2021 Department of Neurological Surgery Annual Report

Reporting period July 1, 2020 through June 30, 2021

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A Mission to Transform Neurosurgery

John Quincy Adams, sixth President of the United States, once said, “If your actions inspire others to dream more, learn more, do more and become more, you are a leader.” We are a leader.

The Department of Neurological Surgery at the University of Pittsburgh has long been at the forefront of neurosurgical innovation, research and training, by setting standards and leading by example. From Stuart Rowe to Peter Jannetta to Dade Lunsford, we have established traditions and standards, transforming neurosurgery.

This standard of excellence that we have cultivated over generations has created an environment of care that is second to none. It’s an environment where subspecialists collaborate to offer the best possible treatment to our patients, while at the same time, teaching and inspiring future generations of neurosurgeons. And it’s an environment where researchers are thinking outside of the box to develop future therapies.

Our department currently has six federally-funded researchers, likely the most in the nation. Ian Pollack is developing novel brain tumor treatments; David Okonkwo is developing new treatment strategies for trauma patients; Ray Sekula is developing new techniques for treating cranial nerve disorders; and Jorge González-Martínez and Taylor Abel are advancing new epilepsy care strategies, while I am looking into new means to treat neurological diseases.

In the clinical area, Paul Gardner and his team have established the UPMC Cranial Base Center as a world leader in the minimally invasive treatment of brain tumors. Dr. Lunsford and his team at the Center for Image-Guided Neurosurgery are the leading international authorities on stereotactic radiosurgery treatment, having now treated almost 18,000 patients with the revolutionary Gamma Knife. Physicians from all over the world come here to learn from Drs. Gardner and Lunsford through their instructional courses.

The multidisciplinary spine team of Drs. Kojo Hamilton, David Okonkwo, Adam Kanter, Peter Gerszten, Vince Miele and David Kauffman provide a vast array of cutting-edge surgical services from trauma to scoliosis to interventional neuroradiology and beyond. Recent faculty addition Michael Lang brings a new comprehensive approach to vascular and endovascular treatments, joining a strong cerebrovascular team of myself and talented doctors Brad Gross, Paul Gardner, George Zenonos and Dan Wecht. Dr. Pascal Zinn continues to develop methods to bring personalized medicine for the management of devastating brain tumors. Dr. John Moossy continues to provide exceptional care for patients experiencing debilitating pain.

Drs. Pollack, Stephanie Greene, Taylor Abel and Robert Kellogg—our pediatric neurosurgery team at UPMC Children’s Hospital of Pittsburgh—have gained international recognition for their treatment of tumors, spinal and cranial deformities, vascular malformations, spasticity, epilepsy, cerebral palsy and traumatic brain injury. Our Center for Clinical Neurophysiology is the largest and busiest academic intraoperative neurophysiological monitoring program in the country, helping make neurosurgery safer at UPMC, and providing innovative protocols, setting standards followed around the globe.
Introduction

These areas are the building blocks for the foundation of an internationally renowned neurosurgery residency program. With 29 residents in our program—the largest in the country—we seek to teach and inspire the best medical students with exceptional clinical and scientific education, developing future leaders in the field of neurosurgery. As a measure of our success, in the last five years, over 80% of our residency program graduates have secured coveted academic positions upon graduation.

We strive to innovate and transform the field through new treatment strategies, never standing still. We endeavor to inspire by our actions and to encourage others to do and become more.

Famed Apple founder Steven Jobs was quoted as saying, “Innovation distinguishes between a leader and a follower.”

We are a leader, with a mission to transform neurosurgery.

Chair, Walter E. Dandy Distinguished Professor of Neurological Surgery
Head of Cerebrovascular Neurosurgery
Director, Complex Brain Surgery Program
Co-Director, UPMC Neurological Institute
Faculty and Residents
Faculty and Residents

Faculty

• Chairman and Professor:
  Robert M. Friedlander, MD, MA

• Professors:
  C. Edward Dixon, PhD
  (Vice Chairman, Research)
  Paul A. Gardner, MD
  (Executive Vice Chairman, Surgical Services)
  Peter C. Gerszten, MD, MPH
  (Vice Chairman, Quality Improvement)
  Jorge A. González-Martínez, MD, PhD
  D. Kojo Hamilton, MD
  Adam S. Kanter, MD
  L. Dade Lunsford, MD
  John J. Moossy, MD
  Ajay Niranjan, MD, MBA
  David O. Okonkwo, MD, PhD
  (Executive Vice Chairman, Clinic Operations)
  Ian F. Pollack, MD
  (Vice Chairman, Academic Affairs)
  Raymond Sekula Jr, MD, MBA
  (Vice Chairman, UPMC Central Pa.)
  Mingui Sun, PhD
  Parthasarathy D. Thirumala, MD

• Associate Professors:
  Jeffrey Balzer, PhD
  Diane L. Carlisle, PhD
  Donald J. Crammond, PhD
  Avniel Ghuman, PhD
  Stephanie Greene, MD
  Nilkantha Sen, PhD
  (Left department June 2021)

• Assistant Professors:
  Taylor Abel, MD
  Sameer Agnihotri, PhD
  Nduka Amankulor, MD
  (Left department June 2021)
  Katherine M. Anetakis, MD
  Marco Capogrosso, PhD
  Bradley Gross, MD
  Luke C. Henry, PhD
  Baoli Hu, PhD
  Robert Kellogg, MD
  Gary Kohanbash, MD
  Michael J. Lang, MD
  Ava Puccio, PhD, RN
  Fang-Cheng (Frank) Yeh, MD, PhD
  Georgios Zenonos, MD
  Pascal O. Zinn, MD, PhD
Faculty and Residents

Faculty

• Clinical Professors:
  Matt El-Kadi, MD, PhD
    (Vice Chairman, UPMC Passavant)
  Joseph C. Maroon, MD
  Daniel A. Wecht, MD, MSc
  David S. Zorub, MD

• Clinical Associate Professors:
  Vincent J. Miele, MD
  Michael J. Rutigliano, MD, MBA

• Clinical Assistant Professors:
  Robert L. Bailey, MD
  J. Brad Bellotte, MD
  Bryan Bolinger, DO
  Salem El-Zuway, MD
  Chikezie I. Eseonu, MD
  David L. Kaufmann, MD
  Eva F. Pamias-Portalatin, MD
    (Left department August 2020)
  Rodwan K. Rajjoub, MD
  Robert J. Schlegel Jr, MD
  Fadi Sweiss, MD

• Research Associate Professors:
  Yue-Fang Chang, PhD
  Hideyuki Kano, MD, PhD

• Research Assistant Professors:
  Shaun W. Carlson, PhD
  Wendy Fellows-Mayle, PhD
  Esther Jane, PhD
  Daniel Premkumar, PhD
  Tanusree Sen, PhD
    (Left department February 2021)

• Research Instructors:
  Daniela Leronni, PhD
  Witold Lipski, PhD

• Physician Assistants:
  Alicia Bergell, PA-C
  Lauren Carroll, MPAS, PA-C
  Alissa Conway PA-C
  Danielle Corson, MMS, PA-C
  Anne Cully, MPAS, PA-C
  Komal Eubanks, DNP, CRNP
  Morgan Fisher, PA-C
  Julia Freyer, PA-C
  Amanda Gans, PA-C
  Nicole Gray, PA-C
  Kayla Grom, PA-C
  Samantha Gulick, PA-C
  Chrisanne Hennicke, MPAS, PA-C
  Danielle Hudak, PA-C
  Alexis Kimes, PA-C
  Sarah Kwiatkowski, CRNP
  Kathleen Mannion, PA-C
  Lawrence Marcello, PA-C
  Maggie Marcus, PA-C
  Hope Maromonte, MPAS, PA-C
  Sally McGinley PA-C
  Kristin Mellon, MPAS, PA-C
  Jessica Nguyen, MPAS, PA-C
  Angela Petrosky, MPAS, PA-C
  Hannah Pierre, CRNP
  Pam Rosato-Lange, CRNP
  Elizabeth Schmele, PA-C
  Suzan Semroc, PA-C
  Edward Shaffer, PA-C
  Alyssa Simon, PA-C
  Lillian Smith, PA-C
  Kristen Thompson, PA-C
  Erin Thomson, PA-C
  Svetlana Trofimova, MPAS, PA-C
  Jennifer Wojcik, CRNP
  Rachel Wrigley, PA-C
  Brittany Zambelli, PA-C
  Jenna Turney, PA-C
Chief Residents
Nitin Agarwal, MD
Medical School: Rutgers
Undergraduate School: College of New Jersey
Hometown: Flemington, N.J.

Nima Alan, MD
Medical School: Case Western
Undergraduate School: British Columbia
Hometown: Vancouver, B.C.

Michael McDowell, MD
Med School: Columbia
Undergraduate School: Arizona State

Alp Ozinpar, MD
Medical School: Oregon
Undergraduate School: California
Hometown: Istanbul, Turkey

Jeremy Stone, MD
Medical School: Hawaii
Undergraduate School: Case Western Reserve
Hometown: Kaneohe, Hawaii

Daniel Tonetti, MD
Medical School: Pittsburgh
Undergraduate School: Drexel
Hometown: Keedysville, Md.

PGY-6
Enyinna Nwachuku, MD
Med School: Pittsburgh
Undergraduate School: Pittsburgh

Matthew Pease, MD
Medical School: Keck/USC
Undergraduate School: Duke

2020-21 graduating chief residents Michael McDowell, MD; Jeremy Stone, MD; Nitin Agarwal, MD; and Daniel Tonetti, MD.
### Faculty and Residents

#### Residents

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<tr>
<th>PGY-5</th>
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<tbody>
<tr>
<td>Hanna Algattas, MD</td>
<td>Edward Andrews, MD</td>
</tr>
<tr>
<td>Medical School: Rochester</td>
<td>Med School: Thomas Jefferson</td>
</tr>
<tr>
<td>Undergraduate School: Colgate</td>
<td>Undergraduate School: Pennsylvania</td>
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<tr>
<td>Kamil Nowicki, MD, PhD</td>
<td>Xiaoran Zhang, MD</td>
</tr>
<tr>
<td>Medical School: Florida</td>
<td>Medical School: Pittsburgh</td>
</tr>
<tr>
<td>Undergraduate School: Florida</td>
<td>Undergraduate School: UCLA</td>
</tr>
<tr>
<td>Hometown: Gainesville, Fla.</td>
<td>Hometown: Luoyang, China</td>
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<th>PGY-4</th>
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<tbody>
<tr>
<td>David Fernandes Cabral, MD</td>
<td>Zachary C. Gersey, MD</td>
</tr>
<tr>
<td>Medical School: Central de Venezuela</td>
<td>Medical School: Miami</td>
</tr>
<tr>
<td>Undergraduate School: None</td>
<td>Undergraduate School: Florida</td>
</tr>
<tr>
<td>Hometown: Caracas, Venezuela</td>
<td>Hometown: Rochester, N.Y.</td>
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<tr>
<td>Justiss A. Kallos, MD</td>
<td>Andrew Legarreta, MD</td>
</tr>
<tr>
<td>Medical School: Vanderbilt</td>
<td>Medical School: Duke</td>
</tr>
<tr>
<td>Undergraduate School: Emory</td>
<td>Undergraduate School: Vanderbilt</td>
</tr>
<tr>
<td>Hometown: Medford, Ore.</td>
<td>Hometown: Buffalo, N.Y.</td>
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<tr>
<td>Roberta K. Sefcik, MD</td>
<td>Joseph Scott Hudson, MD</td>
</tr>
<tr>
<td>Medical School: Icahn, Mount Sinai</td>
<td>Medical School: Iowa</td>
</tr>
<tr>
<td>Undergraduate School: Carnegie Mellon</td>
<td>Undergraduate School: Iowa</td>
</tr>
<tr>
<td>Hometown: Dunedin, Fla.</td>
<td>Hometown: Waterloo, Iowa</td>
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<tbody>
<tr>
<td>Hussam Abou-Al-Shaar, MD</td>
<td>Jeffrey Head, MD</td>
</tr>
<tr>
<td>Medical School: Alfaisal University</td>
<td>Medical School: Thomas Jefferson</td>
</tr>
<tr>
<td>Undergraduate School: None</td>
<td>Undergraduate School: Colgate</td>
</tr>
<tr>
<td>Hometown: Damascus, Syria</td>
<td>Hometown: Fairfield, Conn.</td>
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<tr>
<td>Daryl Fields II, MD, PhD</td>
<td>Rachel Jacobs, MD</td>
</tr>
<tr>
<td>Medical School: Wisconsin, Madison</td>
<td>Medical School: Pittsburgh</td>
</tr>
<tr>
<td>Undergraduate School: St. John’s (Minn.)</td>
<td>Undergraduate School: Emory</td>
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<td></td>
<td>David McCarthy, MD</td>
</tr>
<tr>
<td></td>
<td>Medical School: Miami, Miller</td>
</tr>
<tr>
<td></td>
<td>Undergraduate School: Florida</td>
</tr>
<tr>
<td></td>
<td>Hometown: Tampa, Fla.</td>
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Friedlander Named Distinguished Professor

Robert Friedlander, MD, Walter E. Dandy Professor and chair of the Department of Neurological Surgery, was appointed to the special faculty rank of Distinguished Professor at the University of Pittsburgh in May of 2021, the highest honor the university can accord a faculty member.

In his announcement, university chancellor Patrick Gallagher wrote to Dr. Friedlander stating “this special category of distinguished professorship honors ‘extraordinary, internationally recognized scholarly attainment,’ a standard that you certainly meet.”

A noted neurosurgeon and an expert in Huntington’s disease, ALS, and stroke research, Dr. Friedlander has received a number of significant academic awards and accolades over the years, most significantly an induction into the prestigious National Academy of Medicine in 2019, one of the highest honors in the fields of health and medicine. In addition, Dr. Friedlander is an elected member of the American Society for Clinical Investigation and the American Association of Physicians.

As a sign of his prominence as a clinician and scientist, Dr. Friedlander is one of a very select group of authors to have been invited by the New England Journal of Medicine to write both a basic science review, as well as a clinical review. His work has been published in the highest impact journals, most notably Nature, Science, Nature Medicine and Nature Neuroscience.

In addition to serving as chair of the department, Dr. Friedlander is also head of the department’s cerebrovascular program, director of the department’s complex brain surgery program and co-director of the UPMC Neurological Institute.

Dr. Friedlander is the third current department faculty member to receive the appointment of Distinguished Professor rank, joining Center of Image Guide-Neurosurgery director L. Dade Lunsford, MD, and UPMC Children’s Hospital of Pittsburgh chief of pediatric neurosurgery Ian Pollack, MD.
History

Neurological surgery in Pittsburgh began in 1936 with the arrival of Stuart Niles Rowe, MD, a promising young surgeon trained under the auspices of Charles M. Frazier in Philadelphia. Rowe’s arrival marked the birth of a dedicated neurosurgical division that would become a leader in the field. His move here was prompted by a letter from L.H. Landon, Sr., MD, the chief of general surgery at West Penn Hospital, emphasizing the need for a formally trained neurosurgeon in Pittsburgh. It is said that Rowe won a coin toss over William J. Gardner for the opportunity to migrate to the Pittsburgh area and set up practice. Gardner subsequently moved to the Cleveland area and developed his own neurosurgical center.

Rowe, a Michigan native, developed a strong clinical practice based on the loosely affiliated community hospitals in the Pittsburgh area. He focused his research activities at the University of Pittsburgh and wrote several pioneering papers on the neurosurgical treatment of pain, brain abscess and cerebral trauma. An avid sportsman and devoted father, he dedicated at least one day a week to physical fitness and family life. Rowe began the first formal residency program at West Penn Hospital in 1949 and consolidated this program at Presbyterian University Hospital within the University of Pittsburgh in 1952. Another program was also established at Mercy Hospital in 1949 under the direction of Floyd Bragden, MD, who arrived in Pittsburgh three years after Rowe. Dr. Bragden, trained by Jefferson Browder at Kings County Hospital in New York, was a Pittsburgh native and a well-known acoustic tumor surgeon.

