LETTER FROM THE CHAIR

Reflecting on the Past & Anticipating the Future:
Traditions of Excellence & Preparations for a New Chair & New Hospital

It’s been one of the joys and pleasures of my life to have worked here these many years. I will always be grateful for the fact that Dr. Hoff and colleagues took a chance on me back in 1989, allowing me to start my career here in January 1990. Since that time, we have seen tremendous growth in the department, having started with nine faculty members and now encompassing 33 faculty across all tracks. We have a strong and renowned research group, with eight research faculty. In addition, our residency program has expanded to two-alternating-with-three residents per year. We continue to see more patients each year and our case volume has grown as well. Since 2005, our OR cases have increased by 92% and our RVU totals have increased by 106%.

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We have been through a pandemic and have recognized the need to expand clinical facilities. The new Pavilion is now well underway after being put on hold for a time due to the pandemic. Steel girders are being put in place as I write this very letter. This neuroscience-focused hospital should open in 2025. It will represent a state-of-the-art facility with 20 operating rooms and 264 beds. The building will have the neurosciences as its anchoring tenant but will include cardiovascular patients as well. It will also provide an environment in which all aspects of patient care are considered. All beds will be capable of converting to critical care beds, but rooms will still maintain a sense of comfort and calmness for patients. It will house state of the art radiologic imaging, an intraoperative MRI, a CT/angiography suite for complex endovascular work and will have an electrically silent OR for complex monitoring of the electrical activity/function of the brain. We have created a space for experimental cellular and viral therapy that is adjacent to the ORs.

The aesthetics of the building are designed to bring the outside in, and there are many nature-associated and appointed areas, including a wall with Petoskey stones, a reference to the Huron River seen in wall art motifs, a fireplace to help create a sense of welcoming in the lobby, and live planting areas within the building. The theme of the building is “Michigan meets Michigan.” We wanted a state-of-the-art facility, but also thought deliberately about creating one with warmth and a sense of community.

I will be sending separate letters thanking many of you for your meaningful contributions over these 17 years. It’s truly been a wonderful journey. I hope to be able to continue parts of this journey, as I continue to do work in pediatric neurosurgery, along with work in our research laboratories.

I consider it among my greatest honors that I have been able to work with such an outstanding group of faculty, residents, and staff over these many years. As I look to the end of this period in my life, I also look forward to continuing my activities as mentor, researcher, writer, and clinician. I know that we will find a strong leader to advance neurosurgery even further here at Michigan.

Thank you again for all your kindness over these many years. Together with you, I await the announcement of our next Chair of Neurosurgery.

Go Blue!

Sincerely,

Karin Muraszko, MD
Julian T. Hoff Professor and Chair
The resident and fellow group at Michigan continues to excel clinically as well as academically. Highlights of some of the group’s recent successes are listed in these pages. We especially welcome our two newest department members: PGY-1 residents Rushi Joshi and Mark Zaki. Both come from outstanding academic backgrounds and have a great deal of potential to become leaders of our field in the future.

We are also very proud of our most recent residency graduates. David Altshuler is currently doing a skull base surgery fellowship with Jacques Morcos in Miami and Yamaan Saadeh has remained at Michigan for a spine and peripheral nerve fellowship.

The training programs in our department have adapted to the changing landscape brought on by the global pandemic with the goal of maintaining the highest possible standards for education, research, and patient care. At the start of the pandemic, I never could have predicted that our conferences would remain largely online for over 18 months (and counting). This new format does allow for easy attendance, but it will be nice to get back in the conference room as a group.

The resident application process has become totally virtual during the pandemic – and the latest word from the AAMC and ACGME is that this online format may become the rule going forward. The days of in-person interviews are likely over. Despite these changes to the national landscape, 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 to choose the three new residents who will join the Department in 2022. It is comforting to see that, amidst all the changes to our society caused by the pandemic, one thing will not change – our commitment to be the leaders and best in neurosurgery.
2021 Chief Resident Graduation

A commemorative night of celebration was held on June 16, 2021, to honor our 2021 residency graduates – Drs. David Altshuler and Yamaan Saadeh – and to recognize them for the completion of their seven years of training within the U-M Department of Neurosurgery.

Due to the ongoing pandemic, in-person attendance was limited to our graduating residents and their immediate family members, along with neurosurgery faculty and residents. The group gathered on the Michigan Medicine hospital campus while others, including a number of resident alumni, joined the event virtually.

With residency training now officially behind them, Drs. Altshuler and Saadeh have both begun fellowship training; Dr. Altshuler has begun a one-year skull base fellowship at the University of Miami, while Dr. Saadeh is completing a one-year combined spine and peripheral nerve fellowship with our own Drs. Paul Park and Lynda Yang in the U-M Department of Neurosurgery.

CONGRATULATIONS TO DR. ALTSHULER & SAADEH!
We wish them the best as they take the next steps in their neurosurgical careers.
A Farewell to Our 2021 Fellow

Dr. Lauren Ottenhoff completed a two-year Neurocritical Care Fellowship in the Department of Neurosurgery in June 2021 and is now practicing at Henry Ford Health System.

“The Neurocritical Care Fellowship provides trainees with the opportunity to spend two years learning from the vast neurosurgical and critical care expertise that exists across the University of Michigan. It was a pleasure to watch Dr. Ottenhoff grow as a neurocritical care practitioner during her two-year fellowship, and I am confident that she will continue to take excellent care of neurosurgical patients as she continues on in her career,” said Dr. Craig Williamson, Clinical Associate Professor of Neurosurgery and Neurology and Director of the Neurocritical Care Fellowship.

2021 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.

2021 Recipient:
Jacob Joseph, MD

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.

2021 Recipient:
Yamaan Saadeh, MD

Friend of Neurosurgery Award

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

2021 Recipient:
Matt Cheney, BS, RN, CNOR, Neurosurgery Service Lead, Michigan Medicine Operating Rooms

McGillicuddy Resident Leadership Award

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

2021 Recipient:
David Altshuler, MD, MS
New 2021 Neurosurgical Residents & Fellows

In 2021, the Department of Neurosurgery welcomed two new residents to our residency training program: Dr. Rushikesh Joshi and Dr. Mark Zaki.

Residents

Rushikesh S. Joshi, MD
- Medical school: University of California, San Diego, School of Medicine
- Undergraduate: California Institute of Technology
- Hometown: Sunnyvale, CA

Why Neurosurgery? After many years of volunteering as a Muscular Dystrophy Association camp counselor and studying engineering in college, I found Neurosurgery to be the perfect confluence of medicine, neuroscience, and technology. The profoundly intimate relationships that we develop with our patients and their families resonated strongly with my experiences. It is a privilege to now be pursuing my dream profession!

Why U-M? Michigan exemplifies the dual pillars of neurosurgery – providing the highest level of neurosurgical care and pioneering innovative research to keep advancing the field. What stood out during the interview process was the familial environment and collaborative spirit. I am looking forward to working with amazing colleagues both in Neurosurgery and across the greater U-M campus.

Hobbies or Interests: Tennis, music (drums, piano, alto saxophone), reading fantasy/sci-fi, golf, collecting hats

Clinical Interests: Spinal deformity, neural prosthetics/device development, skull base surgery, neuro-oncology/tumor biology, machine learning applications for neurosurgery.

Mark Zaki, MD, MBA
- Medical school: Harvard Medical School
- Graduate: Harvard Business School
- Undergraduate: University of Pittsburgh
- Hometown: Hollidaysburg, PA

Why Neurosurgery: During high school, my grandfather's double lung transplant for idiopathic pulmonary fibrosis first sparked my interest in surgery. I then studied neuroscience as an undergraduate, and combining these interests led me to shadow a neurosurgeon as a sophomore. I've been hooked ever since!

Why U-M? I was first drawn to U-M for its strong clinical training and endless academic resources. The close-knit culture and collaborative spirit that were so palpable on my interview day helped seal the deal. Also, my fiancée grew up in Michigan and will be starting her GI fellowship in Detroit.

Hobbies or Interests: Basketball, soccer, traveling, eating great food, and attempting to learn latte art

Clinical Interests: Spine, endovascular, tumor, value-based care, device innovation, biotechnology, cell therapy.
Fellows

The Department also welcomed two fellows who began their respective one-year fellowships in July 2021. Dr. Adam Khan, a graduate of the University of Minnesota neurosurgical training program, is completing an endovascular fellowship, and our own 2021 residency graduate, Yamaan Saadeh, is completing a combined spine and peripheral nerve fellowship.

