeutic strategies for glioma: Using pet dogs with spontaneous high-grade glioma

**Castro M, Lowenstein P**

University of Minnesota 9/30/2017 – 8/31/2021

Pediatric brain tumor

**Castro M, Lowenstein P**

Samson Research Fund 7/1/2019 – 6/30/2029

Systemic delivery of brain penetrating nanoparticles loaded with STAT3 siRN

**Castro M**

Forbes Foundation 3/1/2020 – 3/28/2021

Technological innovations in brain cancer

**Castro M, Schwendeman S**

Biosciences Initiative – Scientific Initiative Program  
9/01/2020 – 8/31/2026

Three dimensional genomic heterogeneity in human gliomas: Implications for therapeutics

**Castro M**

Rogel Cancer Center 7/1/2019 – 6/30/2022

Tuning biomaterials-immune cell interactions for treatment of glioblastoma multiforme

**Castro M, Lowenstein P**

NIH R01 EB022563 9/7/2016 – 5/31/2020

Targeting glioblastoma stem cells through epigenetic reprogramming

**Fan X, Muraszko K**

NIH R01 NS 10661603 6/15/2018 – 3/31/2023

A phase 2/3 randomized, open-label study of Toca 511, a retroviral replicating vector, combined with Toca FC versus standard of care in subjects undergoing planned resection for recurrent glioblastoma or anaplastic astrocytoma

**Heth J**

Tocagen, Inc. 7/1/2016 – 2/14/2033

Peroxiredoxin-2 and intracerebral hemorrhage-induced brain injury

**Hua Y, Keep R, Xi G**

NIH R21 NS 11239401 6/1/2019 – 5/31/2021

Early hematoma lysis and hemoglobin toxicity in intracerebral hemorrhage

**Keep R, Xi G, Hua Y, Xiang J**

NIH R01 NS 10674603 3/15/2018 – 2/28/2023

Cancer hematopoiesis immunology

**Lowenstein P**

Rogel Cancer Center 4/1/2019 – 4/31/2020

Implementation of an immune-mediated gene therapy strategy for pediatric high-grade gliomas

**Lowenstein P**

Ian's Friends Foundation 1/1/2020 – 1/16/2030

Neuroimmunology of malignant brain tumors: Innate mechanisms

**Lowenstein P, Castro M**

NIH R01 NS 09675605 2/15/2016 – 1/31/2021

PhaseOne - A non-randomized open-label, dose-finding trial

**Lowenstein P**

PhaseOne Foundation 1/1/2013 – Open

Self-organization of malignant brain tumors (GBM): Oncostreams regulate GBM growth and invasion

**Lowenstein P, Comba A**

MICHR/National Institute of Health  
6/1/2018 – 11/30/2020

A study to investigate the safety, tolerability, pharmacokinetics of single ascending dose of MT-3921 in subjects with acute spinal cord injury

**Oppenlander M**

DP Clinical, Inc. 4/8/2020 – 4/30/2022

Clinical study protocol to assess the safety and effectiveness of the Premia Spine TOPS system

**Oppenlander M**

Premia Spine 7/19/2019 – 4/30/2024

Aneurysmal subarachnoid hemorrhage trial randomizing heparin (ASTROH)

**Pandey A**

Penumbra Inc. 4/18/2016 – 7/10/2020

Anticoagulation in ICH survivors for prevention and recovery (ASPIRE)

**Pandey A**

University of Cincinnati 7/1/2019 – 4/30/2024

Novel ultrasonic technique for the treatment of hemorrhagic stroke

**Pandey A, Xi G, Chaudhary N, Daou J**

NIH R01 NS 10804203 9/30/2018 – 7/31/2023

Phenomenon of ultra-early erythrolysis in intracranial hemorrhage in humans on MRI

**Pandey A**

NIH R21 NS 10466302 9/30/2018 – 8/31/2021

Risk factors for surgical site infection in MRSA-colonized patients: A 5-year review of all surgical cases at Michigan Medicine

**Pandey A, Adapa A**

Blue Cross Blue Shield of Michigan Foundation  
9/8/2020 – 9/7/2021

Statins use in intracerebral hemorrhage patients (SATURN)

**Pandey A**

University of Cincinnati 9/1/2019 – 5/31/2026

The role of carbonic anhydrase in hydrocephalus formation post-intraventricular hemorrhage in a murine model

**Pandey A, Koduri S**

Hydrocephalus Association 12/1/2020 – 11/30/2021

An ACDF multi-center study using ViviGen cellular bone matrix

**Park P**

DePuy Orthopaedics, Inc. 12/31/2016 – 6/30/2021

An assessment of P-15L bone graft in transforaminal lumbar interbody fusion with instrumentation

**Park P**

Cerapedics, Inc. 11/21/2019 – 10/31/2026

Prospective radiographic and clinical evaluation of surgical treatment for cervical deformity: A multi-center study (PCD2)

**Park P**

International Spine Study Group Foundation (ISSGF)  
7/1/2019 – 4/30/2029

SILVIA: SIJ stabilization in multilevel spine fusion with fixation to the pelvis randomized controlled trial

**Park P**

SI-BONE, Inc. 5/8/2020 – 7/31/2025

Spine surgery clinical fellowship - Dr. North

**Park P, North R**

Neurosurgery Research and Education Foundation (NREF)  
7/1/2020 – 6/30/2021

Spine surgery clinical fellowship - Dr. Swong

**Park P, Swong K**

Neurosurgery Research and Education Foundation (NREF)  
7/1/2019 – 6/30/2020

Advance neuro targeting system for deep brain stimulation surgery

**Patil P, Chestek C**

Coulter Translational Research Partnership Program  
9/1/2020 – 12/31/2020

NCS FR - Elucidating the relationship between motor cortex neural firing rates and dexterous finger movement EMG for use in brain computer interfaces

**Patil P, Chestek C, Temmar H**

National Science Foundation 9/1/2019 – 8/31/2023

SETPOINT 2: A pragmatic trial to test the effectiveness of early vs. delayed percutaneous tracheostomy in patients with severe stroke and respiratory failure

**Rajjee V**

Patient-Centered Outcomes Research Institute (PCORI)  
3/1/2018 – 1/30/2020

The impact of the dura mater on prostate spine metastases

**Szerlip N**

Department of Defense W81XWH-18-1-0487  
9/1/2018 – 8/31/2021

The role of differential bone marrow immune landscape in permissive tumor growth in the spine

**Szerlip N, Strong M**

Society for Neurological Surgeons (SNS)  
7/1/2020 – 6/30/2021

Initial clinical validation of a novel portable CT scanner in the neurological ICU

**Williamson C, Rajjee V, Sheehan K**

Xoran Technologies, LLC 5/1/2019 – 12/31/2020

Experimental cerebral hemorrhage: Mechanisms and therapies

**Xi G, Keep R, Hua Y**

NIH R35 NS 11678601 5/1/2020 – 4/30/2028

Iron, minocycline and brain injury after intracerebral hemorrhage

**Xi G, Keep R, Hua Y**

NIH R01 NS 09092505 5/1/2015 – 3/30/2021

Targeting CD47 to aid in clearing intracerebral hemorrhage

**Xi G, Hua Y, Keep R**

NIH R01 NS 09691705 5/1/2016 – 3/31/2021

Nerve transfers to improve upper extremity function and quality of life in tetraplegic patients

**Yang L**

Washington University in St. Louis / Department of Defense 9/30/2019 – 8/29/2023

\*Grants/awards listed are those that have a PI or Co-PI from the Dept. of Neurosurgery. Bold denotes Dept. of Neurosurgery affiliation.



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