The first woman to practice neurosurgery in the area was Dorothy Klinke Nash, MD. Having completed training in both neurology and neurosurgery at Bellevue Hospital under the guidance of Byron Stookey in the late 1920s, Nash moved to the Pittsburgh area in 1936 but did not gain hospital appointment until a chance meeting with Morris Abel Slocum, MD, the chief of general surgery at St. Margaret Hospital. At the time, Nash worked at the blood bank. While drawing Slocum’s blood, he determined Nash’s background in neurosurgery and immediately appointed her to a staff position. This appointment was a landmark in that she became the first woman to practice neurosurgery in the United States and, thereby, pioneered the way for other women in the field. Shortly thereafter, she was appointed to the hospital staff at the university under Rowe. A graduate of Bryn Mawr College and the Columbia College of Physicians and Surgeons, Nash was named Pennsylvania Woman of the Year in 1957.

Rowe volunteered for military service in World War II, served as an Army lieutenant colonel, and treated casualties triaged to a southern England military hospital. Upon return to Pittsburgh at the end of the war, he resumed control of the neurosurgery service at the university, which was then a division of General Surgery. Rowe embarked on a mission to unify the service, which performed operations at many local hospitals. He also began to train residents.

His own training firmly based in academic neurosurgery, Rowe sought to acquire residents with a commitment to research, teaching and independent thought. The conference schedule included joint conferences with the Mercy Hospital neurosurgical program and a monthly journal club that convened after a dinner at Rowe’s home.

Anthony Fredrick Susen, MD, joined the university in 1953 as a clinical instructor after completing his training at both Bowman Gray Medical School and Harvard. The Illinois native graduated from Dartmouth College and Harvard Medical School. Susen held the same belief as Rowe: that residency training programs should be designed to teach not only exceptional surgical technique, but also the critical clinical decision-making skills. Susen supported Rowe’s beliefs in training residents and emphasized the need for thorough literature review and independent research as a means of broadening clinical knowledge.
Rowe and Susen worked together into the 1960s. In 1964, Henry Bahnson, MD, the chair of General Surgery, appointed Sidney Goldring, MD, of St. Louis to be the first chief of the Division of Neurological Surgery. After two years, Dr. Goldring returned to St. Louis as a professor of neurosurgery and subsequently was named chairman at Washington University. In 1966, Susen was named acting chief and, under his direction, other facilities including Children’s Hospital and the Veterans Administration Medical Center, became part of the service.

In 1971, Peter Joseph Jannetta, MD, was appointed professor and chairman of the newly formed Department of Neurological Surgery and served in the post for 25 years. Dr. Jannetta is universally known for his work in the treatment of cranial nerve disorders, developing a microvascular decompression procedure—widely known as the Jannetta Procedure—that offers trigeminal neuralgia patients an effective therapeutic alternative when medications fail. Although Dr. Jannetta’s scientific and leadership contributions are significant, perhaps his greatest achievement is the legacy of outstanding international leaders he trained in neurosurgery. During his tenure, he trained 49 residents—including four future department chairmen—and was honored with an endowed professorship, appropriately named after Walter E. Dandy—considered one of the founding fathers of neurosurgery. In June of 2000, Dr. Jannetta retired from the University of Pittsburgh and, subsequently, took a position with Allegheny General Hospital.

In 1997, L. Dade Lunsford, MD, was selected as the second department chairman. In the ensuing decade, Dr. Lunsford guided the department to an elite position in the academic community. Under his guidance, the department established itself as one of the top academic neurosurgical departments in the country—continuing Dr. Jannetta’s tradition of training strong, well-rounded residents—and developed into one of the most extensive neurological research programs in the nation. Dr. Lunsford also established the department as one of the leading stereotactic radiosurgical programs in the world. In 1987, he was responsible for bringing the Gamma Knife to the University of Pittsburgh, the first center in the United States to offer this state-of-the-art, minimally invasive form of brain surgery. The university now has three such devices and is a world leader in Gamma Knife treatment and education, having treated more than 15,200 patients.

In June of 2006, Dr. Lunsford announced his decision to step down as department chair in order to devote more time to his clinical work, clinical investigation, and resident and fellow training. University of Pittsburgh School of Medicine dean, Arthur S. Levine, MD, appointed Amin Kassam, MD, co-director of the department’s minimally invasive program, interim chair of the department. Dr. Kassam was subsequently appointed chairman by Dr. Levine in May of 2007. In June of 2009, Dr. Kassam resigned as chairman.

On June 1, 2010, Robert M. Friedlander, MD, a noted cerebrovascular and neuro-oncologic surgeon, became the fourth chair in the department’s history. Dr. Friedlander carved a prominent career as a clinician and scientist at Harvard Medical School and Women’s Hospital in Boston before coming to Pittsburgh. His strong leadership in both clinical and research areas has further established the University of Pittsburgh Department of Neurological Surgery as a world-leader in the academic neurosurgical field.

In June of 2011, the University of Pittsburgh Department of Neurological Surgery residency program was ranked as the most productive residency program in the nation in terms of graduates remaining and contributing in academic neurosurgery, according to a study published online in the Journal of Neurosurgery.

The study’s authors sought to determine those programs that produce a high number of graduates remaining within academic programs and the contribution of these graduates to
academic neurosurgery. In the study, 97 academic neurosurgery departments with 986 faculty members were analyzed. All data regarding training program and medical school education were compiled and analyzed according to the center from which each faculty member graduated. The neurosurgery training program at the University of Pittsburgh produced the highest number of academic neurosurgeons in this sample.

In another similar study published in the *Journal of Neurosurgery* in 2015, the department ranked among the top five neurosurgical residency programs in the country in terms of academic publishing output of faculty. In this comprehensive, five-year study, researchers used bibliometrics—the statistical analysis of written publications—to calculate the objective impact of academic papers. The results showed that the University of Pittsburgh Department of Neurological Surgery had the third highest score of 103 neurosurgical residency programs across the United States for papers published by its faculty from 2009 through 2013.

**Goals/Mission**

The Department of Neurological Surgery at the University of Pittsburgh began more than 75 years ago with a commitment to patient care, education and research. Today these goals are still paramount in our pursuit of excellence: first, to provide outstanding care to patients with neurological disease; second, to equip neurosurgeons of the future with state-of-the-art techniques and analytical skills to lead the field of neurosurgery; and third, to foster research designed to enhance the treatment of diverse diseases affecting the nervous system. Although the faculty has had a wide variety of interests over the years, their unity of vision has been remarkable in this regard.

**Organization**

The main offices of the Department of Neurological Surgery at the University of Pittsburgh are housed on the fourth floor of UPMC Presbyterian. The 2020-21 full-time faculty includes 14 professors, six associate professors and 15 assistant professors. In addition, there are 16 clinical faculty, nine research faculty and 28 residents at various levels of training. The support staff includes more than 200 physician assistants, clinical coordinators, administrative assistants, nurses, technicians and other personnel.

The department has created a unique environment where "centers of excellence and focused programs" flourish. In this model, neurosurgical subspecialists devote time to research and patient care in focused programs. The use of centers of excellence has strengthened neurosurgery at the University of Pittsburgh and facilitated attainment of our mission.

- **Brain and Spine Injury Program**

The Brain and Spine Injury Program consists of a number of programs developed to better understand and treat the problems associated with traumatic injury to the central nervous system, brain and spinal cord, in both adults and children.

The department's adult clinical neurotrauma division, led by David Okonkwo, MD, PhD, remains a world leader in the treatment of and research into traumatic brain and spinal cord injury. The neurotrauma service works closely with integral colleagues from the Trauma Division, Critical Care Medicine, Neurophysiology, Neuroradiology, and Physical Medicine and Rehabilitation to provide the most sophisticated treatments available for brain and spinal cord injury patients.

The department collaborates with investigators worldwide to advance the evaluation, treatment and outcomes of patients suffering traumatic injuries of the spinal column and spinal cord. The Neurotrauma Clinical Trials Center (NGTC) provides the infrastructure necessary to carry out the large number of active research protocols ongoing within the program. Recent trials launched include the first stem cell trial for chronic spinal cord injury to be conducted in Pennsylvania.
Clinical efforts in traumatic brain injury are conducted in collaboration with research carried out through the Brain Trauma Research Center (BTRC) under the direction of C. Edward Dixon, PhD. Research conducted both at the center and at other brain injury research programs clearly demonstrates the potential for improving outcome using therapies designed to treat biochemical derangements that occur following impact to the brain. The BTRC has pioneered efforts using temperature manipulation and cerebral blood flow monitoring in the treatment of severe head injury and has conducted landmark investigations into the mechanisms of induction and recovery of head trauma and secondary injury.

- **Cerebrovascular Neurosurgery Center**
  The Comprehensive Center for Cerebrovascular Neurosurgery at the University of Pittsburgh Medical Center is a subspecialized multidisciplinary clinical unit that evaluates and treats all forms of vascular disorders of the brain and spinal cord. Given the high volume of cases managed by the center, it serves as a national and international resource for the management of patients with complex cerebrovascular disease, including aneurysms, arteriovenous malformations (AVMs), arteriovenous fistulas (AVFs), carotid disease, Moya-Moya, and cavernous malformations. With a group of highly subspecialized physicians, center faculty prospectively assess patients and provide broad state-of-the-art treatment options. Since cerebrovascular disease can often be treated using a spectrum of complementary techniques, experts evaluate cases and provide recommendations with the goal of minimizing risks and maximizing long-term efficacy.

  The center is directed by department chairman Robert M. Friedlander, MD. Other members of our team include Paul A. Gardner, MD; Bradley A. Gross, MD; Michael J. Lang, MD; Daniel A. Wecht, MD; and Georgios Zenonos, MD. As part of the cerebrovascular center, Dr. Gross serves as director of endovascular neurosurgery.

  Challenging cases are reviewed prospectively in our weekly multidisciplinary cerebrovascular conference. All the key subspecialists are represented and discuss the individual features of each case. Individual consideration is given to each patient to tailor the most effective therapy taking into consideration a number of important features including patient age, overall health status, and specific anatomical consideration of their vascular abnormality.

  The Cerebrovascular Neurosurgery Center works in close collaboration with the UPMC Stroke Institute—staffed by neurologists with additional training in vascular neurology. Our endovascular neurosurgeons and interventional neurologists perform acute interventions for ischemic strokes at one of the highest rates in the country and are involved in innumerable trials advancing the field. For patients with complex, elective cerebral ischemic disease, Dr. Lang has a very busy practice in cerebral revascularization, offering cutting-edge cerebral bypass options, among.

- **Center for Clinical Neurophysiology**
  The Center for Clinical Neurophysiology (CCN) at UPMC was organized in 1981 to serve as an interdepartmental resource serving then-Presbyterian University Hospital, Montefiore Hospital and Children’s Hospital of Pittsburgh. At that time, the CCN was composed of just a few clinicians providing diagnostic testing and intraoperative neurophysiological monitoring (IONM) services for only very specific surgeries in the neurosurgical and orthopedic disciplines.

  The service has now grown to providing more than 7,000 IONM cases per year at all UPMC pavilions, as well as supporting UPP surgeons at non-UPMC hospitals. The use of IONM at UPMC reaches across many surgical disciplines and has proven to be an
Department Overview

Invaluable adjunct not only in adult and pediatric neurosurgical procedures but also in orthopedic, ENT, vascular, cardiothoracic and interventional neurological procedures.

The CCN and its highly trained and nationally renowned faculty and technical staff’s primary goal is to provide high-quality service in a cost-efficient manner to the UPMC patient population. The center focuses on interdisciplinary research to improve the understanding and the value of IONM to predict and prevent nerve injury. In addition, CCN faculty have established an IONM course and training program at Carlow University. The first undergraduates in this program, graduated in May of 2020.

Parthasarathy Thirumala, MD, is director of the CCN and is joined by Jeffrey Balzer, PhD; Donald Crammond, PhD; Katherine Anetakis, MD, Varun Shandal, MD, and James Castellano, MD.

The CCN is the largest and busiest academic IONM program in the country, offering and providing services at all UPMC hospitals including UPMC Hamot, Horizon, Altoona, Somerset, Susquehanna and Western Maryland. In addition, the CCN provides professional and technical services at Armstrong Regional Health System, Excela Health System, Indiana Regional Hospital and Trinity Health System. The CCN faculty is able to achieve this service expansion to community hospitals through the use of telemedicine technology. Patients in community hospitals, more than 100 miles away, can receive the same quality care without having to travel to Pittsburgh.

Intraoperative multimodality monitoring at UPMC includes expertise in somatosensory evoked potentials (SSEP), brainstem auditory evoked potentials (BAEP), transcranial motor evoked potentials (TcMEP), direct cortical motor evoked potentials (dMEP) electroencephalography (EEG) and electromyography (EMG). Direct peripheral nerve recordings (CNAP and CMAP) are also are performed, as well as single unit micro-electrode recordings (MER) and macrostimulation performed for subcortical mapping during placement of DBS electrodes in various subcortical structures. EEG is used to monitor cerebral function and ischemic risk during cerebral and peripheral vascular procedures, including cerebral aneurysm treatment, carotid endarterectomy and a variety of cardiothoracic procedures.

EEG recorded directly from the pial surface of the brain, or electrocorticography (ECoG), is used to help determine resection margins in epilepsy surgery, and to monitor for seizures during direct electrical stimulation of the brain surface carried out while mapping eloquent cortex in awake patients. In addition to providing IONM services, the CCN also performs diagnostic evoked potential testing, and transcranial Doppler studies.

The CCN is proud to provide a high-quality, high value service at a significantly low cost to patients, which it is able to achieve by constantly evaluating and improving clinical services through its various research initiatives and quality improvement programs. The center’s cutting-edge research efforts—represented by multiple, peer-reviewed publications in high quality journals each year—have demonstrated the value of the application of multimodality intraoperative neurophysiological monitoring to improved patient safety during various peripheral and central nervous system operative procedures.

• Complex Brain Surgery Program
The Complex Brain Surgery Program, under the direction of department chairman Robert Friedlander, MD, is devoted to the surgical treatment of lesions and tumors located in deep, eloquent or difficult-to-reach regions of the brain. The goal of the program is to provide
gentle, accurate, and safe surgery for the most complex lesions and locations, often regarded as inaccessible or high-risk.

This program has its foundation on a precise and meticulous knowledge of microsurgical neuroanatomy and neurosurgical approaches, and is built upon extensive surgical experience at UPMC, and intense microsurgical learning and research conducted at the Surgical Neuroanatomy Lab and the Fiber Tractography Lab at the University of Pittsburgh.

Areas of surgical expertise include intrinsic tumors in eloquent brain areas and deep white matter, limbic/paralimbic tumors (insula, medial temporal lobe, cingulum), intraventricular and thalamic lesions, pineal and posterior tentorial incisura tumors, cerebellar and brain-stem lesions.

A unique feature of this program is the application of sophisticated presurgical planning techniques, such as surgical simulation with crafted anatomical specimens and High-Definition Fiber Tractography (HDFT), to carefully develop the most effective and less invasive operative plan.

HDFT is an advanced MRI-based non-invasive imaging technique, with its surgical applications pioneered by Dr. Friedlander, to study the three-dimensional structure of the fiber tracts of patients with intrinsic brain lesions. HDFT provides a superior presurgical evaluation of the fiber tracts for patients with complex brain lesions, including benign, low grade, and high-grade tumors. The combination of HDFT with accurate neuroanatomical knowledge of the white matter tracts is the key to design the less invasive trajectory into a target lesion and apply more effectively intraoperative electrical mapping techniques for maximal and safe tumor resection in eloquent cortical and subcortical regions.