Adam Khan, MD
Residency Training:
University of Minnesota
Medical School:
University of Michigan Medical School
Undergraduate:
University of Michigan

Yamaan Saadeh, MD
Residency Training:
University of Michigan
Medical School:
Michigan State University, College of Human Medicine
Undergraduate:
University of Michigan

U-M Neurosurgery Residents Plan for Fellowships Throughout the Country

Our trainees historically continue their neurosurgical training after residency with fellowships. Several of our residents have already secured their fellowship positions at various, renowned institutions throughout the country.
Resident Honors & Awards

Our residents continue to receive many prestigious awards and honors for both their academic and clinical work; 2021 was no exception, despite the many changes that have resulted from the COVID-19 pandemic. Recent notable achievements include but are not limited to those listed below.

**David Altshuler, MD**  
- Departmental resident representative, House Officer Quality and Safety Council, 2020-2021
- John E. McGillicuddy Resident Leadership Award, U-M Department of Neurosurgery, 2021

**Amy Bruzek, MD, MS**  
- Making a Difference Award, University of Michigan, March 2021

**Badih Junior Daou, MD**  
- Best Neurosurgery Platform Presentation, Neuroscience Day, University of Michigan, June 2021
- Endovascular Fellowship, Barrow Neurological Institute, 2023-2024

**Katherine Holste, MD**  
- Resident Ombudsman, U-M Department of Neurosurgery, July 2021-present
- Neurosurgery Research and Education Foundation (NREF) and American Association of Neurological Surgeons (AANS)/Congress of Neurological Surgeons (CNS) Section on Pediatric Neurological Surgery Research Fellowship Grant, 2021-2022
- Elected to American Association of Neurological Surgeons Young Neurosurgeons Committee, April 2022-2026

**Sravanthi Koduri, MD**  
- Congress of Neurological Surgeons (CNS) Resident Committee, 2020-present
- Resident Ombudsman, U-M Department of Neurosurgery, July 2020-2023
- Best Neurosurgery Resident Poster, Neuroscience Day, University of Michigan, June 2021
- Neurology T32 training grant, July 2021-June 2022
- First Place Resident Presentation, Michigan Association of Neurological Surgeons (MANS), August 2021
- Endovascular Fellowship, Thomas Jefferson University, 2024-2025

**Joseph Linzey, MD, MS**  
- Departmental resident representative, House Officer Quality and Safety Council, 2021-2022

**Whitney Muhlestein, MD**  
- Kuntz Scholar Award at the Joint Spine Section for peripheral nerve project, 2021

**Yamaan Saadeh, MD**  
- Max Peet Resident Teaching Award, U-M Department of Neurosurgery, 2021
- Congress of Neurological Surgeons (CNS) Paper of the Year: Tumor Section, 2021

**Mike Strong, MD, PhD, MPH, MS**  
- Congress of Neurological Surgeons (CNS) Resident Committee, 2020-present
- National Institutes of Health (NIH)/National Cancer Institute F32 federal award, 2021-2022
- Ruth L. Kirschstein National Research Service Award (F32 Postdoctoral Fellowship), National Cancer Institute, 2021
- Second Place Resident Presentation, Michigan Association of Neurological Surgeons (MANS), August 2021

**Ayobami Ward, MD, ScM**  
- U-M Consultant of the Year, awarded by Emergency Medicine Residency, June 2021

**Matt Willsey, MD, PhD, MEng**  
- Functional Fellowship, Stanford, 2022-2023

**Tim Yee, MD**  
- Spine Fellowship, University of California San Francisco, 2023-2024
2021 Visiting Professors

Each year, the Department of Neurosurgery invites renowned guest speakers and lecturers to present on various 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 our visiting professors delivered their lectures virtually.

Elizabeth Crosby
Visiting Professor
Stuart Grossman, MD, Co-Chair, Brain Cancer Research Program, Professor of Neurosurgery, Medicine, and Oncology, The Johns Hopkins University, School of Medicine, Baltimore, MD

Titles:
1) Clinical Updates in Neuro-Oncology: 2021
2) Will the next 30 years be different for patients with glioblastoma?

Saeed M. Farhat
Visiting Professor
Sepideh Amin-Hanjani, MD, FAANS, FACS, FAHA, Professor and Co-Director of Neurovascular Surgery, Department of Neurosurgery, The University of Illinois at Chicago

Title:
Evidence-based Neurosurgery: What role should we play?

Julian T. Hoff
Visiting Professor
Brian L. Hoh, MD, MBA, Chair and James & Brigitte Marino Family Professor of the Lillian S. Wells Department of Neurosurgery, The University of Florida

Titles:
1) Pharmacotherapeutic Targets for Cerebral Aneurysms
2) Surgical and Endovascular Treatment for Cerebral Aneurysms

Edgar A. Kahn
Visiting Professor
Laurence Rhines, MD, Professor and Director of Spine Program, Department of Neurosurgery, MD Anderson Cancer Center, The University of Texas, Houston, Texas

Titles:
1) Primary Spinal Column Tumors: Evaluation and Management
2) Case Review

James Taren
Visiting Professor
Philip Starr, MD, PhD, Dolores Cakebread Chair and Professor of Neurological Surgery, University of California, San Francisco

Title:
Brain sensing: the next big advance in functional neurosurgery

Joan Venes
Visiting Professor
Howard L. Weiner, MD, FAANS, Chief and George A. Peterkin Jr. Endowed Chair in Neurosurgery, Texas Children’s Hospital, Professor and Vice Chair, Department of Neurosurgery, Baylor College of Medicine, Houston, TX

Titles:
1) Epilepsy Surgery for Children: A 25-Year Perspective
2) Reflections on Developing an Academic Practice: The Transforming Power of Hospitality in Pediatric Neurosurgery
2021 Stryker Mobile Lab Experience

In April 2021, Stryker hosted a mobile spine lab at U-M’s North Campus for our neurosurgery residents, as well as orthopaedic residents. Fresh cadavers, C-arm fluoroscopy, and intraoperative CT were made available for a variety of spinal approaches.

Residents practiced C1-2 fixation, lateral retropleural and retroperitoneal interbody cage placement, thoracic transpedicular decompression, and lumbar navigated percutaneous fixation. Faculty and chief residents guided junior residents through the various steps of exposure, decompression, and placement of instrumentation.

The mobile spine labs have been a tremendous adjunct to residency training over the years.
In 2021, the U-M Department of Neurosurgery welcomed two new faculty members: Dr. Kevin Chen and Dr. Todd Hollon. Both Drs. Chen and Hollon are alumni of the U-M Neurosurgery Residency Program.

Kevin Chen, MD
Dr. Kevin Chen, who graduated from the U-M Department of Neurosurgery’s Residency Program in 2018, joined the U-M Neurosurgery faculty as Clinical Assistant Professor in November 2021.

Dr. Chen specializes in the surgical treatment of movement disorders (Parkinson’s Disease, tremor, and dystonia), epilepsy, and chronic pain syndromes. He attended the Johns Hopkins University for his undergraduate studies and then earned his Doctor of Medicine from Duke University School of Medicine. After completing his residency at U-M, he completed an additional fellowship in Stereotactic and Functional Neurosurgery at Stanford University. Clinically, he is interested in deep brain stimulation for movement disorders, as well as expanding indications in epilepsy and other neurologic/psychiatric diseases. He also has interests in treatments for chronic pain syndromes, including spinal cord stimulation and trigeminal neuralgia.

Dr. Chen’s research interests focus on stem cells – specifically, induced pluripotent stem cells (iPS). Induced pluripotent stem cells can be generated by culturing tissue from patients (e.g., skin cells), and genetically “reprogramming” them to a stem cell state. These reprogrammed stem cells can then be used to create neurons in culture.

Dr. Chen seeks to utilize these techniques to understand causes for neurodegenerative diseases like amyotrophic lateral sclerosis (Lou Gehrig’s Disease) and Alzheimer’s Disease. Eventually, these engineered patient-derived cells may also become treatments for these and other neurologic disorders.

Todd Hollon, MD
Dr. Todd Hollon, who graduated from the U-M Department of Neurosurgery’s Residency Program in 2020, joined the U-M Neurosurgery faculty as Assistant Professor in January 2021.

Dr. Hollon specializes in the treatment of brain tumors. He attended the University of Michigan for his undergraduate degree and then earned his Doctor of Medicine from the Ohio State University. After completing his residency at the University of Michigan in 2020, Dr. Hollon completed a clinical fellowship specializing in skull base neurosurgery at the University of Utah under the training of Dr. William Couldwell. Dr. Hollon’s clinical interests include the diagnosis and treatment of skull base and malignant brain tumors, including pituitary adenomas, meningiomas, and gliomas. He is trained in both open and endoscopic neurosurgical techniques.

Dr. Hollon is the principal investigator of the Machine Learning in Neurosurgery Laboratory (MLiNS) at Michigan Medicine. His research includes the use of computer science and artificial intelligence to improve the diagnosis and treatment of patients with brain tumors. Currently, his work focuses on using advanced intraoperative imaging methods to improve the speed and accuracy of tumor diagnosis and detection of tumor margins.

Dr. Hollon has published extensively in peer-reviewed journals, including Nature Medicine, Nature Biomedical Engineering, Neuro-Oncology, Cancer Research, Journal of Neurosurgery, and Neurosurgery.
2021 Faculty Promotions & Appointments

Promotions
Effective Sept. 1, 2021

Dr. Ilyas Aleem (who holds a joint appointment in the Department of Neurosurgery) was promoted to Clinical Associate Professor in the Departments of Orthopaedic Surgery and Neurosurgery.

Dr. Jason Heth was promoted to Clinical Professor in the Departments of Neurosurgery and Otolaryngology.

Dr. Nick Szerlip was promoted to Clinical Professor in the Department of Neurosurgery.

Dr. Craig Williamson was promoted to Clinical Associate Professor in the Departments of Neurosurgery and Neurology.

Appointments

Dr. Kevin Chen was appointed Clinical Assistant Professor in the Departments of Neurosurgery and Neurology, effective November 2021.

Dr. Andrea Comba was appointed Research Investigator in the Department of Neurosurgery, effective April 2021.

Dr. Todd Hollon was appointed Assistant Professor in the Department of Neurosurgery, effective January 2021. He was also appointed Affiliate Assistant Professor in the Department of Computational Medicine and Bioinformatics and the Michigan Institute for Data Science, effective September 2021.

Dr. Christian Vercler, Associate Professor of Surgery, Plastic Surgery Section, was granted a joint appointment as Associate Professor in the Department of Neurosurgery, effective September 2021.

2021 Faculty Board Certifications

U-M Neurosurgery faculty members Drs. Wajd Al-Holou and Osama Kashlan – both of whom are also U-M Neurosurgery resident alumni – completed the final step in their respective board certification processes in May 2021 by passing the oral boards. With the successful completion of this step, both Drs. Al-Holou and Kashlan are now certified Diplomates of the American Board of Neurological Surgery (ABNS).

Dr. Al-Holou is an alumnus of both the University of Michigan Medical School and the U-M Department of Neurosurgery Residency Program, which he completed in 2016. He became a U-M Neurosurgery faculty member in October 2019.

Dr. Kashlan is also an alumnus of the U-M Neurosurgery Residency Program, which he graduated from in 2017. He became a U-M Neurosurgery faculty member in September 2018.
**ALUMNI NEWS**

**Tony Asher, MD, (1995)** was named President and Enterprise Service Line Leader, Neuroscience Institute, Atrium Health in March 2021. In this role, Dr. Asher is responsible for directing the operations, quality care, and strategy for the combined Atrium Health and Wake Forest Baptist neuroscience services. Atrium Health and Wake Forest Baptist Health completed a merger in October 2020, creating an expanded 42-hospital health system, with total annual revenues of $14 billion.

**Sonia Eden, MD, (2007)** became the first Black woman to lead the adult sector of the neurosurgery department at the Detroit Medical Center when she was named Chief of Neurosurgery at the DMC Harper University Hospital in February 2021.

**David Kline, MD, (1967),** Boyd Professor Emeritus of Neurosurgery and Department Chairman Emeritus at Louisiana State University Health Sciences Center (LSUHSC) New Orleans, served as the 2021 A. Lee Dellon Endowed Lectureship visiting lecturer in the Department of Plastic and Reconstructive Surgery at Johns Hopkins University, delivering a talk entitled “Reflections on a Career in Peripheral Nerve Surgery” in October 2021. Dr. Kline also spoke on this topic during a teaching session and discussion with University of Michigan plastic surgery and neurosurgery residents in October 2021.

**Luis Rodriguez, MD, (2004)** served as Interim Chief of Pediatric Neurosurgery at Johns Hopkins All Children’s Hospital from January 2020 to July 2021. He also completed a Master of Applied Science (MAS) degree in Patient Safety and Quality in Health Care from Johns Hopkins University in May 2021.

**Mark Roy, MD, (1993)** retired in April 2020 and is now keeping busy on his farm in Rockingham County, North Carolina, where he raises Labrador Retrievers. He has a guide service for deer and turkey hunters and is also working at a shooting preserve with his dogs. Prior to retiring, Dr. Roy practiced as a neurosurgeon at UNC Rockingham Health Care (formerly Morehead Memorial Hospital) in Eden, North Carolina.

**Khoi Than, MD, (2014),** Associate Professor of Neurosurgery and Orthopaedic Surgery at Duke University, received the Duke University Department of Neurosurgery Educator Award in 2021. He also became a Member-at-Large of the Congress of Neurological Surgeons Executive Committee in October 2021.

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**Sanjay Gupta, MD, (2000) Receives Brooks Jackson Prize**

U-M Neurosurgery Residency Alumnus Sanjay Gupta received the 2021 Brooks Jackson Prize in July 2021 for his COVID-19 pandemic journalistic fact-checking. Presented with the Walter Cronkite Awards for Excellence in Television Political Journalism by the Annenberg Public Policy Center, the Brooks Jackson Prize for Fact-Checking is named for the veteran journalist who covered Washington, D.C., and national politics for news organizations including the Associated Press, Wall Street Journal, and CNN.

Dr. Gupta, who serves as CNN’s chief medical correspondent, received the award for his correction of COVID-19 misinformation. The jury praised him as an important voice throughout the pandemic and in many formats, identifying Dr. Gupta as a “consistent and reliable messenger for accurate information.” He delivered on-air fact-checking segments – delivering the facts clearly and stating them with purpose and authority – participated in town halls, and hosted a COVID-19 podcast. For more information, including the winning entry videos for the Cronkite Awards, visit [www.cronkiteaward.org](http://www.cronkiteaward.org).
STAFF NEWS

Notable Achievements & Milestones

Steve Napolitan becomes President of NERVES

Neurosurgery Chief Department Administrator Steve Napolitan became President of the Neurosurgery Executives’ Resource Value & Education Society (NERVES) during the organization’s 2021 Annual Business Meeting, which took place virtually in September 2021. His term as President follows a progression of leadership in the organization including President-Elect/Vice President, Treasurer, and Regional Director.

NERVES is the premier national neurosurgery practice management organization. It was established in 2002 for the purpose of helping neurosurgery practice managers and administrators strengthen their neurosurgical practices.

Steve plans to lead the organization by focusing on the Society’s recently updated mission statement – to connect neurosurgery executives to resources, education, and data to enhance value for the business of neurosurgery. One way Steve plans to help lead the Society with alignment to its mission and ensure both its short and long-term success is to hold the Society’s first ever Advisory Board session. The NERVES Advisory Board will provide strategic guidance, expertise, and support by making recommendations, providing candid feedback, and assisting with long-range planning that are aligned with the mission, vision, and values of NERVES.

Tammy Whittaker Celebrates 30 years in the Department of Neurosurgery

Administrative Assistant Tammy Whittaker celebrated 30 years in the Department of Neurosurgery in February 2021. Tammy’s dedication over the last 30 years has made an indelible impact on all those she has worked with and on the Department of Neurosurgery as a whole.

Tammy joined Michigan Medicine as a high school co-op student employee in 1982. Upon graduation in 1984, she took on a full-time role at the health system. In her first seven years at the hospital, she held positions in several departments, including the Department of Dietetics, Hospital Information Services, and the Department of Radiology. In February 1991, Tammy joined the Department of Neurosurgery, where she has remained ever since.

Tammy has gained expertise in many different areas in her 30+ years in the Department of Neurosurgery. From 1991 through 2003, she provided medical transcription services to the neurosurgery residents and faculty. Then, beginning in 2003, she focused on billing and reconciliation, helping to improve collection and reimbursement rates for the Department from participating insurance companies, as well as co-pay collections. Since 2005, Tammy has provided administrative support to our faculty members; currently, she supports Dr. Osama Kashlan, outpatient nurse practitioner Megan Curtis, and the spine team.

Outside of work, Tammy enjoys spending time with her two grown children, Brenden and Alissa. “I have a Shih Tzu named Gabe and a goldfish that came from a carnival many years ago that refuses to go to fish heaven!” Tammy also enjoys traveling and spending time with friends.