• Center for Cranial Base Surgery

Cranial base surgery has a long tradition at the University of Pittsburgh. The UPMC Center for Cranial Base Surgery—under the current direction of Paul Gardner, MD, and Georgios Zenonos, MD, in the Department of Neurological Surgery and Carl Snyderman, MD, MBA, and Eric Wang, MD, in the Department of Otolaryngology—is the first skull base center to be established in North America and has pioneered both transcranial microscopic and endoscopic endonasal approaches to the skull base and brain. Together with their partners in the Departments of Otolaryngology, Oculoplastics, and Plastic Surgery, they continue to advance the field through improvement of surgical techniques as well as molecular strategies for treating skull base disease. They also work in regular collaboration with L. Dade Lunsford, MD, who established the first Gamma Knife center in North America at UPMC in 1987, and was also the first to introduce radiosurgery for the non-operative treatment of skull base tumors.

Experts at the UPMC Center for Cranial Base Surgery continue to lead the field of minimally invasive brain surgery by developing new techniques, tools and approaches that have made it possible to access many tumors, regardless of size. Since 1997, more than 4,000 endonasal surgeries have been performed in adults and children, making UPMC one of the busiest centers in the world for the surgical treatment of tumors of the pituitary region and cranial base. By combining this innovative approach with other minimally invasive approaches, such as transorbital and endoscopic-assisted retromastoid and keyhole approaches, as well as the full complement of standard skull base approaches, the team at UPMC provides a full array of options for cutting-edge treatment of skull base disease. In addition, the Center for Cranial Base Surgery has also been designated as a Pituitary Tumor Center of Excellence by the UPMC Health Plan, setting the standard for pituitary tumor treatment in the region.
Drs. Gardner, Snyderman, Zenonos and Wang, along with Tonya Stefko, MD, from the Department of Ophthalmology, and Barry Hirsch, MD, and Andrew McCall, MD, neuro-otology surgeons from the Department of Otolaryngology, comprise a team of experts in cranial base surgery, advancing patient care through clinical outcomes studies, in-depth anatomical study, molecular science and genetics research and an international training program. Supported by expert physician assistants Rachel Rogers and Brittany Snider, and a highly experienced subspecialty nursing team, patients are evaluated and guided through even the most complex, multidisciplinary care.

The concept of team surgery allows the center to select the best surgical approach for each tumor, with a surgical plan designed around the particular needs of the individual patient. Treatment is designed to offer the best surgical outcome with the least side effects and maximal preservation of function. A full array of transcranial approaches, minimally invasive key-hole approaches and endoscopic endonasal approaches are routinely applied with proven and studied success. The UPMC Center for Cranial Base Surgery is also a major teaching and research destination for surgeons and other health care professionals looking to learn more about these techniques. Faculty teach three courses a year at UPMC, featuring live surgery and hands-on laboratory work. They also travel the world teaching these procedures to the next generation of skull base surgeons.

• Center for Cranial Nerve Disorders
The Center for Cranial Nerve Disorders, under the direction of Raymond F. Sekula Jr., MD, joins experts in a variety of medical disciplines, including neurosurgery, neurology, neurophysiology, radiology, anesthesia, neuro-oncology, and neuro-otology with the intent of providing the most advanced care for a variety of brain disorders. The goal of the center is to provide the very best outcomes for patients with a variety of disorders in the most minimally invasive manner.

Building upon pioneering work accomplished by University of Pittsburgh faculty over the past four decades, the Center for Cranial Nerve and Brainstem Disorders is the international leader in the management of trigeminal neuralgia, hemifacial spasm and glossopharyngeal neuralgia. Dr. Sekula has performed more than 1,000 microvascular decompressions for trigeminal neuralgia, and more than 1,000 MVDs for hemifacial spasms since finishing his mentorship with MVD pioneer Peter Jannetta, establishing him as one of today’s preeminent international experts in the field of cranial nerve surgery.

The center is driven by outcome-based clinical research and basic science research projects aimed at understanding the biologic mechanisms of diseases within the realm of the center. In recent years, this research has resulted in improved outcomes for patients and new therapies for a variety of disorders.

In conjunction with the Gold Laboratory at the University of Pittsburgh, Dr. Sekula (PI) and Dr. Gold (PI) received a five-year (R01) award in the amount of $3,481,696 to study mechanisms of pain associated with trigeminal nerve injury.

• Epilepsy, Movement Disorders and Psychiatry Surgical Program
The Epilepsy, Movement Disorders and Psychiatry Surgical Program, under the direction of Jorge A. González-Martínez, MD, PhD—with the assistance of Danielle Corson, PA-C—at the University of Pittsburgh encompasses the treatment of medically intractable epilepsy, movement disorders and psychiatry disorders. These brain diseases are similar in that successful neurosurgical treatment requires an expert understanding of the involved brain networks and their potential for modulation by functional neurosurgical procedures, as well
Department Overview

as multidisciplinary teams that deliver surgical care to these special groups of patients. Dr. González-Martínez has expertise in both adult and pediatric patients. Pediatric patients are treated at the UPMC Children’s Hospital of Pittsburgh, one of the best pediatric hospitals in the country, as noted in *U.S. News and World Report*.

UPMC also houses the region’s foremost centers for the comprehensive neurosurgical treatment of all types of adult and pediatric epilepsy, including epilepsy caused by lesions visible on MRI (mesial temporal sclerosis, cortical dysplasia, neurodevelopmental brain tumors, cavernous malformations, etc) and epilepsy where the seizure onset location is not obvious and must be localized by intracranial monitoring, including stereo-electroencephalography (SEEG). Part of the University of Pittsburgh Comprehensive Epilepsy Center, the surgery program is one of the busiest—and most renowned—programs, offering the latest less invasive and conventional surgical treatments, including responsive neurostimulation, laser thermal ablation, deep brain stimulation and incisionless endoscopic nasal resections in patients with temporal lobe epilepsy.

Dr. González-Martínez, co-director of the epilepsy center, has the country’s largest experience in SEEG implantations, SEEG guided resections and neuromodulation surgeries, with more than 3,000 successful surgical procedures performed. In order to promote an optimal safety profile and seizure outcome, many procedures are performed under robotic guidance. In addition of developing and implementing the SEEG method in North America, Dr. González-Martínez is also a pioneer in robotic surgery, having performed more than 1,000 procedures using this technique. The University of Pittsburgh has the largest experience in robotic neurosurgery in the country and was one of the first institutions in adopting the novel technology.

In addition to clinical activities, The Epilepsy, Movement Disorders and Psychiatry Surgical Program is considered one the premier programs in the country regarding translational and basic science research, working in collaboration with the University of Pittsburgh Department of Neuroscience, Carnegie Mellon University Department of Biomedical Engineering, John Hopkins University and Aix Marseille University in France. The program’s research activities are led by Dr. González-Martínez and his research team, and conducted through the University of Pittsburgh Cortical Systems Laboratory.

- **Human Neural Prosthetics Program**
  The Human Neural Prosthetics Program—under the surgical direction of Jorge A. González-Martínez, MD, PhD—is the result of a multidisciplinary effort to explore the utilization of brain computer interfaces for improving the lives of patients with motor disabilities. In 2007, a collaborative group was established—representing expertise in engineering, neuroscience and rehabilitation—to promote clinical trials using brain computer interfaces to control neural prosthetic devices.

Researchers obtained an initial grant to evaluate micro-ECoG grids in patients in the Epilepsy Monitoring Unit. Data from this study demonstrated that patients could utilize a brain computer interface to control a computer cursor. This grant served as the kick-start for two clinical trials.

In the first, quadriplegic patients are implanted with a custom-designed ECoG grid for up to 30 days. The first subject was able to obtain consistent three-dimensional cursor control using a 3D visual environment. He was also able to successfully control a robotic arm. Additional subjects have also successfully achieved cursor control in a 3D virtual environment and control of a robotic arm. The initial work was funded by the Cortical Control of a Dextrous Prosthetic Hand study funded by National Institute of Neurological Disorders and Stroke (NINDS) and Andrew B. Schwartz, PhD (Department of Neurobiology) was the principal investigator.
A second study utilizes microelectrode arrays that penetrate the surface of the brain. This study is funded by the Defense Advanced Research Projects Agency (DARPA) and is part of the Revolutionizing Prosthetics Program, Phase 3 study for which Michael L. Boninger, MD, former chairman of the Department of Physical Medicine & Rehabilitation, is the principal investigator. In the study, two 96-channel electrode arrays were implanted into the brain of a quadriplegic individual. This study participant was able to obtain control of up to 10 degrees of freedom. Using seven degrees of freedom, she has been able to utilize the robotic arm to perform standardized rehabilitation tasks, such as placing objects on a shelf. Once FDA approval was obtained, she was able to interact personally with the robotic arm and was able to grasp a food item and feed herself. As part of the Revolutionizing Prosthetics Program, Phase 3 study, investigators also obtained FDA approval to place stimulating arrays in conjunction with recording arrays in anticipation of adding sensory feedback to the control of the robotic arm. A second subject was implanted with two recording arrays in motor cortex and two stimulating arrays in sensory cortex. This subject was able to experience a natural-like sense of touch when the fingers of the robotic arm were stimulated by touch. In sensory tests, he was able to correctly identify which finger was touched while blindfolded.

The success of these early studies has led to additional collaborations. The first collaboration is funded by a $7 million NIH grant (Michael Boninger, MD, Physical Medicine and Rehabilitation) to expand our research team to include the University of Chicago. We join Sliman Bensmaia, PhD, and Nicholas Hatsopoulos, PhD, to expand our research efforts with the goal of restoring hand function in patients with paralysis. The second new collaboration is funded by a $1.2 million NIH award (Jennifer Collinger, PhD, Physical Medicine and Rehabilitation) to better understand the underlying neural activity of reaching and grasping. The program will be collaborating with University of Pittsburgh researchers, Aaron Batista, PhD, and Patrick Loughlin, PhD, from the Swanson School of Engineering, and Carnegie Mellon researchers Steven Chase, PhD, and Byron Yu, PhD, from the College of Engineering.

In January of 2020, Marco Capogrosso, PhD—an expert in neuroprosthetics and spinal cord stimulation—joined the department. His research efforts in spinal cord injury and motor control will complement the expertise of our current collaborators. The program continues to look for opportunities to apply expertise in brain computer interfaces to help patients.

In June of 2021, the program was awarded a $6.37 million National Institutes of Health grant to study how population dynamics in motor cortex change with behavioral context and how they are shaped by sensory feedback. Through this proposal, researchers hope to gain a better understanding of how motor cortical activity generalizes across static and dynamic behaviors as well as the potential to drive plasticity within cortical circuits that communicate sensorimotor information, which has relevance for understanding skill learning and improving rehabilitation after injury.

• **Center for Image-Guided Neurosurgery**

The Center for Image-Guided Neurosurgery (CIGNS) led by L. Dade Lunsford, MD, Lars Leksell Distinguished Professor at the University of Pittsburgh, incorporates the expertise of individuals in image-guided stereotactic and functional neurosurgery, brain tumor surgery, Gamma Knife radiosurgery, neuro-oncology, radiation oncology and neuro-radiology. Ajay Niranjan, MD, MBA, is associate director of the center. The goal of the center is to provide quality patient care using minimal access or minimally invasive stereotactic and radiosurgical technology, high resolution neuroimaging and advanced computer systems. In 1981, the center was the first U.S. center to install a dedicated computed tomography (CT) scanner in a unique stereotactic operating room suite.
As the first North American group to initiate a clinical program for Gamma Knife stereotactic radiosurgery in 1987, the Center for Image-Guided Neurosurgery continues to be a leader in this field. Currently, two Gamma Knife units are located at UPMC Presbyterian, one of the few clinical sites in the world with two clinical units. In the fall of 2007, the Leksell Gamma Knife Perfexion™ was installed. This fifth generation Gamma Knife unit incorporates advanced robotics, expands the role of radiosurgery to include extracranial targets, provides greater patient access, and enhances patient safety. In 2016, UPMC installed its sixth Gamma Knife, the newest generation ICON Gamma Knife. It was reenergized with new Cobalt 60 sources in May of 2021. The ICON incorporates a cone beam CT imaging system with the Gamma Knife in order to facilitate a mask stereotactic fixation system for selected patients.

Gamma Knife technology represents one of the most advanced means available to help patients with brain tumors, arteriovenous malformations (AVMs), and pain or movement disorders. Over 17,000 patients have undergone Gamma Knife stereotactic radiosurgery at UPMC Presbyterian. In addition, spinal radiosurgery using several radiosurgical systems is offered under the direction of Peter Gerszten, MD, who serves as the Peter E. Sheptak Endowed Professor at the University of Pittsburgh.

The center also has a dedicated MEGIN NeuroMag® magnetoencephalography (MEG) unit that performs brain mapping in patients with structural brain lesions, epilepsy, trauma and degenerative brain disorders. Dr. Niranjan is the operations director of the MEG project and continues to pursue cutting edge MEG research combining high-definition fiber tractography (HDFT) in the care of patients with refractory movement disorders and trigeminal neuralgia. UPMC’s MEG unit will be replaced by a state-of-the-art MEGIN TRUIX™ neo unit. This unit includes a helium recycling device to significantly reduce the annual cost of helium replacement needed to supercool the detectors of tiny brain waves that can allow detection of critical areas of brain function and the source of epileptic seizures.

The Center for Image-Guided Neurosurgery is also an international training site for radiosurgery and minimally invasive neurosurgery, holding six week-long training courses per year. Over the last 20 years, more than 2,500 neurosurgeons, neurootologists, radiation oncologists, medical physicists, and nurses have trained at this center. These courses are among the highest rated post-graduate courses offered at the University of Pittsburgh. In 2015, the center opened a new state-of-the-art education and training facility equipped with the latest generation high definition display systems. In July of 2020, the center switched to virtual Gamma Knife training courses with participants from around the world attending remotely as “temporary” students at the University of Pittsburgh. Students can now remotely study radiosurgery effectively, avoiding the costs and time involved with national or international travel. CIGNS also participates in the training of selected fellows who compete for the Leksell Gamma Knife Society three-month fellowship in Pittsburgh. Neurosurgery residents at UPMC spend a three-month dedicated block for study during their third year of training.

In addition, the center conducts numerous clinical, long-term outcome research projects and is the coordinating center for the International Radiosurgery Research Foundation (IRRF), a multi-institutional international clinical consortium of centers of excellence performing stereotactic radiosurgery. The IRRF currently has members from the United States, Canada, China, the Czech Republic, Spain, Taiwan, Egypt, Turkey and India. Multiple retrospective clinical trials have been published or are underway. More than 5,000 articles have now been published worldwide in the field of stereotactic radiosurgery. The University of Pittsburgh has the highest number of studies, having been cited more than 100 times.
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Each year more than 600 patients undergo Gamma Knife radiosurgery at the CIGNS, making it one of the busiest centers in the world. Each year, center faculty publish approximately 20 clinical research studies, now exceeding more than 700 combined peer reviewed publications and over 1,000 publications when book chapters and presentations are included.

In May of 2019, the 280-page volume Leksell Radiosurgery, coedited by Drs. Niranjan Lunsford and Hideyuki Kano, MD, PhD, was published by Karger Publishers and represented a significant summary of the current role of the Gamma Knife.

In 2021, the third edition of Stereotactic Radiosurgery will be released by Thieme Publishing, with Dr. Lunsford, and Jason Sheehan, MD, co-director of the Gamma Knife Center at the University of Virginia—and former fellow at the University of Pittsburgh—serving as editors.

More than 100 U.S. or international fellows have received training at this center since 1987. The center provides an opportunity for advanced training in image-guided stereotactic and functional surgery at the fellowship level. Current international research fellows are from China and Japan. The fellowship has two tracks, one for candidates interested in a functional focus (movement disorders, pain, and epilepsy) and one for candidates focusing on neurooncology and radiosurgery. This one-year PGY-7—or post residency—opportunity is approved by the Society of Neurological Surgeons Committee on Advanced Specialty Training (CAST). The first track, under the direction of Jorge Gonzalez-Martinez, MD, PhD, includes nine months spent on the functional neurosurgery service which includes epilepsy and movement disorder experience plus three months on the radiosurgery service. The second track includes nine months on the radiosurgery service and three months on the functional service. Currently, all PGY-3 residents spend three months each on the Gamma Knife service each year.