“I have enjoyed my 30 years (and counting!) here in Neurosurgery. I have made friends along this journey that I will treasure forever.”
Memorable Retirements

Wilma MacKenzie, NP, Retires from Michigan Medicine

Neurosurgery nurse practitioner Wilma MacKenzie retired from the Department of Neurosurgery in February 2021. Wilma joined the Department in 2013, after graduating from the U-M Adult-Gero Acute Nurse Practitioner Program.

“Nursing was a third career for me, having been a researcher in Immunology and then a stay-at-home mom until 2009,” Wilma said. Wilma completed the accelerated nursing course at U-M from 2009 to 2010 and then, as previously noted, went on to complete the NP program. During her time in the Department of Neurosurgery, Wilma was admired by her colleagues for her work ethic, ability to learn quickly, and most of all, her passion for what she did. In addition to providing compassionate, expert clinical care to patients, Wilma also worked on the boards of both the Great Lakes Chapter of the Gerontological Advanced Practice Nurses Association (GAPNA) and the Michigan Council of Nurse Practitioners (MICNP) to improve the practice environment for NPs throughout the state of Michigan. She was dedicated to education through these organizations as well, planning conferences and educational programs for NP students.

Wilma’s willingness to go the extra mile for her patients and colleagues and her propensity to be the “first to volunteer” (including volunteering to be redeployed to a COVID unit at the start of the pandemic) were attributes that her colleagues greatly appreciated and will miss. Wilma’s dedication and commitment to her patients was notable. She played an instrumental role in the Department of Neurosurgery for eight years and we wish her all the best in retirement.

Sherrill Bird, Clinic Manager, Retires After 37 Years at Michigan Medicine

Adult Clinic Manager Sherrill Bird retired at the beginning of August after 37 years at the University of Michigan. Sherrill spent 20 of her 37 years at the University in the Department of Neurosurgery.

Sherrill started at U-M in 1984, when she joined the Law School staff. She eventually transitioned to a Patient Service Assistant role at Mott Children’s Hospital and then became a Medical Assistant in the Mott PACU. She began working in the Department of Neurosurgery in 2001 as a Medical Assistant and in 2014 was promoted to MA Specialist. In 2015 she was promoted to Associate Clinic Manager.

During her time in the Department, Sherrill was recognized by faculty and staff alike as a wonderful colleague and professional teammate in the clinic who always brought a calming influence, even on the busiest and most challenging of days. “When there were too few rooms, too many urgent add-on visits, stressed out patients, harried surgeons, and overwhelmed staff, Sherrill was always at her best,” said Dr. Greg Thompson, John E. Mcgillicuddy Professor of Neurosurgery. She was known throughout the Department for her kindness, dependability, and resilience, and she will be missed.

In retirement, Sherrill plans to spoil her three grandchildren and begin a professional organizing business to help others with organizational tasks. We wish Sherrill all the very best in this next phase of life!

Wilma and Sherrill have both made a lasting impact on the U-M Department of Neurosurgery through their dedicated service and commitment to patient care at Michigan Medicine. We wish them the very best in retirement.
Welcome to U-M Neurosurgery!

The Department of Neurosurgery welcomed a number of new staff members this year, as well as a few in 2020. Take a moment to get to know your new colleagues.

Devon Beck, Patient Services Intermediate; OR Scheduler
Devon joined the Department of Neurosurgery staff in November 2021 and is providing administrative support to the Pediatric Neurosurgery Team. Prior to joining the Department, Devon was a call center representative in the Department of Plastic Surgery. She has been at Michigan Medicine for almost 10 years and has worked as a phlebotomist, front desk clerk, and call center representative.

Stephanie Beckman, MSN, RN, APRN, Clinical Data Abstractor
Stephanie joined the Clinical Outcomes team in July 2021, where she is serving as a Clinical Data Abstractor/Data Outcomes Specialist for the Michigan Spine Surgery Improvement Collaborative (MSSIC). Prior to joining the Department, she worked as a nurse at an outpatient surgery center in Arizona, where she also served as the risk management officer and benchmarking officer. Stephanie holds a bachelor's degree in nursing as well as a master's degree in nursing with a focus in administration and management. Originally from Michigan, she moved back from Arizona at the beginning of 2021 and is happy to be part of the U-M Department of Neurosurgery. In her role on the MSSIC team, Stephanie is focused on clinical data abstraction and quality improvement projects for spine surgery.

Tina Casto, Call Center Representative
Tina joined the Department of Neurosurgery Contact Center in August 2021. Prior to joining the Department, she worked at another organization in Neurology for several years. She is currently a student at Washtenaw Community College studying Criminal Justice and hopes to one day practice law. She looks forward to growing and learning with the Department of Neurosurgery. “I have been familiar with this clinic for four years as a parent of two patients here. I know how amazing this team is and I am excited to be a part of it!”

Linda Diroff, Patient Services Assistant
Linda joined the staff of the Neurosurgery Adult Clinic in June 2021; she is working the front desk, check-in, and check-out in the clinic. Linda came to the Department of Neurosurgery from the Rogel Cancer Center, where she was a Patient Services Associate. During her time there, she was known by many to be the “first impression” at the Cancer Center, always welcoming patients and guests with a warm smile and greeting.

Lourdes Foster, Medical Assistant
Lourdes joined the Adult Neurosurgery clinic staff in January 2020 as a medical assistant. Prior to joining the Department of Neurosurgery, Lourdes spent time working with the U-M Kidney Transplant Triage team preparing patient packets for potential kidney transplant candidates. Before coming to U-M, she worked as a medical assistant in both a nephrology clinic and a pediatric clinic.

Andria Goedert, Patient Services Intermediate
Andria joined the Department of Neurosurgery staff in August 2021 and is providing administrative support to Drs. Todd Hollon, Steve Sullivan, and the tumor team. Andria has two years of experience at Michigan Medicine, having previously worked in the Therapy Thyroid Clinic in Radiology. Before coming to Michigan Medicine, she worked at Beaumont Health as a registration scheduler. Andria graduated from Michigan State University in 2014 with a bachelor's degree in psychology.

Emily Hattie, Call Center Representative
Emily joined the Department of Neurosurgery Contact Center in February 2021. Before joining the Department of Neurosurgery, Emily worked in the Rogel Cancer Center in the Mammography Department where she deconstructed paper charts and carried out front desk operations. Emily looks forward to continuing to learn and contribute to the Neurosurgery team.

Kenya Johnson, Call Center Representative
Kenya joined the Neurosurgery Contact Center in December 2020. Prior to joining the Department, she served as a patient services assistant in the East Ann Arbor Geriatrics Clinic. She has been at U-M for five years and enjoys working in a customer care environment to assist patients and medical faculty and staff.

Melissa Lay, Research Administrative Assistant
Melissa joined the Department of Neurosurgery in October 2021 and is providing administrative support to the Castro/Lowenstein Neuro-Oncology Laboratories. She is responsible for providing a full range of faculty and administrative support for Drs. Maria Castro and Pedro Lowenstein, and their laboratory team. Prior to joining the Department, Melissa spent 20 years in the Fetal Diagnosis and Treatment Center at U-M’s Von Voigtlander Women’s Hospital. She holds a bachelor’s degree in health service administration from Baker College, as well as an associate degree in applied science from Monroe County Community College.

Angela Martin, Patient Services Intermediate
Angela joined the Department of Neurosurgery in June 2021 and is providing administrative support to Drs. Heth and Sagher. She came to the Department with three years of experience at Michigan Medicine, having worked previously in the Department of Radiology. She also has 15 years of experience teaching (both in the United States and abroad) and has experience in project management.

Dana Munson, Patient Services Intermediate
Dana joined the Adult Neurosurgery Clinic staff in June 2021; she is working at the front desk doing patient check-in and check-out, as well as films and various other responsibilities. Dana came to the Department of Neurosurgery with previous patient services experience at Michigan Medicine, having spent time in the last year as both a Guest Services Specialist and Patient Services Intermediate Float. Prior to being hired at Michigan Medicine, Dana spent more than 25 years in the automotive industry, where she was a global project buyer for a Tier 1 automotive supplier. She traveled internationally often, but after her two grandchildren were born, decided she did not want to be away from home so often. She is glad to now be a team member at U-M and is enjoying learning and taking on new challenges in her new role.
‘I Feel Like this is a Second Chance’
How Michigan Medicine Helped Patient Overcome Epileptic Seizures

Sarah Mellendorf’s life-altering medical journey began innocently enough.