The multidisciplinary Center for Image-Guided Neurosurgery includes the clinical and research efforts of neurosurgeon Dr. Kano and radiation oncologists John Flickinger, MD, Yoshio Arai, MD, Susan Rakfal, MD, and Zaid Siddiqui, MD. The participating medical physics group consists of Jong Oh Kim, PhD, Greg Bednarz, PhD and Tanvir Baig, PhD. Grace Yum provides assistance in medical informatics. Lana Trofimova, PAC, provides patient care assistance for the Gamma Knife program. Five full time dedicated, and very talented, nurses headed by Jonet Vacsulka, BSN, and assisted by RNs Mark Geminetti, Devi Willaman, Nancy Bastine, and Brenda Unghajer provide pre, intra, and post radiosurgery care to more than 600 patients every year. They are all especially trained in conscious sedation techniques to provide comfort and attentive care to our patients.

Kelly Powell, Dana Adams, and Julie Martin are an extremely capable administrative team that ensures prompt patient approvals and care.

- Neurosurgical Oncology Program

The University of Pittsburgh’s Neurosurgical Oncology Program includes leading neurosurgeons, neuro-oncologists, radiation oncologists, neuropathologists, researchers, rehabilitation experts, nurses and support staff. This multidisciplinary team delivers compassionate and sophisticated care and uses the latest technologies to treat patients with tumors of the brain, spine and skull base. Education, support and counseling for family members are important parts of the program.

The Neurosurgical Oncology Center features two clinical divisions: the Adult Neurosurgical Oncology Program and the Pediatric Neurosurgical Oncology Program. Both operate under the auspices of the comprehensive Brain Tumor Program, centered at the Hillman Cancer
Department Overview

Center of the University of Pittsburgh Cancer Institute (UPCI). The Brain Tumor Program supports clinical trials and basic science research for patients with brain tumors and is led by Ian Pollack, MD.

The Adult Neurosurgical Oncology Center—directed by Pascal O. Zinn, MD, PhD—is dedicated to providing the best treatment available for patients with both benign and malignant tumors of the brain and spine. The center is also dedicated to discovering novel and effective therapies for these diseases and is a leading center for surgically-driven clinical trials and translational bench-to-bedside trials based on scientific breakthroughs developed in our laboratories.

The Neurosurgical Oncology Center is one of the most robust and innovative in the world, with one of the largest volumes of patients treated on an annual basis. The center has been a leader in the implementation of cutting-edge technologies such as stereotactic radiosurgery using the Gamma Knife, CyberKnife, and image-guided tumor resection using intraoperative CT and MRI. Other technologies, including minimally invasive techniques for tumor removal using intracranial endoscopic port surgery (Neuroendosport™) and endoscopic endonasal approaches to the skull base have been pioneered at this center. The use of advanced imaging modalities, such as high definition white matter fiber tract imaging and magnetoencephalography, has also facilitated better outcomes for selected patients with tumors. In addition, awake craniotomy techniques with brain mapping, and fluorescent-guided brain tumor resection are routinely used to maximize safe removal of brain tumors at the cancer center.

As an international referral center for both adult and pediatric brain tumors, the center ranks among the top neuro-oncology programs in the nation. Faculty members provide consultation and guidance for local, national and international referrals. Patients with both primary brain and spine tumors and metastatic tumors are seen in the Hillman Cancer Center multidisciplinary clinics that include representation from neurosurgery, medical neuro-oncology and radiation oncology. A weekly multidisciplinary neuro-oncology tumor board is a forum for a team of specialists to review patient problems and to formulate management recommendations. The tumor board draws from the expertise of the neurosurgery, neurology, radiology, pathology and radiation oncology faculty at UPMC. Similarly, there is a weekly skull base tumor board with involvement from otolaryngology/head and neck cancer specialists, neuro-ophthalmology, radiology, and adult and pediatric neurosurgery.

Our team is also actively studying other neurological complications of systemic cancer and its treatment, including stroke, neurobehavioral disorders, neurological complications of chemotherapy and/or radiation therapy, and paraneoplastic neurological syndromes, in collaboration with medical neuro-oncologists Frank Lieberman, MD, and Jan Drappatz, MD, and Megan Mantica, MD.

To highlight our skill and breadth of expertise in neuro-oncology, the University of Pittsburgh is a member of the Pediatric Brain Tumor Consortium composed of 15 academic centers and children’s hospitals located across the United States and Canada selected based on their scientific excellence and clinical expertise in pediatric brain tumors, and is also the coordinating center for the International Radiosurgery Research Foundation, an international consortium of academic centers of excellence dedicated to furthering stereotactic radiosurgery treatment.

The Spine Oncology Radiosurgery Program, led by Peter C. Gerszten, MD, MPH, is the most experienced center in the world in using radiosurgery to treat a wide variety of both malig-
nant and benign spinal and paraspinal tumors. This highly effective therapy is both safe and painless, and avoids many of the risks associated with open surgery.

- **Pediatric Neurosurgery**
The Pediatric Neurosurgery Division at UPMC Children’s Hospital of Pittsburgh is led by Ian Pollack, MD, and also includes Stephanie Greene, MD, and Taylor Abel, MD. Robert Kellogg, MD, will join the group in September of 2020. The division provides care for children with tumors, spinal and cranial deformities, vascular malformations, spasticity and epilepsy, and peripheral nerve disorders, and has gained international recognition for the treatment of pediatric brain tumors, cerebral palsy and traumatic brain injury.

The center’s neurosurgeons work closely with specialists in pediatrics, surgery, radiation therapy, oncology, physical therapy, orthopedics, plastic surgery, critical care, pediatric neurology and social services. Through its neuro-oncology program, the center provides comprehensive, multi-disciplinary care for patients with brain and spinal cord tumors, in collaboration with the oncology and radiation therapy programs. Patients may be eligible for treatment in one of many innovative research protocols at Children’s Hospital. These protocols—several of which are unique to Children’s or available at only a few centers throughout the country—provide Children’s patients access to new treatments and promising studies.

Dr. Pollack is the institutional principal investigator and chair of the neurosurgery and translational biology committee in the Pediatric Brain Tumor Consortium, supported by the National Cancer Institute to perform cutting-edge clinical trials in children with brain tumors, and serves as the principal investigator on several studies involving vaccine-based immunotherapy for children with challenging brain tumors. The clinical program has been enhanced by the completion of an intraoperative MRI suite, which facilitates the goal of achieving safer and more extensive resections in challenging childhood brain tumors and allowing immediate postoperative imaging without the need for a second anesthetic.

These clinical advances are coupled with a robust and rapidly growing research enterprise, encompassing a state-of-the-art pediatric brain tumor bank that will soon receive specimens from other regional pediatric neurosurgical sites, as well as a series of three NIH R01 funded research projects, two of which our led by young investigators, Sameer Agnihotri, PhD, and Gary Kohanbash, PhD. These activities build upon the division’s existing strength in experimental therapeutics and immunobiology, with a goal of developing the next generations of precision-medicine-based clinical trials.

Patients with vascular anomalies such as aneurysms, arteriovenous malformations, cavernous malformations, and moyamoya syndrome are managed by Dr. Greene, the director of vascular neurosurgery at Children’s Hospital. Select patients undergo further evaluation at the department’s Center for Image-Guided Neurosurgery with L. Dade Lunsford, MD, for possible radiosurgical treatment; angiography by an endovascular neurosurgical team, for further definition of anomalies and possible embolization of feeding vessels to reduce blood flow to a malformation; and assessment by a vascular neurologist for management of seizures, dystonia, and coagulopathies that may be identified during the course of the evaluation process. Such comprehensive evaluation best identifies those patients who would benefit from surgical intervention. Patients with vascular problems involving more than one organ system, or those with syndromes such as Sturge-Weber or PHACES, are seen in the multidisciplinary Vascular Anomalies Clinic, one of the largest of its kind in the country.

The Pediatric Epilepsy Surgery Program, led by Dr. Taylor Abel, is the only center in the region able to provide comprehensive epilepsy surgery evaluation and performs more than
120 epilepsy surgeries each year. A comprehensive pre-surgical evaluation, using state-of-the-art neuro-imaging and electrophysiology resources, is performed to identify the specific site in the brain causing seizures and to determine its relationship to important functional areas of the brain. Patients with focal epilepsy can be treated with the full range of treatment options including lesionectomy, cortical resection, lobar resection, or hemispheric disconnection—with or without a period of direct cortical recordings (i.e. SEEG or subdural grid electrodes) to elucidate epileptic cortex. The surgical epilepsy program is equipped with both a ROSA robot and O-Arm intraoperative CT scanner, which enables frameless robot-assisted SEEG implantation. Approaches are tailored to minimize the use of craniotomies when possible. A large proportion of patients are treated with MR-guided laser ablation.

Direct cortical modulation with responsive neural stimulation (RNS) is also available when the seizure focus involves eloquent cortex. For children with drug-resistant multi-focal or generalized epilepsy, all available palliative procedures are available including MR-guided laser callostomy, traditional callosotomy, vagus nerve stimulation, and deep brain stimulation. Recently, a multidisciplinary epilepsy surgery clinic was started which provides streamlined, comprehensive evaluation of children with drug-resistant epilepsy for surgery.

Dr. Abel’s NIH, PCORI, and industry-funded research efforts are focused on understanding how the brain processes auditory information and comparative effectiveness studies of epilepsy surgery interventions. Dr. Abel is the site-PI for multiple clinical trials investigating use of stereotactic laser ablation or neuromodulation for drug-resistant epilepsy.

The program is also involved in cutting edge clinical and basic research focused on developing and applying new and improved treatments for children with movement disorders. Dr. Kellogg manages this aspect of the practice and participates in The Spasticity and Movement Disorders Clinic that is held weekly. This clinic is made up of a team of pediatric medical professionals who specialize in the comprehensive, multidisciplinary evaluation and treatment of children and young adults with spasticity and other movement disorders, such as cerebral palsy, spasticity, dystonia, chorea, athetosis and tremor. The purpose of the clinic is to determine whether a patient would benefit from treatment with oral medications, intrathecal baclofen, selective dorsal rhizotomy, intramuscular botox injection, deep brain stimulation orthopedic procedures, or other therapies. Additionally, we are able to offer intraventricular baclofen pumps which is a therapy pioneered at UPMC Children’s Hospital of Pittsburgh by A. Leland Albright, MD, and that has been revived with the addition of Dr. Kellogg. With the ROSA robot and O-Arm, asleep frameless stereotactic deep brain stimulation is available for children with dystonia and other movement disorders requiring neuromodulation.

The division is an integral collaborator in the Cleft-Palate and Craniofacial Center in the management of children with craniofacial disorders. Because children with complex craniosynostosis often require a staged approach to the treatment of their cranial, midfacial and lower facial deformities, close multidisciplinary follow-up is maintained throughout childhood and adolescence in order to optimize long-term functional and cosmetic outcome.

The division is actively involved in the Brain Trauma Research Program, the Fetal Diagnosis and Treatment Center, the Vascular Anomalies Center and the Brachial Plexus Program. In conjunction with a team of specialists at UPMC Magee-Womens Hospital, Dr. Greene has established a program to treat babies with myelomeningocele, or spina bifida, with in utero surgery here in Pittsburgh. Babies who are not candidates for in utero surgery undergo conventional closure of the defect within several days of birth. These children are seen throughout childhood by a multidisciplinary team of medical professionals in the Spina Bifida Clinic at Children’s Hospital, one of the largest such clinics in the country. Expectant
mothers are referred by the Fetal Diagnosis and Treatment Center at UPMC Magee-Womens Hospital for counseling in the pediatric neurosurgery clinic if prenatal imaging reveals a potential neurosurgical abnormality.

The Brachial Plexus Birth Injury Clinic—run through the division of pediatric plastic surgery—manages infants with birth injuries to the brachial plexus in a collaborative fashion with specialists from neurosurgery, plastic surgery, orthopedic surgery, and physical and occupational therapy. UPMC Children’s Hospital of Pittsburgh is one of a handful of centers in the country that have a dedicated multidisciplinary clinic for these patients and is the only such program in the region. Older patients with peripheral nerve tumors or injuries are seen by Dr. Greene outside of the Brachial Plexus program.

UPMC Children’s Hospital of Pittsburgh is a member of the Hydrocephalus Clinical Research Network, a group of 11 premier pediatric neurosurgical departments in North America that are dedicated to designing and undertaking field-changing prospective research into pediatric hydrocephalus. In addition, Children’s is also a member institution in the Park-Reeves Syringomyelia Research Consortium, a group dedicated to solving important clinical problems within the realm of Chiari malformation and syringomyelia.

Finally, the clinical team has been expanded with the addition of Dr. Kellogg, a former neurosurgical fellow who joined the group in September of 2020. In addition to his management of the Pediatric Neurosurgery Division’s spasticity and movement disorders program noted above, he will be focusing on the many studies conducted within the Hydrocephalus Clinical Research Network as well as expanding the division’s outreach program to communities beyond our immediate geographic area.

**Pituitary Center**

Over the last few decades, there has been a dramatic shift in the standard of care for pituitary surgery with the introduction of endoscopic techniques. The UPMC Center for Skull Base Surgery has been a pioneer and leader in the development of these techniques and has performed over 4,000 endoscopic skull base procedures. Since the introduction of the endoscopic endonasal approach, more than 1,400 pituitary surgeries have been performed at the UPMC Pituitary Center, and our surgical team, consisting of Paul Gardner, MD, and Georgios Zenonos, MD, from neurosurgery, and Carl Snyderman, MD, MBA and Eric Wang, MD, from otolaryngology, currently performs around 100 operations for pituitary tumors every year (over 900 since 2009). In addition, the Pituitary Center is also led by a dedicated neuro-endocrinology team of Pouneh K. Fazeli, MD, (director) and Hussain Mahmud, MD, who specialize in patients with pituitary-related hormone deficiencies or over-production.

Numerous studies now show better outcomes and lower complication rates in centers with more experienced pituitary surgeons. This experience–outcome effect is likely more pronounced in complex cases such as invasive adenomas, reoperations for recurrent adenomas, giant pituitary adenomas, Cushing’s disease, and acromegaly.

As a result, the Pituitary Society has proposed consensus criteria for pituitary centers of excellence (PCOEs), including a baseline requirement of 50 surgical cases per year. In addition, multidisciplinary care via a center of excellence model has been espoused and its advantages well described, even leading to a call for accreditation for PCOEs. Based on the above, combined with UPMC’s longstanding expertise and major role in the development of endoscopic pituitary surgery, it is logical that UPMC create a system-wide pathway of care for pituitary tumors. This has led to formation of official pituitary center of excellence criteria within UPMC and recognition of COE status for our skull base center surgeons. In addition,
in conjunction with co-surgeon/pediatric neurosurgeons, the Center for Skull Base Surgery is the only group with expertise in pediatric skull base surgery and performs pediatric pituitary surgeries at UPMC Children’s Hospital of Pittsburgh.

All physicians on the current pituitary COE team are subspecialty trained. The UPMC Pituitary Center is a multidisciplinary team which includes: neurosurgery, endocrinology, otolaryngology, neuro-ophthalmology, neuroradiology/head and neck radiology, endovascular neurosurgery, radiation oncology (including Gamma Knife radiosurgery), neuroanesthesia, neuro-oncology, and neuropathology. As one of the leading centers for pituitary tumors worldwide, our triple mission is to provide comprehensive care and support to patients with pituitary disorders; to provide residency and fellowship training, as well as continuing medical education in the management of pituitary and neuroendocrine disease; and to contribute to basic science and clinical research in pituitary disorders. As a result of this collaboration, UPMC has become a regional, national and international center for referral.

• Spine Services Division

The Neurosurgical Spine Services Division at the University of Pittsburgh is a multidisciplinary organization composed of specialists in the fields of physical therapy, physical medicine and rehabilitation, interventional neuroradiology and neurological spine surgery. Specialists from these fields work together as a unified group to provide the highest quality care for patients and athletes who have spine injuries, painful disc conditions, neck, arm, back or leg pain.

Adam S. Kanter, MD, is chief of neurosurgical spine services and also leads the minimally invasive spine program. David O. Okonkwo, MD, PhD, leads the spinal deformity program and D. Kojo Hamilton, MD, provides specialty care in the treatment of cervical malalignment and spinal deformity. Peter C. Gerszten, MD, MPH, leads the percutaneous and spine radiosurgery programs.

The Neurosurgical Spine Services Division offers comprehensive care for all types of spinal disorders, including degenerative, traumatic, and oncologic conditions. The initial treatment approach is typically non-surgical, with surgical options reserved for patients with recurrent or disabling symptoms and/or progressive deficits. Complete diagnostic testing of all spinal and nerve disorders is available through the center.

The minimally invasive program, led by Dr. Kanter, utilizes state-of-the-art portal techniques and lateral access corridors to minimize trauma and disruption of stabilizing back muscles. The spinal deformity program, led by Dr. Okonkwo, offers full-scale analysis, longitudinal tracking and treatment interventions for patients with scoliosis and thoracolumbar spinal deformity. Together, they continue to push the surgical envelope and combine their unique skill sets to provide each and every patient with the least invasive yet maximally effective treatment options.

Dr. Hamilton correspondingly treats complex cervical deformity, such as swan neck and chin-on-chest disorders, in addition to thoracolumbar scoliosis, oncologic and degenerative spine conditions. The spine radiosurgery program, led by Dr. Gerszten, is one of the most experienced centers in the world in treating a wide variety of benign and malignant spine and paraspinal tumors that has proven highly effective, safe, and painless, and avoids many of the risks associated with open surgery.

Within the division is the Center for Surgical Pain Management led by John J. Moossy, MD. This program provides a variety of surgical options for the management of medically intrac-
table pain syndromes. The range of treatment varies from neuroaugmentation (i.e., spinal cord stimulation and intrathecal opioids) to surgical decompression (with or without spinal fusion) to ablative neurosurgery.

The Neurosurgical Spine Services Division works together as a unified team, utilizing a multidisciplinary approach to maximize patient care and outcomes. An array of research studies and protocols are employed to deliver unsurpassed treatment strategies, ensuring that patients receive the best state-of-the-art care in the country.

- **Community Outreach:**
  This year, the Department of Neurological Surgery—along with its partner provider, the UPMC Neurological Institute—has launched a dedicated effort to educate, engage and update our community-based network of referring physicians. This network of family practice, internal medicine and emergency medicine physicians, along with our fellow specialist and subspecialist providers, is critical to the success and longevity of our program, from both the academic and hospital administrative perspective.

Central to the overall plan is an external communication program that has been initiated to keep community providers aware of institute services through local liaison office visits, regional dinners with select UPMC physicians to highlight marquis services, such as surgical epilepsy management, and continuing medical educational offerings, both live at UPMC facilities and through remote access hosted by department faculty members.

The overarching goal of all of these efforts is to keep our regional community partners abreast of the happenings within the institute from the global level down to the individual patient perspective, all the while ensuring to local referring physicians that the intent of the Department of Neurological Surgery/UPMC Neurological Institute is care that is episodic in nature; reiterating that once neurosurgical services are completed, the department/institute will facilitate the seamless transition of care management of these patients back to their local providers.
Accomplishments and Highlights of Note in Fiscal Year 2020-21

July 2020

- The University of Pittsburgh and UPMC Center for Image-Guided Neurosurgery—in cooperation with Elekta, Inc.—successfully conducted the first virtual Gamma Knife training course with participants from around the world attending. The course included lectures, videos, application demonstrations and live hands-on supervised treatment planning.

- Taylor Abel, MD, was featured in a *Pittsburgh Tribune* article that discussed how his surgery helped a young epilepsy patient become seizure free.

August 2020

- *The Surgical Handbook*, a resource guide for medical students and junior residents interested in surgical specialties—especially neurosurgery—coauthored by third-year resident Hussam Abou-Al-Shaar, MD, was published by Thieme Publishers.

- Chief resident Jeremy Stone, MD, was named a winner of the 2020 UPMC Medical Education LEAP Award for Patient Safety and Quality Improvement for his paper "Improved Patient Satisfaction Through Adoption of the Transradial Approach Compared to the Transfemoral Approach for Diagnostic Angiography."

- Chief resident Nima Alan, MD, was named recipient of the 2020 North American Spine Society (NASS) Young Investigator Clinical Research Grant Award for his research project "Quantitative Tractography of Spinal Cord White Matter Pathways to Assess Severity of Clinical Presentation in Cervical Spondylotic Myelopathy."

- Joseph Maroon, MD, received the 2020 UPMC Clinician of Courage Award, presented to a UPMC physician who is thriving and/or serving as a leader within their community after having faced and overcome adversity. To further honor Dr. Maroon, UPMC announced that the award would be renamed the Joseph Maroon Clinician of Courage Award for future award winners. *(See page 169.)*

- Peter Gerszten, MD, presented a special talk on the paleopathology South American mummies for the Carnegie Museum of Pittsburgh’s popular traveling mummies exhibit.

September 2020

- Nitin Agarwal, MD, was selected to receive the inaugural University of Pittsburgh School of Medicine Distinguished Junior Mentor Award recognizing junior fellows who demonstrated exemplary care and commitment in all aspects of student mentoring.

- David Okonkwo, MD, PhD, was a guest on the *One Mind Brain Waves* webcast discussing the mental health of athletes and traumatic brain Injury in the sports world.

- Pascal Zinn, MD, PhD, was the featured monthly speaker in the University of Pittsburgh’s Senior Vice Chancellor Research Seminar Series, delivering the talk "The Making of Brain: Toward Personalized Bio-Adaptable Brain Cancer Therapy."

- First-year resident Prateek Agarwal, MD, was elected to the American Association of Neurological Surgeons’ Young Neurosurgeons Committee. The committee provides a channel for young neurosurgeons to impact the direction of neurosurgery and helps develop future leaders of the field.
October 2020

- Joseph Maroon, MD, finished first in his age group in the virtual 2020 Columbus Triathlon with a time of 3:57:00. He also provided the keynote address at the University of Pennsylvania Abramson Cancer Center 2020 Neuro-Oncology Brain Tumors Symposium.

November 2020

- Gary Kohanbash, PhD, was awarded a $50,000 Discovery Grant from the American Brain Tumor Association for his research project ‘Theranostic Antibody for Improving Immunotherapy and Immune Monitoring in Glioma.’

December 2020

- A new book volume on skull base orbital surgery, part of the popular Journal of Neurological Surgery Part B: Skull Base series—coedited by Paul Gardner, MD, and S. Tonya Stefko, MD, director of the Oculoplastic, Aesthetic and Reconstructive Surgery Service at the UPMC Eye Center—was released by Thieme Publishers.

- Joseph Maroon, MD, was a guest on the Ben Greenfield Fitness podcast discussing life lessons learned in dealing with burnout, fatigue and stress through proper diet, self-care and exercise.

- Raymond F. Sekula Jr., MD was promoted to full professor at the University of Pittsburgh.

January 2021


- The second edition of the book Brain and Spinal Tumors of Childhood, coauthored by Ian Pollack, MD, was released by CRC Press.

- A paper published in Nature Communications and coauthored by Marco Capogrosso, PhD, proposed a new technology to improve arm and hand movements in individuals with arm paralysis due to spinal cord injury, stroke and other movement disorders.
Department Overview

Accomplishments and Highlights of Note

- The Federal Drug Administration cleared a rapid concussion test, helped developed by David Okonkwo, MD, PhD, and Ava Puccio, PhD, that paves the way for having a quick test available wherever someone might suffer a head injury.

- The UPMC Center for Cranial Base Surgery hosted a live broadcast from the UPMC Presbyterian operating room showcasing the endoscopic endonasal skull base approach. The surgery was performed and described by Paul Gardner, MD, and Carl Snyderman, MD, MBA, with Eric Wang, MD, and Georgios Zenonos, MD, serving as moderators.

- A research study on the 'Point-of-Care Platform Blood Biomarker Testing of Glial Fibrillary Acidic Protein versus S100 Calcium-Binding Protein B for Prediction of Traumatic Brain Injuries: A Transforming Research and Clinical Knowledge in Traumatic Brain Injury Study' was cited by the prestigious Journal of Neurotrauma as the most downloaded article published in 2020. David O. Okonkwo, MD, PhD, was the lead author on the article.

- Ian Pollack, MD was elected vice-chair of the American Board of Pediatric Neurosurgery.

February 2021

- A cavernous malformation patient of Robert Friedlander, MD, who participated in her own awake craniotomy procedure as surgeons utilized high-definition fiber tracking to pinpoint surgical location was featured in the Pittsburgh Post-Gazette.

- The University of Pittsburgh launched the Alba Tull Center for Neuro Imaging and Therapeutics. The center will be dedicated to designing and expanding imaging technologies for patient care to produce a new, sophisticated understanding of the brain at the molecular level with the goal of developing anti-aging therapeutics. (See page 34.)

- UPMC Passavant spine care specialist Robert Bailey, MD, was featured on a WPXI-TV Community Matters segment talking about various back and spine issues and treatments.

- Robert Friedlander, MD, was announced as a recipient of a 2021 University of Pittsburgh Chancellor Distinguished Faculty Research Award. The award recognizes faculty members who have made outstanding contributions to teaching excellence, public service, and have achieved exceptional scholarly accomplishments.

- Chief resident Michael McDowell, MD, received the University of Pittsburgh School of Medicine Award for Outstanding Mini-Elective at the School of Medicine’s Curriculum Colloquium faculty teaching awards. Dr. McDowell’s course dealt with introducing medical students to the field of neurosurgery.

- A cavernous malformation patient of Raymond Sekula Jr., MD, was featured on the KDKA-TV Evening News, detailing how a life-saving diagnosis and treatment plan helped her achieve a prognosis for a full recovery.

March 2021

- Joseph Maroon, MD, was a guest on the KDKA-1020 Radio Morning Show discussing links between bacteria, depression and microbiomes, and stressing the importance of a healthy diet and a balanced lifestyle.

- Adam Kanter, MD, was promoted to full professor with conferral of tenure at the University of Pittsburgh.
Department Overview

Accomplishments and Highlights of Note

- Nduka Amankulor, MD, was a guest on the John Legend Music On My Mind YouTube channel show discussing how music helps in the operating room.

- D. Kojo Hamilton, MD, was promoted to full professor at the University of Pittsburgh.

- Sharath Anand, MD; Andrew Faramand, MD; Sakibul Huq, MD; and Anthony Schulien, MD, matched into the University of Pittsburgh Department of Neurological Surgery residency program.

- Jorge Gonzalez-Martinez, MD, PhD, was featured on WMC-TV 5 (Memphis, Tenn.) in a story on a new surgical technique accessing the brain through the gingival labial fold—inside the mouth—to treat epilepsy.

April 2021

- Chief residents Nitin Agarwal, MD, and Michael McDowell, MD, were elected to the Journal of Neurosurgery editorial board as Young Neurosurgery Committee ad hoc reviewers. Dr. Agarwal will be focusing on JNS Spine and Dr. McDowell will be focusing on JNS Pediatrics.

- David Okonkwo, MD, PhD, was a guest on the Neurosurgery Podcast discussing the current state of neurotrauma and critical care medicine.

- The Center for Image-Guided Neurosurgery, under the direction of L. Dade Lunsford, MD, treated their 17,000th patient using the ground-breaking Leksell Gamma Knife radiosurgery system. The patient was treated for a slight progression of a benign brain growth and was able to go home the same day.

- The second book volume of the orbital pathology issue of the popular Journal of Neurological Surgery Part B: Skull Base series—coedited by Paul Gardner, MD, and S. Tonya Stefko, MD, director of the Oculoplastic, Aesthetic and Reconstructive Surgery Service at the UPMC Eye Center—was released by Thieme Publishers. The two-volume effort was so comprehensive that journal editors noted "for the first time in the history of the journal we had to utilize a full two editions to publish the entirety of the work."

May 2021

- Joseph Maroon, MD, and his lecture “From Surgical Burnout to Wellness” were nominated by The American College of Surgeon Academy of Master Surgeon Educators as finalist for Encore Presentations from 2017-2020.

- Fourteen University of Pittsburgh neurosurgeons were named among this area’s best doctors in their field in a national survey published locally in Pittsburgh Magazine. The list includes Nduka Amankulor, MD; Matt El-Kadi, MD, PhD; Robert M. Friedlander, MD; Paul A. Gardner, MD; Peter C. Gerszten, MD; Jorge A. Gonzalez-Martinez, MD, PhD; Stephanie Greene, MD; D. Kojo Hamilton, MD; Adam S. Kanter, MD; L. Dade Lunsford, MD; David O. Okonkwo, MD, PhD; Ian Pollack, MD; Raymond Sekula, Jr., MD; and Daniel Wecht, MD.

- The UPMC Pituitary Center held a virtual pituitary conference providing up-to-date evaluation and management strategies for non-functioning pituitary adenomas, hyperprolactinemia, Cushing’s Disease and acromegaly. The conference—under the direction of center co-directors Paul Gardner, MD, and Pouneh K. Fazeli, MD—included recorded lectures and two live Q&A/case discussion sessions with course faculty.
• Kamil Nowicki, MD, PhD, and Robert Friedlander, MD, were selected to participate in the University of Pittsburgh's Pitt Ventures First Gear program for their research project 'Small Molecule Inhibitor Therapy to Prevent Aneurysm Formation, Growth, and Rupture.' The First Gear program is an effort to help shape inventions originating from university research into products and services that can be commercially transitioned as a startup company or as a viable product or service.

• Daryl P. Fields II, MD, PhD, was named recipient of top research awards from the Chuck Noll Foundation for Brain Injury Research and the 2021 Congress of Neurological Surgeon Spine Summit for his work in spine trauma research.

• Joseph Maroon, MD, was a guest on TechVibe Radio discussing how research efforts through the Chuck Noll Foundation are helping diminish the impact of sports-related head injuries.

• Robert Friedlander, MD, was appointed to the special faculty rank of Distinguished Professor at the University of Pittsburgh, the highest honor the university can accord a faculty member. In announcing the appointment, university chancellor Patrick Gallagher wrote to Dr. Friedlander that "this special category of distinguished professorship honors 'extraordinary, internationally recognized scholarly attainment,' a standard that you certainly meet." (See page 10.)

• UPMC was designated as a 2021 Multidisciplinary Team of Distinction by the North American Skull Base Society (NASBS). The designation recognizes the work of Cranial Base Surgery Center co-directors Paul A. Gardner, MD, and Carl Snyderman, MD, along with S. Tonya Stefko, MD, director of the Oculoplastic, Aesthetic and Reconstructive Surgery Service at the UPMC Eye Center, and Bernard Costello, DMD, MD, dean of the University of Pittsburgh School of Dental Medicine.

• Joseph Maroon, MD, received a service award from the Pittsburgh Steelers in recognition and appreciation for his 30+ years of dedication and service to the NFL franchise.

• Hanna Algattas, MD, received the first Aequanimitas Award from the University of Pittsburgh Department of Neurological Surgery. The award—endowed by University of Pittsburgh Heindl Scholar Joseph Maroon, MD—is awarded to a department resident that personally and professionally exhibits the humanistic qualities of empathy, caring, kindness, imperturbability, and collegiality...complemented by availability, affability and ability. (See page 46.)
Alba Tull Center Launched

In February of 2021, the University of Pittsburgh launched the Alba Tull Center for Neuro Imaging and Therapeutics—a center dedicated to designing and expanding imaging technologies to produce a new, sophisticated understanding of the brain at the molecular level with the goal of developing anti-aging therapeutics.