“I started to get some weird feelings, almost as though I was having déjà vu,” said Sarah, who was 16 years old at the time. But those feelings became more frequent and more severe, and Sarah began to think she may be having epileptic seizures. So, she and her mom, Michigan Medicine care management nurse Shanda Willis, went to the nearest hospital to get tested. Sarah underwent a brief brain scan, and based off the test results and her symptoms, she was placed on medication. When those didn’t stop the seizures from taking place, Shanda decided it was time for Sarah to come to Michigan Medicine for a second opinion.

“Working here, I knew the capabilities we have both technologically and in terms of our experts,” Shanda said.

A diagnosis
Sarah underwent several tests that required inpatient stays at C.S. Mott Children’s Hospital. Eventually, she was diagnosed with intractable epilepsy, a disorder that causes electrical malfunctions — or seizures — in the brain’s temporal lobe and can’t be treated by medication. For Sarah, the seizures would always occur in the morning, and then four to seven more times throughout the day. “While I would never black out, I would become consciously unaware of what was going on,” Sarah said. “I could be having a conversation and then two minutes later I’d have to ask what we were talking about.” That made typical life functions difficult. For a teenager, that meant she could not drive and, eventually, even schoolwork became nearly impossible. What Sarah needed was a solution — and a new technology provided exactly that.

Placing a pace
Hugh Garton, MD, MHSc, was Sarah’s neurosurgeon at Mott. He and two pediatric neurologists — Sucheta Madhav Joshi, MBBS, and Erin Marie Fedak Romanowski, DO — came up with a plan that they thought could help Sarah lead a relatively normal life. “The team recommended that we implant a NeuroPace directly into Sarah’s brain,” Shanda said. “Basically, they would place a neurostimulator that could feed the brain electric shocks if a seizure was about to occur.” The surgery had only been done a handful of times before at Mott. “That made it a little scary to have the surgery,” Sarah said. “But at the same time, the reassurances of the doctors and everyone else helped so much. In the end, it was clear that I needed to take the leap and get the pace put in.” The surgery was a success, and the results have been eye-opening. Sarah has had only two minor seizures in the two years since the surgery. ‘I’m really lucky to be where I am today’. Sarah, now 22, completed her bachelor’s degree in social work and is now in the accelerated Master of Social Work program at U-M.

And helping her get through school?
A job delivering pizzas.

“I have a job that involves driving — can you believe that?” Sarah said with a smile. “I went years without ever driving, and now it’s helping put me through school.” Looking ahead, Sarah said the NeuroPace will be a part of her life forever. But technology makes it easy to use — she can even download information from the device and send it to her doctors who can adjust any necessary settings. And every eight years, she will come in for a simple procedure to get the batteries changed. All in all, she and her mother can’t say enough about their experience at Michigan Medicine.

“The doctors have been just incredible,” Sarah said. “But that’s not all. The nurses and techs have been so friendly and comforting and Denver the hospital dog would come and visit — they were all just what I needed when times got tough.” To this day, Shanda said her colleagues on the pediatric neurology floor ask about Sarah frequently: “They’ll come up and say, ‘How’s our girl?’ We’re just one big family here — it’s a pretty special place.” And it’s a place that has proven to be a perfect fit for Sarah and Shanda. “I feel like this is a second chance,” Sarah said. “I’m really lucky to be where I am today.”
Back Pain: A Thing of the Past

Nothing could slow Peggy Arden down – until severe back pain. Now, thanks to minimally invasive back surgery, she lives pain-free.

It’s been more than five years since Peggy Arden’s spine surgery at Michigan Medicine and the 80-year-old is happy to report she’s still going strong. In fact, stronger than many half her age. The commercial interior designer and builder may have retired years ago, but that didn’t mean she would slow down — before or after the 2016 surgery to repair the vertebrae in her lower back and relieve her severe pain.

Seeking help
She attributes her spine issue to a fall in 2014 when she landed on her tailbone. This, along with natural age-related degeneration of her spine, brought Arden to Michigan Medicine and neurosurgeon Paul Park, MD.

“The fall was the start of my back pain,” says the Canton, Michigan, resident. “I eventually developed leg numbness and restless leg syndrome, along with bladder incontinence. There were many things happening all at once,” she says, adding, “Testing at Michigan Medicine indicated I had a serious issue.” Her serious issue was spondylolisthesis, a condition in which one of the vertebrae (the bone block of the spine) slips out of place in front of the vertebra below it. “This can cause pinching of the nerves,” says Park. In Arden’s case, nerve compression was severe, resulting in back and bilateral leg pain as well as incontinence.

Minimizing the risks

The Michigan Medicine spine team determined Arden would be a candidate for a minimally invasive decompression and interbody fusion of L-5 (the lowest lumbar vertebra) to S1 (the upper end of the triangular bone at the base of the spine).

The goal of L5-S1 decompression is to remove the abnormal bone and tissue causing nerve compression, giving the nerve more space and thereby reducing pain. Interbody fusion then prevents excessive movement of the lower spine by stabilizing the affected vertebrae. This fusion is accomplished with the use of a cage and small titanium screws connected with short rods. Compared to traditional open surgery, Arden’s minimally invasive procedure required less extensive tissue exposure resulting in decreased blood loss, less post-surgery pain, minimized risks such as infection and a quicker recovery, says Park.

Arden’s age — then 75 — was also a factor in using a less invasive technique. “Spondylolisthesis can be difficult to treat when the slippage becomes pronounced, which was so in her case,” says Park. “We were able to offer her a minimally invasive option and it worked out well. She’s had very durable results.”

Back on her feet

Although many patients Arden’s age require spending time at a rehabilitation center following surgery, her particular situation would not allow it. “I needed to be home to manage the care of my husband with Alzheimer’s,” she says, noting that her six-week recovery was relatively easy. “I used a walker for one week and had to be careful not to bend or twist or lift anything heavier than a gallon of milk for a period of time,” she says. Arden appreciates that she’s been living life free of back pain since her surgery.

“I can now do all the things I did before my surgery,” she says, including adventures with her grandchildren, travel, dancing and gardening, just to name a few. “As a do-it-yourselfer, it was important for me to get back to the way I was,” she says. “Dr. Park was amazing. He fulfilled the best expectations I could have had for my surgical results.”

For more patient stories, please visit michiganhealthblog.org
‘It Was Definitely Worth It’ – Conquering Back Pain & Baseball

Because of back pain, a Division 1 baseball player struggled with his sport and his classes. Here’s why he’s so glad he addressed it with outpatient spinal surgery.

John Holt made full use of his extra year of collegiate baseball eligibility in the spring of 2021. The pitcher thought he’d have to close out his time at Eastern Michigan University with fewer innings than he wanted due to a brutal combination of relentless back pain and a pandemic-shortened senior season. But even though he only appeared in three games after his minimally invasive spine surgery before COVID-19 canceled the rest of the 2020 season, Holt’s teammates voted him the most improved teammate. In the spring of 2021, he returned to the mound for a fifth season. “After the surgery my body felt 100% better,” Holt says. “Six months later, I was able to pitch at the level I could before, and I was feeling the best I had felt since high school. I love baseball so much, so it was definitely worth it.”

‘Radiating’ pain

After hurting his back while lifting weights freshman year, Holt was dealing with pain that kept him awake at night. It was difficult for him to sit for long periods of time, and he couldn’t bend down past his knees to pick up the baseball. “I had radiating pain down my leg consistently, every single day,” Holt says. “And being a pitcher, flexibility is huge.” By his sophomore year, he was losing out on playing time, and starting to worry about losing his academic eligibility, too. The pain made sitting in a tiny desk in a classroom for hours on end unappealing, and the entire situation was becoming incredibly frustrating. “I was depressed a lot of the time because I couldn’t play baseball, and I couldn’t perform in the classroom either,” he remembers.

Physical therapy and rehab had helped his range of motion a bit, but eventually he got some testing done. His MRI showed an area of wear and tear in his lower back that was causing pressure on the nerve going down his leg. It would need to be fixed if he wanted to perform at an elite level again. “I was 21 years old, and I didn’t think back surgery was something I really wanted to pursue,” says Holt. Knowing he was eager to get back on the field as soon as possible, Holt’s new providers at Michigan Medicine recommended a laminotomy. A routine and minimally invasive approach, it involves only small incisions to remove part of the bone that’s pressing on nerves. And Holt would be able to go home the same day, without the intense recovery that an open surgery requires. That sounded good to him: “They made me feel so comfortable about it.”

“I resected the area to free up the nerve to address the pain,” says Holt’s neurosurgeon, Osama Kashlan, MD. “He went through the procedure like a champ and recovered faster than I would’ve expected.” Unfortunately, Holt didn’t get a full chance to show what he could do when the pandemic hit early in the spring of 2020.