The center is the result of a $1 million grant from the Tull Family Foundation, longtime supporters of the University of Pittsburgh Medical Center. The Tull Family Foundation was founded by Thomas and Alba Tull to support organizations that are devoted to transforming the lives of the people in underserved and underfunded communities. A private foundation, TFF funds the advancement of innovative ideas in education, medical and scientific research, and conservation.

“This gift enables a first-of-its-kind center for multidisciplinary collaboration to advance the fields of neuroscience, therapeutics and imaging,” said Dr. Anantha Shekhar, senior vice chancellor for the health sciences and John and Gertrude Petersen Dean of the School of Medicine at the University of Pittsburgh. “This support from the Tull Family Foundation will expand and enhance the University’s already robust research in this field.”

“I am excited about the opportunity to advance our work in neuro AR, chemistry and personalized medicine, keeping us at the forefront of patient care and research breakthroughs,” said Robert Friedlander, MD, Walter E. Dandy Professor and chairman of the University of Pittsburgh Department of Neurological Surgery and co-director of the UPMC Neurological Institute. Dr. Friedlander also highlighted the key role Joseph Maroon, MD, clinical professor of neurological surgery at the University of Pittsburgh Medical Center, played in securing this important gift. The Alba Tull Center will encourage researchers to collaborate on leading cross-disciplinary projects exploring new frontiers in imaging technology and its applications. Work will include the development of a single, non-invasive scan, known as radiomics, that integrates multiple patient records to predict responses to therapies in order to help determine the best course of treatment. It will also enhance high-definition imaging of fiber connections in the brain to better fight tumors without damaging other tissue.

Alba Tull added, “The past year, more than ever, has underscored the power medicine has to change the world and the future. Supporting leading medical care and research is one of our priorities and this new center will enable scientific innovations from allowing physicians to examine a patient’s brain without making an incision to guiding surgeons’ hands in real-time when invasive treatment is the only option. We are proud to be able to support the University of Pittsburgh School of Medicine and look forward to continuing to work together.”

Alba Tull (center) with Robert Friedlander (left) and Joseph Maroon (right).
Education Programs
The Department of Neurological Surgery provides medical education in a wide variety of forums at UPMC and the University of Pittsburgh. The faculty contributes to undergraduate and graduate-level education at many sites and to the continuing education of their professional colleagues.

**Undergraduate Level**
Selected faculty of the Department of Neurological Surgery participate in several undergraduate courses at the University of Pittsburgh. In addition, undergraduate students are offered shadowing opportunities with various faculty members while they evaluate and operate on patients at UPMC. To qualify, an undergraduate student must obtain faculty permission and complete online training courses related to patient confidentiality. Medical students often round with the evening-on-call neurosurgery resident at UPMC Presbyterian in order to get real-life observations of the types of clinical problems encountered, as well as insights into the life of a neurosurgery resident.

**Medical Students**
Faculty participate in teaching clinical neuroscience and neuroanatomy to first- and second-year medical students. Several Pitt medical students spend elective time doing clinical research with faculty members from various centers in the department. During their surgery core clerkship, third-year medical students may elect to take a two-week introductory subspecialty experience in neurosurgery.

Selective fourth-year medical students at the University of Pittsburgh, as well as visiting medical students from other schools, may elect to take a four-week clinical subinternship on the neurosurgery services at UPMC, during which they participate in all phases of the training program as well as in supervised patient care services. Typically, each four-week rotation includes experience on cranial, spinal, and pediatric neurosurgery. During the 2020 COVID pandemic—in collaboration with the advice of the Society of Neurological Surgeons—Pitt students will spend eight weeks on the neurosurgery service as fourth year students, with experience in general and trauma neurosurgery, pediatrics, endovascular, and radiosurgery.

- **Visiting Medical Students**
The Department of Neurological Surgery at the University of Pittsburgh Medical Center offers a clinical elective that is open to enrolled fourth-year medical students in good academic standing at any U.S. medical school. During the fall of 2020, these visiting rotations have been suspended because of travel restrictions imposed by the Covid pandemic.

When they resume, elective rotations (subinternships) are four weeks in length and must correspond with the School of Medicine’s dates. The application requests will begin in February of each year. Assignments will be made after our fourth-year students finalize their schedules at the end of March. Once the student affairs office verifies each application, they will forward the application to the department. Reviewing of applications will start mid-April.

One-month clerkships offered to senior medical students from other medical schools attract 10-20 students each year. In their senior year selective students may participate in ongoing research projects in the Department of Neurological Surgery under the supervision of an advisor. This experience trains students in basic or clinical neurosurgical research techniques and procedures and offers in-depth education in basic neurosciences. Other medical students seek a more formal and longitudinal exposure to neurosurgical investigation, and complete an approved scholarly project. Pitt medical students often use this educational opportunity as the base for their required graduation scholarly project.
• Pitt Med Neurosurgery Interest Group
The Neurosurgery Interest Group at the University of Pittsburgh School of Medicine is devoted to fostering an interest in the exciting field of neurological surgery. The group connects medical students to key resources in the Department of Neurological Surgery and provides opportunities to shadow, conduct cutting-edge research, and network with the department. Mentoring from several senior residents in our program helps to stimulate interest in the field.

Under the direction of senior residents and participating faculty, the department offers focused lectures and demonstrations on neurosurgical topics for University of Pittsburgh medical students. The goal is to provide a background of current advances in neurosurgery to prospective students interested in a neurosurgical career.

Residency Program
The UPMC Department of Neurological Surgery offers a seven-year (PGY 1-7) residency program that is internationally renowned as a training ground for exceptional neurosurgeons. Accredited by the UPMC Graduate Medical Education Council, as well as the Accreditation Council on Graduate Medical Education (ACGME), the program is currently approved to train 28 residents, four each year. The goal of the program is to provide exceptional clinical and scientific education to top-notch graduates of medical schools who wish to be future leaders in the field of neurological surgery. The program focuses on training to maximize medical knowledge, build patient care skills, and provide for practice based and systems based learning. The department stress professionalism and interpersonal and communication skills, and relies heavily on both inpatient and outpatient use of informatics.

The University of Pittsburgh Department of Neurological Surgery—which was founded in 1936 and has offered a residency training program dating back to the late 1940s—has always stressed a strong commitment to patient care, education and research. Today, the department is the largest neurosurgical academic provider in the United States, performing over 9,000 major procedures annually system-wide, the majority of which are performed at our academic hospitals of UPMC Presbyterian, UPMC Shadyside, UPMC Mercy, UPMC Children’s Hospital of Pittsburgh and the VA Pittsburgh Healthcare System, University Drive.

An article published in USA Today in February of 2018, ranked the University of Pittsburgh neurological surgery residency program as one of the top five programs in the country, citing the “advanced technology and focus on innovation” available here. In a ranking published in Becker’s Spine Review in August of 2018, our program was ranked among the top in five in the country based on a peer-rated, review-based survey.

A 2015 study published in the Journal of Neurosurgery showed that our department ranked among the top five neurosurgical residency programs in the country in terms of academic publishing output of faculty. Another Journal of Neurosurgery article, published in 2011, showed that our department ranked as the most productive residency program in the nation in terms of graduates remaining and contributing to academic neurosurgery. Still another article, published in informaHealthcare, showed that our stereotactic research effort was the most productive in the world.

In the 2018, the department completed a 50-year retrospective assessment of training at our program, published in the Journal of Neurosurgery [2018 Aug 1-7]. In each decade, beginning in 1971, we looked at admitted residents and finishing residents, tracking any changes in professional or behavioral events during training. We surveyed 98 graduates and analyzed the data in 76% who completed the survey. This study does not indicate that resi-
students have changed in any significant way over these 50 years. The vast majority of resident graduates express satisfaction with their career choice and its overall positive impact on their families.

Almost eighty years at the forefront of neurosurgical care have demonstrated that we are a proven international leader in patient care, research and training. Resident performance and tracking is performed twice per year using the ACGME Milestones project.

• **PGY-1**
  Residency training at the department begins with the first-year experience. PGY-1 residents who enter the field as novices in neurosurgery will spend eight months on various neurosurgical services, two months on critical care medical services (trauma, neuro, surgical ICU), and two months on neuropathology. The first year of training is critically evaluated each year by the faculty and trainees to optimize the introductory experience in neurosurgery. It is designed to optimize performance for the next year, when full integration into patient care teams is accomplished.

• **PGY-2**
  The PGY-2 year represents an in-depth introductory year to clinical neurosurgery and emphasizes critical care, basic operative techniques, and initial clinical decision making. The department emphasizes the importance of the flow of information and communication between residents, senior residents and responsible faculty. PGY-2 residents routinely spend a block of three months on the cranial service, three months at UPMC Mercy, three months on the pediatric service (Children’s Hospital of Pittsburgh of UPMC) and three months on the trauma service.

Most junior residents participate in more than 250 neurosurgical procedures during their first year. PGY-2 residents will complete basic training in many procedures, such as lumbar puncture, external ventricular drain placement, intracranial pressure monitor insertions and placement of cerebral blood flow technologies such as Licox tissue oxygenation monitors. Initial case experience includes the selection and identification of patients who will undergo craniotomy, routine spinal procedures and trauma cases.

Clinical judgment is enhanced by spending an average of one day per week in the physician outpatient office. Numerous midlevel providers, including physician assistants and nurse practitioners, provide support both on the hospital floors and in the outpatient clinics.

• **PGY-3**
  The PGY-3 year emphasizes clinical experience in brain and spinal surgery including vascular neurosurgery (an initial introduction to endovascular and exovascular techniques), image-guided surgery, functional neurosurgery and neurosurgical oncology at UPMC Shadyside.

During the PGY-3 year, residents have a greater opportunity to consolidate their knowledge and to maximize supplemental reading and clinical reviews in preparation for a practice run of the written board examination (American Board of Neurological Surgery). This test is taken for practice in March of the PGY-3 year. Attendance at a training course in stereotactic radiosurgery, as well as initial experience in movement disorder, pain surgery and neuro-oncological surgery are obtained during this year. Each fall, PGY-3 residents also attend the annual Research Update in Neuroscience for Neurosurgeons (RUNN) course at Woods Hole, Mass. This course provides an update on exciting developments in neuroscience and is intended to catalyze residents to pursue neuroscience basic or clinical research.
• **PGY-4**
In the PGY-4 year, senior residents in neurological surgery will gain additional critical experience in multiple cranial and spinal cases in order to reach the next set of milestones in their education. Consolidation of medical knowledge, enhanced patient care skills and intense practice-based learning will occur in this year. PGY-4 residents spend a significant portion of their time in the operating room. Increasingly difficult procedures are assigned to senior residents and include complex spinal procedures with instrumentation, craniotomies for intra-axial tumors, meningiomas and posterior fossa surgery. Residents spend nine months on the adult service and three months as senior resident on the pediatric service. Typically, a senior resident participates in between 400 and 500 cases per year.

• **PGY-5**
The PGY-5 block provides a total of nine months of focused career development opportunities for senior residents. During this time, residents will spend three as the chief resident at the VA Pittsburgh Healthcare System where they will gain additional surgical and service management skills. During this time, residents take the ABNS training exam for credit. All residents must pass the exam in order to graduate. The departmental target goal is a performance on the written boards at or above the 50th percentile.

The remaining time is flexibly designed for residents to actively pursue clinical or research-focused subspecialty training, along with investigations on topics that will eventually foster their subsequent career and provide benefit to the future course of neurosurgery. There are two paths for trainees in the PGY-5: the Clinical Investigator Path and the Surgeon Scientist Investigator Path:

**Clinical Investigator Path:**

The clinical investigator path includes an 21-month period of time during the PGY-5 and PGY-6 or PGY-7 years (i.e., residents will complete their chief residency year in PGY-6 or PGY-7 depending on enfolded fellowship plans ) for subspecialty training. Residents will identify a primary mentor by the PGY-4 year. The resident in this path must have identified a clinical subspecialty focus that will supplement career development and submit an internal funding grant request (Copeland Grant) on a clinical topic. The resident must complete and submit four to six publications in peer-reviewed journals during this interval of time. Residents also will participate in the Clinical and Translational Science Institute (CTSI) Seminar Series. Residents are expected to present at the AANS (American Association of Neurological Surgeons), CNS (Congress of Neurological Surgeons) or subsection meetings relative to their clinical or scientific work.

**Surgeon Scientist Investigator Path:**

During this interval of time, residents have 21 months to further develop a preclinical and academic research career working in a functional and dedicated laboratory. Some residents choose to enter one of two NIH T32 postdoctoral research fellowship programs available through the University of Pittsburgh’s Department of Anesthesia and Department of Surgery as well as the university’s Physician Scientist Incubator Program. This program is designed to train the highest quality biomedical physician investigators, focusing on those with MD degrees with PhD doctoral training, seeking careers involving pre-clinical research.

Residents will identify a primary mentor by their PGY-4 year. Residents in this path are able to submit for national grants using existing mechanisms from the AANS, CNS,
Education Programs

NIH, and industry. Residents are expected to submit four to six peer-reviewed journal articles during this time. Residents also will have the opportunity to gain a master of science degree but must begin this process one year in advance. Selected residents who wish to obtain a PhD will be fully evaluated for this opportunity but must dedicate additional blocks of training time after they complete the residency training in order to complete such an advanced degree. All residents are expected to present their work at one or more national scientific meetings. During their PGY-6 year, residents are freed from responsibility from both outpatient and operating room coverage, except for elective and approved moonlighting performed on the UPMC Presbyterian neurological surgery service.

The University of Pittsburgh provides a wide spectrum of faculty mentors and opportunities for research in neurosurgery, neurology, neuroscience, psychiatry, physical medicine and rehabilitation, neuro-imaging, neuropathology, bioengineering, public health, and regenerative medicine (McGowan Institute of Regenerative Medicine). Research may be funded from numerous sources, including the Walter Copeland Fund of the department (which is administered by The Pittsburgh Foundation). Residents in the department’s program have competed successfully for AANS, CNS and American College of Surgeons grants. All residents are expected to write scientific papers and to supplement this with additional book chapters. Residents are expected to learn the principals of investigation under the supervision of faculty mentors.

Residents at all levels are expected to attend the departmental teaching conferences, which are mandatory. Neurosurgical knowledge is gauged by performance on written boards, as well as by semi-annual written evaluations and meetings. Each year a promotion to the next level of training is determined by the departmental competency review committee.

• PGY-6
PGY-6 residents return to the service as residents on the clinical services at UPMC Presbyterian, UPMC Shadyside, UPMC Mercy, and in selected cases at UPMC Children’s Hospital of Pittsburgh. Coverage responsibilities include chief of the cranial service, the spinal service and the trauma service. On average, chief residents perform 400-500 major cases during PGY-6, such as clipping of aneurysms, skull-based tumors, complex spine surgery, and posterior fossa surgery. As future practitioners of neurosurgery, they also learn responsibilities of clinical oversight of the service that they are leading. They serve as primary instructors to the younger residents. By the time of their completion of the chief year, residents often have performed more than 1500 neurosurgical procedures as monitored by the ACGME online Accreditation Data System (ADS) database.

• PGY-7
Completing the case log requirements and skill set acquisition in the PGY-6 year allows residents to pursue subspeciality clinical or research training in their last year of clinical neurosurgery before final graduation in June. Selected infolded fellowship opportunities exist in spine (CAST approved), skull base, endovascular (CAST approved), and stereotactic-functional (CAST approved) training. For selected residents pursuing the surgeon scientist pathway, further research opportunities as well as mentoring for grant submission can be pursued.