Healthy again, but another shortened season

“My first year back healthy and able to perform was taken away; it was heartbreaking,” Holt says. Having graduated with his bachelor’s degree in 2020, Holt chose to continue his academic career at EMU with a master’s degree in sports management, which he will complete in 2022. He immediately accepted his coach’s offer to return for one more season in the spring of 2021. Holt credits his strong bench of support for his improved well-being today. “My family has always been there for me and helped me get through everything.” And baseball has always been a family affair, starting with games of catch in the backyard when he was a kid, and trips to Detroit Tigers games.

Teammates became his on-campus family.

“My teammates, who are some of my best friends, encouraged me to stay with it. They knew I could play and wanted me to get better.” So they’d drag him to class even on his most uncomfortable days, making sure he’d be academically eligible to play once his back was better. Holt concluded his final baseball season at EMU in the spring of 2021. “It was by far my most memorable season,” he says. “I made more appearances than I ever had in my career and got the opportunity to pitch against the College World Series Champions, the Mississippi State Bulldogs. I was so excited to be back out there performing and competing with my teammates for one more season.”

“For more patient stories, please visit michiganhealthblog.org

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RESEARCH NEWS

News from the Crosby Neurosurgical Laboratories

The cerebrovascular arm of the Crosby Labs, which includes Drs. Guohua Xi, Ya Hua, Jianming Xiang and Richard Keep, along with Drs. Aditya Pandey, Hugh Garton and Neeraj Chaudhary, continues to examine ways to mitigate brain injury after cerebral hemorrhage. One focus has been to try and control the release of potentially toxic products (such as hemoglobin and iron) when red blood cells within the hematoma lyse. Complement system activation plays an important role in regulating red blood cell lysis and we have found that inhibiting membrane attack complex formation reduces brain injury after intracerebral hemorrhage (ICH) in rodents1. PGY-4 resident Katherine Holste has recently started working in the laboratory during her research elective focusing on the role of the complement system in hemorrhagic brain injury2.

Imaging is a crucial bridge that enables comparison of events in preclinical models of hemorrhage with those occurring in patients. Thus, we have been examining the occurrence of such early red blood cell lysis in ICH patients with MRI as well as its impact on perihematomal iron accumulation and white matter injury3.

Work on subarachnoid hemorrhage (SAH) has been examining why some patients develop hydrocephalus while others do not. PGY-5 resident Sravanthi Koduri is injecting SAH patient cerebrospinal fluid (CSF) into rodents to start to identify hematoma-derived factors in CSF that can induce hydrocephalus4. The Crosby Labs are also using T2*-MRI to identify ultra-early cerebral microthrombosis after SAH in rodents4, which may help develop new therapeutic strategies for this devastating form of stroke4.

In addition to cerebrovascular research, the Crosby Lab continues to expand its focus on brain tumors with the addition of the labs led by Drs. Wajd Al-Holou and Todd Hollon. Their exciting research is highlighted on the next page of this newsletter. They add to the existing research led by Drs. Xing Fan (glioblastoma) and Nick Szerlip (spine metastases); Dr. Szerlip’s research is also highlighted on the following page.


“Just as the clinical side of Neurosurgery has had to adapt to the stresses imposed by COVID-19, so have the Department’s research endeavors – sometimes opening previously unseen doors.”

-Dr. Richard Keep, Director, Crosby Neurosurgical Laboratories
Brain Tumor Research Updates

The Latest from the Lab of Dr. Al-Holou

Dr. Wajd Al-Holou and his research team focus on understanding resistant cell populations and tumor microenvironmental interactions driving resistance in glioblastoma. He and his team have performed innovative laboratory analyses along with spatial transcriptomic and single cell analyses of glioblastoma, which have identified rare cells driving resistance. The first publication from this work was submitted in late 2021. The laboratory has expanded to include Sunita Shankar, PhD, who recently completed her postdoctoral research with Dr. Arul Chinnaiyan, S.P. Hicks Endowed Professor of Pathology and Urology at the University of Michigan. Dr. Shankar will play a critical role in developing analyses of these resistant cell populations.

The lab has also been awarded several pilot grants within the past year and has received generous donations from patient-led fundraising. (Read more about one patient’s fundraising efforts on behalf of Dr. Al-Holou and his team on page 24 of this newsletter.) Dr. Al-Holou and his team are also collaborating with several other laboratories and are active in two new investigator-initiated clinical trials for glioblastoma at the University of Michigan.


Updates from the Machine Learning in Neurosurgery Laboratory (MLiNS)

A major focus of the Machine Learning in Neurosurgery (MLiNS) Lab – led by Dr. Todd Hollon – is to combine stimulated Raman histology (SRH) – a rapid label-free, optical imaging method – with deep learning and computer vision techniques to discover the molecular, cellular, and microanatomic features of skull base and malignant brain tumors.

Dr. Hollon and his team are using SRH in the operating room to improve the speed and accuracy of brain tumor diagnosis. The group has focused on deep learning-based computer vision methods for automated image interpretation, intraoperative diagnosis, and tumor margin delineation. Dr. Hollon and his team’s work culminated in a multicenter, prospective, clinical trial, which demonstrated that AI interpretation of SRH images was equivalent in diagnostic accuracy to pathologist interpretation of conventional histology.

They were able to show, for the first time, that a deep neural network is able to learn recognizable and interpretable histologic image features (e.g. tumor cellularity, nuclear morphology, infiltrative growth pattern, etc.) in order to make a diagnosis. The lab’s future work is directed at going beyond human-level interpretation towards identifying molecular/genetic features, single-cell classification, and predicting patient prognosis.

Spine Oncology Research Updates from Dr. Szerlip & Team

The basic science arm of the Spine Oncology Program led by Dr. Nicholas Szerlip is housed within the Crosby Neurosurgical Laboratories. The aim of this lab is to study the tumorigenesis of spinal metastases and the effects of different treatment strategies on tumor development. This is accomplished through two lines of basic science investigation: 1) examining the effect dura has on promoting spinal metastases and 2) exploring the differences in immune landscapes between long bone and vertebral body bone marrow and its effect on tumorigenesis. The current focus is developing an in-vitro as well as ex-vivo (mouse ossicle (piece of long bone) and vossicle (piece of spine)) model to further investigate these differences in immune cell populations with the goal of identifying novel therapeutic targets for spinal metastases. Additionally, pathway analysis is being performed on human bone marrow samples from radiographically tumor positive and radiographically negative vertebral bodies in the hopes of identifying targetable mechanisms that tumors use to alter the immune landscape to gain a foothold in the bone micro-environment. PGY-5 Neurosurgery resident Michael Strong, MD, PhD, MPH, MS, and Senior Research Scientist Sabrina Rocco, MS, are currently working on these projects with Dr. Szerlip.

News from the Castro-Lowenstein Laboratory: Seeing Light at the End of the Covid-19 Tunnel

Fortunately, during the last year, activities have returned to normal in the Castro-Lowenstein Laboratory, apart from the regular use of masks and social distancing when required. New staff have joined the team, and the bustling life of the lab is fully recovering following the enforced reduction of activities caused by Covid-19 in 2020. We can confidently look into the future light at the end of the Covid-19 tunnel! As always, regulatory bodies – especially ULAM (the Unit for Laboratory Animal Medicine) – have been instrumental in helping with the recovery and prompt return to normal activities.

The Castro-Lowenstein Lab’s continued excellence and innovation in the development of translationally relevant genetically engineered preclinical mouse models of adult and pediatric malignant brain cancer have progressed. Our improved understanding of how brain tumor influences the tumor immune microenvironment is highlighted by three relevant publications, as described below. Shah et al.\(^1\) demonstrates how glioma cells secrete miR-1983 that completely turns off NK killing of tumor cells. Kadiyala et al.\(^2\) and Alghamri et al.\(^3\) show how brain tumors modify the capacity of immune cells to attack the tumor, which identifies potential mechanisms that could be harnessed to develop novel treatments for these deadly brain tumors in the near future.

Published in *Oncoimmunology*, Shah et al.\(^1\) demonstrated the existence of an innate anti-glioma NK-mediated circuit initiated by glioma-released microRNA (miR-1983) within exosomes and which is under the regulation of galectin-1 (Gal-1). The authors showed that miR-1983 is an endogenous toll-like receptor 7 (TLR7) ligand that activates TLR7 in plasmacytoid and conventional dendritic cells (pDCs and cDCs) through a 5’-UGUUU-3’ motif at its 3’ end. TLR7 activation and downstream signaling through MyD88-IRF7 stimulate secretion of interferon (IFN-β). IFN-β then stimulates NK cells, resulting in the eradication of gliomas. They proposed that therapeutic activation of the miR-1983-TLR7-IFNβ-NK innate immune circuit could be used to overcome Gal-1-mediated innate immune suppression in gliomas. They further proposed that successful immunotherapy for glioma might require not only the inhibition/blocking of adaptive immune suppression by Gal-1, but also stimulation of the innate immune activation by endogenous TLR7 ligands.

The work by Kadiyala et al.\(^2\) was featured on the cover of the February 15, 2021 issue of the *Journal of Clinical Investigation*. This manuscript examined the effect of mutant isocitrate dehydrogenase 1 (IDH1-R132H; mIDH1), a hallmark of adult gliomas, on glioma immunity. Lower grade mIDH1 gliomas are classified into two molecular subgroups: lp/19q codeletion/1p/19q-promoter mutations or inactivating mutations in α-thalassemia/mental retardation syndrome X-linked (ATRX) and TP53. This work studied tumor models with the following genetic alterations: mIDH1, TP53, and ATRX inactivation. IDH1-R132H is a gain-of-function mutation that converts α-ketoglutarate into 2-hydroxyglutarate (D-2HG). The objective of the paper was to determine the role of D-2HG within the tumor microenvironment. The work took advantage of drugs that inhibit D-2HG. Inhibition of D-2HG, when used as monotherapy or in combination with the standard-of-care therapies such as radiation and temozolomide (IR/TMZ), led to increased median survival of mIDH1 glioma–bearing mice. In addition, the inhibition of D-2HG increased anti-mIDH1 glioma immunological memory, and increased expression of PDL1. To take advantage of these results, we provided a multi-pronged treatment consisting of D-2HG inhibition/IR/TMZ with anti–PDL1 immune checkpoint blockade, which led to complete tumor regression in 60% of mIDH1 glioma–bearing mice. This treatment greatly reduced T cell exhaustion and increased the generation of memory CD8+ T cells. Our findings demonstrate that metabolic reprogramming elicits anti–mIDH1 glioma immunity, leading to increased survival and immunological memory. These preclinical data strongly support the testing of IDH-R132H inhibitors in combination with IR/TMZ and anti-PDL1 as targeted therapy in patients with tumors with the following genetic abnormalities: mIDH1/mATRX/mTP53 glioma. We look forward to helping translate these novel findings into future clinical trials.

A very recent study by Alghamri et al. in the Castro-Lowenstein Lab was published in *Science Advances*.\(^3\) This work uncovered an unprecedented effect of a common mutation in glioma cells, namely mutant isocitrate dehydrogenase 1 (IDH1-R132H; mIDH1), on immune cell phenotype and function. Alghamri et al. demonstrated that the subtype of gliomas harboring mIDH1 exhibit enhanced responses to
gene stimulatory immunotherapy compared to glioma with wtIDH. The enhanced response to immunotherapy in mutant IDH glioma was due to the reprogramming of the myeloid cells compartment infiltrating the TME, rendering them non-inhibitory. Using advanced immune profiling technologies, the authors learned that the immature myeloid cells infiltrating the mIDH TME are composed mainly of non-suppressive neutrophils and pre-neutrophils, enhancing anti-tumor immunity. The authors delineated the mechanisms for this phenomenon in genetically engineered mouse glioma models and in patient-derived glioma samples, demonstrating that the altered myeloid cell function was due to epigenetic reprogramming of the genetic information within the glioma cells, elicited by 2HG, which was shown to lead to the enhanced production of the cytokine granulocyte colony stimulating factor (G-CSF). Enhanced production of G-CSF altered hematopoiesis in mIDH glioma, promoting the formation of non-suppressive cells, and allowing cytotoxic T cells to mount powerful anti-tumor immunity. This work revealed that G-CSF can be harnessed to enhance the efficacy of immunotherapy in glioma models with wtIDH. This finding helps elucidate why mutant IDH1 glioma patients have better survival and paves the way towards enhanced responses to immunotherapies in aggressive glioblastoma tumor. The effects of G-CSF on modifying the tumor immune microenvironment in a manner conducive to improved anti-tumor immune responses could be harnessed in translational clinical trials.

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 has been completed, and the final manuscript is currently being prepared for publication. A follow-up Phase IB trial that will add the checkpoint inhibitor pembrolizumab to the dual gene therapy (Adenovirus-Flt3L + Adenovirus-HSV1-TK [plus Valacyclovir]) is currently being prepared in collaboration with Dr. Daniela Bota from the University of California at Irvine, and Dr. David Reardon from Dana-Farber/Harvard Cancer Center at Harvard Medical School, as well as Drs. Yoshie Umemura and Wajd Al-Holou.

School, as well as Drs. Yoshie Umemura and Wajd Al-Holou from the University of Michigan. Further trials are leveraging the information learned in our recent Science Advances paper, including a new clinical trial on the use of G-CSF in collaboration with Drs. Yoshie Umemura and Wajd Al-Holou.

Clinical Trials Update

Clinical trials continue to flourish in the Department of Neurosurgery, with ten sponsored projects currently underway. Five of these projects are clinically focused on stroke care while the other five are focused on spine care. There are also several upcoming clinical trials focused on glioblastoma as well as approximately 15-20 clinical outcomes projects underway within the Department.

Judy Heidebrink, MD, MS, Richard D. and Katherine M. O’Connor Research Professor of Neurology, was named Medical Director of the Neurosciences & Sensory (NSS) Clinical Trial Support Unit (CTSU) in 2020. The Department of Neurosurgery’s clinical research team continues to provide pre-post award support, trial coordination, data acquisition and management, regulatory support, statistical support, and publication support.

The Department’s clinical trial support team consists of the following individuals:

- Dr. Judy Heidebrink, CTSU Medical Director
- Karen Sagher, Manager and Clinical Study Coordinator
- Jenny Bell-Allen, Clinical Study Coordinator
- Katherine Wood, Pre/Post Award Support

Additionally, Donna Gauss, Research Process Senior Manager in the Crosby Neurosurgical Laboratories, and Melissa Lay, Research Administrative Assistant in the Castro-Lowenstein Laboratories, provide pre- and post-award support as well. Courtney Wolf serves as the Portfolio Manager in the NSS-CTSU overseeing all projects in the CTSU. Please contact Dr. Heidebrink for additional information regarding the NSS-CTSU or visit clinicaltrials.med.umich.edu for additional information.
In 2021, the Neurosciences Development Team adjusted to the new normal — fundraising in the wake of the COVID-19 pandemic. While in-person events and meetings are still limited, gift officers Kirsten Petriches and Allison Mayer Clark continue to focus on supporting the Department of Neurosurgery’s priorities across the areas of patient care, research, and education. Every day they are inspired by seeing the difference private philanthropy can make in these areas. Below are two stories about donors who have used their own experiences as motivation to support the innovative research being done by leading physician scientists in the Department of Neurosurgery’s Brain Tumor Program.

Christina’s Story

Brain tumor survivor Christina Costa made the local media when she raised money to support the research of her neurosurgeon, Wajd Al-Holou, MD, in gratitude for his lifesaving efforts on her behalf.

It was in the spring of 2020 when Christina, a U-M graduate student, experienced a migraine that caused the left half of her face to go numb. That summer, she experienced dizzy spells and seizures with increased frequency. She sought care at Michigan Medicine and underwent an MRI, which revealed that she had a malignant brain tumor. She was told to go directly to the Emergency Department at Michigan Medicine, where she first met Dr. Al-Holou. He made an immediate impression on her, she recalls, putting her at ease right away, despite her frightening diagnosis.

Dr. Al-Holou performed a 13-hour surgery on Christina in September 2020 and was able to remove 98% of her tumor. She has since been undergoing radiation and chemotherapy. To show her gratitude for the care she received from Dr. Al-Holou and the U-M Neurosurgery team, Christina began a fundraiser to support Dr. Al-Holou’s brain tumor research in December of 2020. She never dreamed that her social media driven fundraisers would ultimately raise $150,000 (and counting) for his research.

To witness the moment when Christina shares news of her original gift with Dr. Al-Holou, and to learn more about her story, please visit:

» [https://giving.medicine.umich.edu/video/christinas-gift](https://giving.medicine.umich.edu/video/christinas-gift)
» [go.ted.com/christinacosta](go.ted.com/christinacosta)

Ian’s Friends Foundation

Ian’s Friends Foundation (IFF) also supports brain tumor research in the Department of Neurosurgery. IFF was established in late 2006 by Cheryl and Phil Yagoda as part of their family’s mission to help cure pediatric brain tumors by investing in promising research.