• General
Residents in this program have a particularly unique experience in microneurosurgery, pediatric, endoscopic, image-guided neurosurgery including radiosurgery, and endo/exo-vascular surgery, including a large volume of complex vascular bypass cases. In addition to daily teaching rounds, led by individual members of the department faculty, the department
Education Programs

holds a series of weekly resident conferences and review lectures to discuss specific neurosurgical concepts, techniques, problems and solutions. Both faculty and residents are regular participants in these programs, many of which include formal didactic presentations. The training program includes the following faculty/resident conference:

- Multidisciplinary Brain Tumor Board (weekly)
- Chairman’s Conference (twice monthly)
- Faculty Teaching Conference (weekly)
- Image-Guided/Radiosurgery Conference (weekly)
- Written Boards Preparation Conference
- Patient Care Conference (weekly)
- Pediatric Neurosurgical Conference (twice weekly)
- Pituitary Conference (quarterly)
- Skull Base Conference (weekly)
- Residents’ Conference (weekly)
- Visiting Professor Series (four to six per year)

The chief residents present the weekly patient care conference. Each resident also presents one or more annual 30-minute lectures on basic neurosurgical topics or recent research. To teach the skills required for the oral boards, several conferences use a board-simulated approach to those cases presented. At least four times per year, an internationally known neurosurgeon serves as a lecturer and visiting professor. The visiting professor also reviews interesting cases with the residents and attends a journal club.

Trainees have been extremely productive during their clinical and non-clinical years. They commonly have 10 or more publications in refereed journals and multiple presentations at national meetings by the completion of their residency.

Since 1980, residents in the department have been awarded three Congress of Neurological Surgeons Preuss Awards for brain tumor research, two CNS clinical fellowships, American College of Surgeons research scholarships, the CNS Margot Anderson Foundation Fellowship in Brain Restoration Research, and two CNS Wilder Penfield Clinical Investigation Fellowships. Six University of Pittsburgh residents have received the Van Wagenen Fellowship, a prestigious award given annually by the American Association of Neurological Surgeons to a North American neurosurgical resident who is graduating that year. At each annual meeting, residents and faculty often receive named awards for their abstract presentations.

Despite the extensive experience in all aspects of brain, spine, and peripheral nerve surgery, some residents elect to complete post-residency fellowships with other prestigious mentors. In particular, residents who wish to have a career focus in pediatric neurosurgery obtain prestigious fellowships at other institutions prior to beginning their neurosurgical careers.

Although the program’s focus is on training academic neurosurgeons interested in clinical and basic science research, it has produced many outstanding private practice neurosurgeons as well. Half of the department’s graduates in the last 25 years serve as full-time academic faculty members, and 25 percent have clinical affiliations with academic institutions.

• Neurosurgery Residency Research Opportunities

Comprehensive programs in basic science and clinical research are conducted by department faculty along with investigators throughout the university community. Current research projects include:
Education Programs

Animal Models of Epilepsy
Brain Tumor Research
Clinical and Basic Science Head Injury Program
Clinical Outcomes of Radiosurgery
Computer-Image Integration into Surgical Planning
Intracranial Blood Flow and Saccular Aneurysm Formation
Research in Spinal Tumors and Spine Biomechanics
Spasticity
Stem Cells
Studies on Cranial Nerve Disorders
Teleradiography
Viral Vectors in Tumor Management

Basic science and clinical research projects are an integral part of department faculty and trainee activities. Most residents spend 18-24 months working on such projects. Local, regional and national peer-reviewed funding resources continue to grow and support productive basic and clinical research. Internal funding from the Walter Copeland Fund provides seed money for many unique and fascinating projects undertaken by residents and faculty. In many cases these projects subsequently receive extramural research funding.

• Neurosurgery Residency Special Features
The Department of Neurological Surgery at the University of Pittsburgh has created a unique environment where centers of excellence flourish. The goals are to provide outstanding neurosurgical patient care, to promote education, and to perform clinical and basic science research. This group of dedicated individuals, including faculty, residents, and staff, is one of the most productive departments in the world.

These accomplishments in both patient care and research have resulted in numerous publications. Each year, more than 200 refereed articles, abstracts, proceedings, book chapters, and books are published by this department. The department supports the largest number of neurosurgeons with federally-sponsored funding. Special features include:

Clinical and Laboratory Program for the Surgery of Cranial Nerve Disorders
Comprehensive Spine Surgery Center
Endoscopic Endonasal and Skull Base Surgery
Frameless Stereotactic Equipment (multiple technologies)
Magnetic Resonance Spectroscopy
Microsurgical Laboratory
Microelectrode Recording System
Laboratory for the Development and Evaluation of New Surgical Techniques
Two Gamma Knife Radiosurgical Suites
Spinal Radiosurgery
State-of-the-Art Neuroimaging:
  CT and MRI angiography
  High Definition Fiber Tractography
  Functional MRI, MRS
  Magnetoencephalography
  PET
  MR Research Center
Intraoperative CT Imaging (Dedicated OR Suite)

The coordinator of the department’s medical education program is Melissa Lukehart.
Education Programs

Raymond F. Sekula Jr, MD, professor of neurological surgery and director of the department’s Center for Cranial Nerve Disorders, is the department’s residency director.

Each academic year ends with a formal farewell celebration. (See photos on pages 210-213.)

Teaching Awards
Annual departmental teaching awards are given to the best faculty teacher (selected by the residents) and to the best resident teacher (selected by the faculty). For 2020-21, the faculty award was given to Vincent Miele, MD (top). The resident honor was presented to Nitin Agarwal, MD (bottom).

Continuing Medical Education
Department faculty take an active role in national and regional continuing education programs. Course presentations are given every year at the annual meetings of both the Congress of Neurological Surgeons and the American Association of Neurological Surgeons. In addition, physicians of several department centers provide institutional training to other physicians throughout the world.

Professional Courses
Principles and Practice of Gamma Knife Surgery, detailing the practical aspects of stereotactic radiosurgery using the Leksell Gamma Knife, is co-directed by Drs. L. Dade Lunsford, John C. Flickinger and Ajay Niranjan. Principles of medical physics and radiobiology as they apply to single-session, focused, small-volume irradiation are covered. Patient selection techniques, didactic course presentations, and hands on computer skills are provided. More than 2,500 professionals from across the world have been trained in more than 120 courses during the past 20+ years. Course graduates are able to create radiosurgery dose plans for brain tumors, vascular malformations and trigeminal neuralgia. The week-long course is offered six times per year. Starting in July of 2020, the course has been offered online.

The Center for Image-Guided Neurosurgery faculty and staff presents Gamma Knife Radiosurgery Training for Nurses, a basic training course geared for nurses and other allied health personnel. The course covers device management, patient preparation, patient education, neuroimaging and post-radiosurgery care related to the Gamma Knife.

Comprehensive Endoscopic Endonasal Surgery of the Skull Base, co-directed by Carl Snyderman, MD, MBA, Paul Gardner, MD, and Eric Wang, MD, demonstrates minimally invasive techniques for endoscopic endonasal surgery of the ventral skull base. The anatomical and technical aspects of this procedure—along with the risks, benefits and outcomes—are presented via didactic lectures, prosections, hands-on anatomical dissection, and live demonstration surgeries. This four-day course is designed for neurosurgeons, otolaryngologists, head and neck surgeons, and senior level residents, and is presented twice a year.

Complex Endoscopic Endonasal Surgery of the Skull Base, co-directed by Carl Snyderman, MD, MBA, Paul Gardner, MD, and Eric Wang, MD, highlights both surgical decision-making and advanced techniques in endoscopic endonasal skull base surgery (training levels 3-5). The course directors lead interactive case-based discussions, prosections, and hands-on anatomical dissection on the indications, limitations and technical nuances of these approaches by anatomical site. This three-day course is offered once a year and is designed for experienced endoscopic skull base teams.

Principles and Practice of Intraoperative Neuromonitoring, co-directed by Partha Thirumala, MD, and Jeffrey Balzer, PhD, is designed for advanced professionals who perform or support in-
traoperative neuromonitoring (IONM) procedures. The course highlights practice specifications, multimodality protocols, recent advances in the field, pre-/post-operative neurological evaluation, and telemedicine in IONM.

**Stuart Rowe Society Lectureship and Research Day**
The Stuart Rowe Society Lectureship and Resident Research Day showcases research activities in the field of neurological surgery and provides a forum for discussion.

During this day, a series of talks are presented by department residents, each spotlighting a topical research issue relevant in the field. These talks are followed by discussion moderated by a special honored guest prominent in the field of neurosurgery. The honored guest will follow this discussion with a special lecture. The honored guest will also select a "Best Presentation" award, presented at a special reception held in their honor later in the evening.

This spotlight on research was a principle first emphasized by Stuart Niles Rowe, MD, the first formally-trained neurosurgeon to practice in Pittsburgh. Rowe is widely considered the founding figure of neurosurgery training in the city, establishing the base of what would later become the University of Pittsburgh Department of Neurological Surgery.

Rowe believed that neurosurgery training should not only teach exceptional technique, but also the critical clinical decision-making skills necessary to succeed. He preached the underlying need for thorough literature review and independent research as a means for broadening clinical knowledge.

Due to the COVID-19 pandemic, the Stuart Rowe Lecture for 2020-21 was canceled.

**Peter J. Jannetta Lecture**
The Peter J. Jannetta Lecture—focusing on innovations in the field of neurosurgery—is held annually in honor of the former, long-time chairman of the University of Pittsburgh Department of Neurological Surgery. Dr. Jannetta was internationally acclaimed for his development of microvascular decompression (MVD), an innovative procedure that moved blood vessels away from the trigeminal nerve, alleviating chronic pain and spasms in facial muscles. The procedure became commonly known as the ‘Jannetta Procedure’ around the world and brought relief to thousands.

Roberto C. Heros, MD, professor of neurosurgery at the University of Miami and senior vice-president and chief medical administrative officer of Jackson North Medical Center in North Miami Beach, was this year’s honored Jannetta Lecturer, presenting a talk on “Intracranial Dural AV Fistulas” on April 7, 2021. Due to COVID-19 considerations, this year’s lecture was held virtually with very limited in-person attendees.

**Visiting Professor Lecture Series**
Throughout the year, the department hosts prominent figures in the field of neurological surgery lecturing on their areas of interest. These visiting professors will also participate in journal clubs and patient care conferences throughout the day, discussing interesting papers and cases with faculty, residents and staff.

**Fridays with Friedlander**
*Fridays with Friedlander* is a live webcast hosted by department chairman Robert M. Friedlander, MD, featuring department faculty, residents, alumni and prominent figures in medicine presenting updates on topical neurological surgery issues—followed by an interactive Q&A session.
Education Programs

Other Postgraduate Education
The Department of Neurological Surgery participates in the education of house staff of other departments, including surgery, neurology, medicine (endocrinology) and emergency medicine. Educational endeavors include neuroscience conferences, general lectures on neurosurgical topics, and grand rounds. In addition, faculty takes part in the Department of Surgery’s Vascular Surgery Conference and provides speakers for the Critical Care Medicine Lecture Series.

Neurocirugía en UPMC
The Department of Neurological Surgery maintains a Spanish-language website at upmc.com/Services/neurosurgery/spanish/Pages/default.aspx to serve, educate and provide important information for Spanish-speaking visitors.
Algattas Receives First Aequanimitas Award

In June of 2020, fifth-year resident Hanna Algattas, MD, received the first Aequanimitas Award, presented by the University of Pittsburgh Department of Neurological Surgery to a resident who best displays humility, compassion and excellence in patient care.

The award—endowed by University of Pittsburgh Heindl Scholar Joseph Maroon, MD—is awarded to a department resident that personally and professionally exhibits the humanistic qualities of empathy, caring, kindness, imperturbability, and collegiality...complemented by availability, affability and ability. The award includes a $2,000 traveling fellowship grant for the awardee to visit other centers of excellence.

Aequanimitas was one of Sir William Osler’s most famous essays, delivered as a valedictory address to medical students at the University of Pennsylvania more than a century ago. In the essay, Osler—one of four physician founders of Johns Hopkins School of Medicine—said, “The good physician treats the disease; the great physician treats the patient who has the disease.”

Aequanimitas, Osler stated, refers to imperturbability-coolness and presence of mind under all circumstances, calmness amid storm, and clearness of judgment in moments of grave peril. It is acquired through experience and a thorough knowledge of medicine.

Even when challenged by the most difficult medical and administrative circumstances in the daily care of patients, the accomplished neuroscientist/neurosurgeon physician is one whose heart has not been hardened or injured by these exigencies of practice. It is one who exemplifies tolerance and a non-judgmental attitude.

Joseph Maroon presents Hanna Algattas with Aequanimitas Award.
Taylor Abel, MD
Assistant Professor
Surgical Director, Pediatric Epilepsy Surgery Program

Taylor Abel, MD, is an American Board of Neurological Surgery and American Board of Pediatric Neurological Surgery certified pediatric neurosurgeon specializing in epilepsy surgery. He is surgical director of the Pediatric Epilepsy Surgery Program at UPMC Children’s Hospital of Pittsburgh. Dr. Abel is from Seattle, Wash. and completed his undergraduate and medical education at the University of Washington. After his medical education in Seattle, Dr. Abel completed neurosurgery residency at the University of Iowa, where he received specialized training in epilepsy surgery and brain mapping techniques. At Iowa, Dr. Abel completed an NIH-funded postdoctoral fellowship—receiving the Ruth L. Kirschstein National Research Service Award—focusing on electrophysiologic mechanisms of face and voice identification in the temporal lobe. He is one of the few neurosurgeons in North America who has completed subspecialty fellowship training in both pediatric neurosurgery (Hospital for Sick Children, Toronto) and epilepsy surgery (Grenoble, France). Dr. Abel’s clinical practice focuses on caring for children drug-resistant epilepsy and movement disorders. He founded and co-directs the UPMC Children’s Hospital of Pittsburgh Multi-Disciplinary Pediatric Epilepsy Surgery Clinic, which focuses on providing comprehensive care to children with drug-resistant epilepsy. He performs traditional open epilepsy surgery, stereotactic and minimally invasive epilepsy surgery, and all forms of neuromodulation. Dr. Abel’s NIH-funded (R01, R21) research program focuses on understanding how the brain processes auditory signals, such as voice and speech, using a combination of electrophysiology, neuroimaging, and lesion mapping techniques. Dr. Abel’s clinical research focuses on clinical trials in epilepsy surgery and comparative effectiveness of different treatments for drug-resistant epilepsy.

Specialized Areas of Interest
Pediatric epilepsy surgery; pediatric stereotactic and functional neurosurgery; general pediatric neurosurgery.

Board Certifications
American Board of Neurological Surgery
American Board of Pediatric Neurological Surgery

Hospital Privileges
UPMC Children’s Hospital of Pittsburgh
UPMC Magee-Womens Hospital
UPMC Presbyterian

Professional Organization Membership
American Association of Neurological Surgeons
American Epilepsy Society
Congress of Neurological Surgeons
International League Against Epilepsy
Joint Section on Pediatric Neurosurgery (AANS/CNS)
Society for Neurobiology of Language

Education & Training
BS, Neurobiology, University of Washington, 2005
MD, University of Washington School of Medicine, 2010
Residency, University of Iowa Hospitals and Clinics, 2016
Fellowship, University of Iowa Hospitals and Clinics, 2016
Taylor Abel, MD

Faculty Biographies

Fellowship, Epilepsy Surgery, Centre Hospitalier Grenoble, Grenoble, France, 2017
Fellowship, Pediatric Neurosurgery, Hospital for Sick Children, Toronto, Canada, 2018

Editorial Service
• Ad Hoc Reviewer:
  Epilepsia
  JAMA Neurology
  Epileptic Disorders

Interdepartmental and Medical Center Activities
• University of Pittsburgh:
  Institutional Review Board

• UPMC Children's Hospital of Pittsburgh:
  Surgical Director, Epilepsy Surgery Program
  Co-Director, Epilepsy Surgery Clinic

Professional Activities
Membership Council, American Epilepsy Society
Chair, Early Career Committee, American Epilepsy Society
Task Force on Research Advocacy and Priorities, International League Against Epilepsy
Guidelines Committee, AANS/CNS Joint Section on Pediatric Neurosurgery
Scientific Review Committee, American Epilepsy Society

Honors and Awards
Robin and Judith Humphreys Fellowship in Pediatric Neurosurgery, 2017-18
NIH Clinical Research LRP Award, 2014-16
NIH Ruth L. Kirschstein National Research Service Award, 2014
Neurosurgery Resident Award, AANS/CNS Section on Stereotactic and Functional, 2014
Mary Gates Research Scholar, 2005

Media Appearances: 2020-21

Publications: 2020-21
• Refereed Articles:
Virtual Presentations:


Invited Lectures: 2020-21

Local/Regional:


Virtual:


Sameer Agnihotri, PhD  
Assistant Professor  
Director, Brain Tumor Biology and Therapy Lab

Sameer Agnihotri, PhD, joined the faculty of the Department of Neurological Surgery at UPMC Children’s Hospital of Pittsburgh in November of 2016. Dr. Agnihotri graduated from the University of Toronto in 2005 with a bachelor of science honors degree in biology, specializing in genetics. He earned his PhD in medical biophysics in 2011 from the University of Toronto where he used genetic screens to identify novel drivers of glioblastoma, an incurable brain tumor. He subsequently completed his post-doctoral fellowship at the Arthur and Sonia Labatt Brain Tumor Research Centre at the Hospital for Sick Children, in Toronto, and the Princess Margaret Cancer Centre, Division of Neuro-oncology Research, also in Toronto.