The Yagodas were stunned when doctors found something on their 2-year-old son Ian’s MRI — an inoperable brain tumor called an astrocytoma. They were stunned again to learn that despite 16,000 children receiving a brain tumor diagnosis each year — with low survival rates — little federal funding supports pediatric brain tumor research. Approximately 1 percent of the National Institutes of Health (NIH) cancer budget is allocated for pediatric brain cancer. “When it’s your child, it’s not raining. It’s not pouring. It’s a hurricane, typhoon, whatever disaster you can think of. It’s nine bazillion times more when it’s your child,” says Phil, who, with his wife, found the grim statistics inconceivable. “We kept asking, how can we not fix this when there is all this technology and so many advances? All you can think is, we need to find a cure.”

Finding a cure is what IFF is all about. “We couldn’t just sit back and wait for something to happen. We knew we couldn’t fix it ourselves, but we could turn to the people who could. We decided to start a foundation to fund pediatric brain research — the most promising research being done anywhere by anyone — and we set out to find the best and the brightest, and in this case, the leaders and the best.” And they have been successful. Since founding IFF in December of 2006, they have funded 32 projects at 20 institutions, including one in Europe.
One project received an NIH Eureka Award and FDA breakthrough status. Another received the NIH Transformation Research Award. Many have led to clinical trials. And IFF does not limit its support to astrocytomas. “We fund things that show promise for any kind of pediatric brain tumor,” Phil says. “Some places focus on tumor-specific research; we focus on its potential to save lives. It’s about the kids and families. If I could, I’d give my life for a child’s.” Unlike more traditional organizations, Phil and Cheryl say IFF doesn’t mind taking chances. “It isn’t always going to work, but we try to find things that show promise, even if they are high-risk. I am not interested in funding something that is just going to wind up in a publication. I want to see research that impacts a child. What we need are game changers. Saving children is our goal.”

IFF supports the immunotherapy work being done in the U-M Neurosurgery laboratory of Maria Castro, PhD, and Pedro Lowenstein, MD, PhD, who are using cancer-cell-killing genes with immune-stimulatory genes to combat brain tumors. Preliminary testing in adults shows the treatment shrinks tumors, increases median survival, and reduces tumor recurrences. Their next step is to determine if this combination therapy is safe for children. More recently, the team published some of their findings related to this research in Science Advances, crediting IFF and others as integral partners in the success of their work. To learn more about this and other research updates from the Castro-Lowenstein Lab, please refer to pages 22 and 23 of this newsletter.

Phil and Cheryl are grateful for their partnership with U-M and the Department of Neurosurgery, praising its clinical and research excellence under the leadership of Dr. Karin Muraszko, Julian T. Hoff Professor and Chair. “We couldn’t be more thankful to U-M and those who have helped us, like Drs. Castro and Lowenstein and Dr. Muraszko — as well as gift officers Ann Kay and Kirsten Petriches, who keep us connected to this important work. We anticipate doing more with the Department of Neurosurgery going forward.” Phil also appreciates the consideration shown for the foundation’s interests and the level of commitment from U-M faculty to keep advancing and accelerating research. "They want to find a cure," he says, "so when families hear the devastating words 'We think we found something,' from their doctors, they can be told in the next breath, 'but don't worry we can fix it, we have a cure.'”

The Yagodas’ sense of gratitude is reciprocated by Dr. Muraszko: “Our donors like Christina Costa and the Yagoda family inspire me with their dedication to helping others facing a brain tumor diagnosis. I am in awe of their proactive approach to finding ways to help extend and save lives — Christina through her innovative fundraising and the Yagodas through their foundation. Their transformational support is helping us address brain cancer in many ways, offering hope to families everywhere.”

If you’d like more information about brain tumor research or other areas within the Department of Neurosurgery that are breaking barriers in patient care and research, please contact Kirsten Petriches or Allison Mayer Clark.
Publications & Grants

2021 PUBLICATIONS*


Chen T, Tan X, Xia F, Hua Y, Keep RF, Xi G. Hydrocephalus induced by intraventricular peroxidase-2: The role of macrophages in the choroid plexus. Biomolecules. 2021;11(5). Epub 2021/05/06. PMID: 33946699


*Publication dates: 11/13/20 - 11/11/21

Bold denotes published Dept. of Neurosurgery affiliation.
Volumetric quantification of aneurysmal subarachnoid hemorrhage independently predicts hydrocephalus and seizures.
J Neurosurg. 2021;1-9. Epub 2021/02/06. PMID: 33545677

Daou BJ, Koduri S, Pandey AS.

Daou BJ, Koduri S, Pandey AS.
Targets for payment reform in mechanical thrombectomy.

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Faisal SM, Mendez FM, Nunez F, Castro MG, Lowenstein PR.
Immune-stimulatory (TK/FK3L) gene therapy opens the door to a promising new treatment strategy against brainstem gliomas.
Oncotarget. 2020;11(50):4607-4612. PMID: 33400737

Tracheostomy for COVID-19 respiratory failure: timing, ventilatory characteristics, and outcomes.

Farzaneh N, Williamson CA, Oryak J, Najarian K.
A hierarchical expert-guided machine learning framework for clinical decision support systems: an application to traumatic brain injury prognostication.

Ferguson SD, Hodges TR, Majd NK, Alfaro-Munoz K, Daou BJ, Koduri S, Pandey AS.
Clipping of unruptured intracranial aneurysms in patients older than sixty: An age-based analysis.

Daou BJ, Pandey AS.
Impact of surgery on outcomes following stroke: A case series.

Hasan MN, Luo L, Ding D, Song S, Castro MG, Zhang Z, Sun D.
Blocking NHE1 stimulates glioma tumor immunity by restoring OXPHOS function of myeloid cells.
Theranostics. 2021;11(3):1295-1309. Epub 2021/01/05. PMID: 33391535

Heth J, Quintero Wolfe S.
Commentary: An examination of standardized letters of recommendation rating scales among neurosurgical residency candidates during the 2020 to 2021 application cycle.

Hollon T, Orringer DA.
Label-free brain tumor imaging using Raman-based methods.
J Neurooncol. 2021;151(3):393-402. Epub 2021/02/22. PMID: 33617106

Holste K, Xia F, Garton HJL, Wan S, Hua Y, Keep RF, Xi G.
The role of complement in brain injury following intracerebral hemorrhage: A review.

Impact of surgeon and hospital factors on surgical decision-making for grade 1 degenerative lumbar spondylolisthesis: a Quality Outcomes Database analysis.

In reply: Dismantling the apocalyptic narrative: The myth of the COVID-19 stroke.
Neurosurgery. 2020. PMID: 33370813

Jackowiak EM, Chou KL, Patil PG, Levin E, Leventhal D.
Delayed dopamine agonist withdrawal syndrome after deep brain stimulation for Parkinson disease.

Kadiyala P, Carney SV, Guccio JC, Garcia-Fabiani MB, Haase S, Alphamri MS, Nunez F, Castro MG, ...Lowenstein PR, Castro MG.
Inhibition of 2-hydroxylglutarate elicits metabolic reprogramming and mutant IDH1 glioma immunity in mice.

Kadiyala P, Gregory JV, Lowenstein PR, Lahmann J, Castro MG.
Targeting gliomas with STAT3-silencing nanoparticles.

Middle meningeal artery embolization for chronic subdural hematoma: A multi-center experience of 154 consecutive embolizations.

Kashlan O, Frech JM, Malcolm JG, Gary MF, Rodts GE, Refai D.
Safety profile and radiographic and clinical outcomes of stand-alone 2-level anterior lumbar interbody fusion: A case series of 41 consecutive patients.
Cureus. 2020;12(11):e11684. PMID: 33391920
Role of complement component 3 in early experience of infancy: The University of Michigan 25-year experience.

Operative Brachial Plexus Surgery.


Acute T2*-weighted magnetic resonance imaging detectable cerebral thrombosis in a rat model of subarachnoid hemorrhage.


Zhang J, Peng K, Ye F, Koduri S, Hua Y, Keep RF, Xi G.

MICHR pilot project

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NIH 1 R01 NS122536 01 07/15/2021 – 06/30/2026

American Brain Tumor Association-DG210003

PI: Andjelkovic-Zochowska AV; Co-I: Castro, M

Glioblastoma

NIH RF1 AG064957 8/1/2019 – 4/30/2024

PI: Andjelkovic-Zochowska AV; Co-I: Castro, M

Glioblastoma

NIH T32 CA009676 9/1/2018 – 8/31/2023

PMID: 34478249

PMID: 33693899

PMID: 33945877

PMID: 33578389

PMID: 33578395

PMID: 33353782

PMID: 34176310

PMID: 34020323

PMID: 34331203

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