**Specialized Areas of Interest**
Pediatric and adult high-grade gliomas.

**Professional Organization Membership**
Children’s Brain Tumor Consortium  
Society of Neuro-Oncology

**Education & Training**
BSc, (hons), Biology, University of Toronto, 2005  
PhD, Medical Biophysics, University of Toronto, 2011  
Fellowship, Hospital for Sick Children, Toronto, 2016  
Fellowship, Princess Margaret Cancer Centre, Toronto, 2016

**Editorial Service**
• Editorial Board: 
  *Frontiers in Genetics*  
  *Journal Archivum Immunologiae et Therapiae Experimentalis*  
  *Translational Neuroscience*

• Ad Hoc Reviewer:  
  *Cancer Research*  
  *Neuro-oncology*

**Professional Activities**
Scientific Committee, Children’s Brain Tumor Tissue Consortium  
Membership Committee, Society of Neuro-oncology

**Honors and Awards**
Children’s Trust and Children’s Hospital of Pittsburgh Young Investigator Award, 2017  
Marlene Reimer Brain Star Award, 2016  
Post-Doctoral Scholarship, Canadian Institute of Health Resources (CIHR), 2013-16  
Trainee of the Year, Hospital for Sick Children, 2014  
Young Investigator Award in Basic/Translational Research, Canadian Neuro-Oncology, 2014  
Lucien J. Rubinstein Award, American Brain Tumor Association, 2013  
Wolfgang Vogel Memorial Award, University of Toronto, 2013  
Young Investigator Travel Award, Society of Neuro-Oncology, 2012  
Graduate Student Scholarship, Ontario Institute for Cancer Research, 2009  
Young Investigator Award in Pediatric Brain Tumour Research, Pediatric Brain Tumor Research Foundation, 2007
Nduka Amankulor, MD
Assistant Professor
Director, Adult Neurosurgical Oncology
Director, Brain Tumor Immunogenetics Laboratory

Nduka Amankulor, MD, is a specialist in the surgical treatment of complex brain and spine tumors. Dr. Amankulor received his medical degree and neurosurgical training from the Yale University School of Medicine. He then completed a clinical fellowship in neurosurgical oncology at Memorial Sloan-Kettering Cancer Center in New York. In addition to his clinical practice, Dr. Amankulor is a cancer biologist and immunologist engaged in developing new therapeutic strategies for primary (diffuse gliomas and GBM) and metastatic brain tumors. Dr. Amankulor left the department in June of 2021.

Katherine M. Anetakis, MD
Assistant Professor

Katherine M. Anetakis, MD joined the University of Pittsburgh Center of Clinical Neurophysiology in July of 2017. She specializes in intraoperative neurophysiological monitoring to adult and pediatric neurosurgical, orthopedic, ENT, vascular, and interventional neuroradiology procedures, as well as motor and language mapping during awake craniotomies. Dr. Anetakis competed her pediatric neurology residency and clinical neurophysiology fellowship at UPMC Children’s Hospital of Pittsburgh. Her fellowship concentrations included pediatric epilepsy as well as intraoperative neuromonitoring.

Specialized Areas of Interest
Intraoperative neurophysiological monitoring.

Board Certifications
American Board of Psychiatry and Neurology
American Board of Psychiatry and Neurology: Subspecialty in Clinical Neurophysiology

Hospital Privileges
JC Blair Memorial Hospital
Excela Health Hospital System
Indiana Regional Medical Center
Monongahela Valley Hospital
Trinity Health System
UPMC Altoona
UPMC Bedford
UPMC Children’s Hospital of Pittsburgh
UPMC Cranberry
UPMC East
UPMC Greenville
UPMC Hamot
UPMC Harrisburg
UPMC Horizon
UPMC Jameson
UPMC Magee-Womens Hospital
UPMC McKeesport
UPMC Mercy
UPMC Northwest
UPMC Passavant
Katherine M. Anetakis, MD

UPMC Presbyterian
UPMC St. Margaret
UPMC Shadyside
UPMC Shenango
UPMC Somerset
UPMC Susquehanna

Professional Organization Membership
American Academy of Neurology
American Clinical Neurophysiology Society

Education & Training
BS, Human Physiology, Michigan State University, 2007
MD, University of Pittsburgh School of Medicine, 2011
Residency, Pediatric Neurology, Children’s Hospital of Pittsburgh, 2016
Fellowship, Clinical Neurophysiology, UPMC, 2017

Interdepartmental and Medical Center Activities
• University of Pittsburgh:
  Intraoperative Neuromonitoring Fellowship Director

Professional Activities
Course Lecturer, Principles and Practice of Intraoperative Monitoring, UPMC, Pittsburgh, Pa., November 2017-2020.

Publications: 2020-21
• Refereed Articles:

Invited Lectures: 2020-21
• Virtual:

Robert L. Bailey, MD
Clinical Assistant Professor

Robert L. Bailey, MD, joined the University of Pittsburgh Department of Neurological Surgery in January of 2019 as a clinical assistant professor. He received his medical degree from the University of Pennsylvania and completed his residency training at the University of Pennsylvania. He completed fellowship training at Wellington Regional Hospital in Wellington, New Zealand. Dr. Bailey specializes in the surgical management of degenerative spine disease of the cervical, thoracic and lumbar spine, utilizing both traditional methods as well as the latest minimally invasive approaches. He also specializes in the surgical removal of both primary and secondary tumors of the spine. Dr. Bailey works with primary care physicians, neurologists, pain management specialists and other clinicians to formulate an individualized treatment plan for his patients.

Specialized Areas of Interest
Back and spine care.
Robert L. Bailey, MD

Faculty Biographies

Hospital Privileges
UPMC Mercy
UPMC Passavant
UPMC Presbyterian
UPMC Shadyside

Professional Organization Membership
American Association of Neurological Surgeons
American Medical Association
Congress of Neurological Surgeons
Pennsylvania Neurological Society

Education & Training
BA, Brigham Young University, 2004
MD, University of Pennsylvania, 2009
Fellowship, Wellington Regional Hospital, New Zealand, 2014
Residency, University of Pennsylvania, 2016

Media Appearances: 2020-21
“Dr. Robert L. Bailey talks about back and spine issues,” UPMC Community Matters, WPXI-TV, Pittsburgh, Pa., February 9, 2021.

Jeffrey Balzer, PhD
Associate Professor
Director, Clinical Services, Center for Clinical Neurophysiology
Director, Cerebral Blood Flow Laboratory

Jeffrey Balzer, PhD, is director of clinical operations and staff clinical neurophysiologist at the Center for Clinical Neurophysiology and director of the Cerebral Blood Flow Laboratory at the University of Pittsburgh Medical Center. His current research interests range from refining language testing during awake craniotomy procedures to the utilization of signal processing analysis during cerebrovascular procedures. Dr. Balzer received his undergraduate education at the University of Pittsburgh, where he also pursued a graduate education and a PhD in behavioral neuroscience. He is also the secretary/treasurer of the American Board of Neurophysiological Monitoring and is on the board of directors of the American Society of Neurophysiological Monitoring. He has published 114 refereed articles and 17 book chapters.

Specialized Areas of Interest
Intraoperative neurophysiological monitoring, subarachnoid hemorrhage, cerebral blood flow and effects of exercise on cerebrovascular function.

Board Certifications
American Board of Neurophysiological Monitoring

Hospital Privileges
Armstrong Regional Health System
Excela Health System
Monongahela Valley Hospital
UPMC Altoona
UPMC Children’s Hospital of Pittsburgh
UPMC Horizon
Jeffrey Balzer, PhD

UPMC Jameson
UPMC McKeesport
UPMC Mercy
UPMC Passavant
UPMC Pinnacle
UPMC Presbyterian
UPMC St. Margaret's
UPMC Shadyside
UPMC Susquehanna
UPMC Western Maryland

Professional Organization Membership
American Clinical Neurophysiology Society
American Association for the Advancement of Science
American Society for Neurophysiological Monitoring (Fellow)
New York Academy of Sciences
Pittsburgh Neuroscience Society

Education & Training
BS, Behavioral Neuroscience, University of Pittsburgh, 1984
MS, Behavioral Neuroscience, University of Pittsburgh, 1989
PhD, Behavioral Neuroscience, University of Pittsburgh, 1994
Fellowship, Neurophysiology, University of Pittsburgh, 1994

Editorial Service
• Editorial Board:
The Neurodiagnostic Journal

• Ad Hoc Reviewer:
Analgesia and Anesthesia
Journal of Clinical Neurophysiology
Operative Neurosurgery
Spine
World Neurosurgery
Journal of Clinical Computing and Monitoring
Global Spine Journal

Interdepartmental and Medical Center Activities
• UPMC Presbyterian:
Co-Director, Neurosurgical Resident's Basic Science Course

• UPMC:
Allied Health Professional Review Committee

Professional Activities
Co-Course Director, Principles and Practice of Intraoperative Monitoring, University of Pittsburgh Medical Center, October 2020.
Secretary/Treasurer, American Board of Neurophysiologic Monitoring
Board of Directors, American Society of Neurophysiological Monitoring
Faculty Biographies

Jeffrey Balzer, PhD

**Publications: 2020-21**

**• Refereed Articles:**


**• Letters to the Editor:**


**• Published Abstracts:**

Invited Lectures: 2020-21

• Local/Regional:
  Balzer JR. “Neuroanesthesia Principles as the Relate to IONM.” Grand Rounds, UPMC Pas-savant Anesthesia Department, Pittsburgh, Pa., April 15, 2021.

• Virtual:

J. Brad Bellotte, MD
Clinical Assistant Professor
Chief, Neurosurgery, UPMC Hamot

J. Brad Bellotte, MD, is chief of neurosurgery at UPMC Hamot in Erie, Pa. He joined the University of Pittsburgh Department of Neurosurgery as a clinical assistant professor in July of 2011. Dr. Bellotte is a leading expert in complex spine surgery, including minimally invasive surgeries. He earned his medical degree from West Virginia University School of Medicine, and completed an internship in general surgery and a residency in neurosurgery at Allegheny General Hospital in Pittsburgh.

Specialized Areas of Interest
Complex spine surgery; brain surgery.

Board Certifications
American Board of Neurological Surgery

Hospital Privileges
UPMC Hamot

Professional Organization Membership
American Association of Neurological Surgeons
Congress of Neurological Surgeons
North American Spine Society
Pennsylvania State Neurosurgical Society

Education & Training
MD, West Virginia University, 1999
Residency, Neurosurgery, Allegheny General Hospital, 2005

Honors and Awards
Orthopedic Teaching Award, UPMC Hamot, 2011-12
Bryan Bolinger, DO  
Clinical Assistant Professor

Dr. Bolinger received a bachelor’s degree in neuroscience from the University of Pittsburgh in 2001. During his undergraduate years, he also participated in clinical and bench research at the Brain Trauma Research Center and the Safar Center for Resuscitation Research. Dr. Bolinger obtained his medical degree from the Philadelphia College of Osteopathic Medicine in 2007 and completed his neurosurgical residency through the Philadelphia College of Osteopathic Medicine Consortium of Hospitals in 2013. Dr. Bolinger returned to the University of Pittsburgh Medical Center in 2013 to complete fellowship training in complex spine surgery under the direction of Adam Kanter, MD; David Okonkwo, MD, PhD, and Peter Gerszten, MD. Board certified in neurosurgery, and after years of practice in Pennsylvania, Dr. Bolinger joined the University of Pittsburgh Department of Neurological Surgery in April of 2020 as a clinical assistant professor.

**Specialized Areas of Interest**
Minimally invasive spine surgery; lateral access spine surgery; artificial disc technology; spinal cord stimulation; spinal cord injury; spine trauma; traumatic brain injury.

**Board Certifications**
American Osteopathic Board of Surgery – Neurosurgical Discipline

**Hospital Privileges**
UMPC Carlisle  
UMPC Community Osteopathic  
UMPC Hanover  
UMPC Harrisburg  
UMPC Lititz  
UMPC Memorial  
UMPC West Shore  
UMPC Williamsport

**Professional Organization Membership**
American College of Osteopathic Surgeons  
American Osteopathic Association  
North American Spine Society

**Education & Training**
BS, Neuroscience, University of Pittsburgh, 2001  
DO, Philadelphia College of Osteopathic Medicine, 2007  
Neurosurgical Residency, Philadelphia College of Osteopathic Medicine, 2013  
Fellowship, Complex Spine Surgery, University of Pittsburgh, 2014

**Honors and Awards**
AANS/CNS Cahill Fellowship Award, 2013
Marco Capogrosso, PhD
Assistant Professor
Director, Spinal Cord Stimulation Laboratory

Marco Capogrosso, PhD, joined the University of Pittsburgh Department of Neurological Surgery as an assistant professor in January of 2020. He completed his doctoral studies in biomedical engineering and robotics at the Scuola Superiore Sant’Anna in Pisa, Italy. His doctorate work focused on the implementation of a computational framework to support the design of peripheral and central neural interfaces for sensory and motor applications. After the receiving his PhD, Dr. Capogrosso completed his post-doctoral training at the Ecole Polytechnique Fédérale de Lausanne, Switzerland where he worked on the development of brain spinal interfaces for the restoration of voluntary motor control in animals and humans with spinal cord injury. Before joining the University of Pittsburgh, he directed his own research group as a research faculty at the primate center of the University of Fribourg, Switzerland and was a manager of the primate platform. He is now director of the Spinal Cord Stimulation Laboratory and part of the Rehab and Neural Engineering Labs of the University of Pittsburgh.

Specialized Areas of Interest
Neuroprosthetics; computer models of electrical stimulation; arm paralysis; spinal cord injury; brain computer interfaces, motor control.

Professional Organization Membership
Society for Neuroscience

Education & Training
BA, Physics (cum laude) Università di Pisa, Italy, 2007
MS, Applied Physics (cum laude) Università di Pisa, Italy, 2009
PhD, Engineering, Institute of Biorobotics, Scuola Superiore Sant’Anna, 2013
Post-Doc, Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland, 2016

Editorial Service
• Editorial Board:
  Scientific Reports
• Ad Hoc Reviewer:
  Journal of Neural Engineering
  Journal of Neurophysiology
  Nature Communications
  Neuroimage
  PNAS

Honors and Awards
Outstanding Reviewer Award, The Journal of Neural Engineering 2020
European Research Council Starting Grant Award, 2019
Career Award, Technological Advances in Spinal Cord Injury, Lupicaia Foundation 2018
MIT 10 Best Breakthrough Technologies, Wireless Brain-Spine Interface, 2017
Swiss National Science Foundation Ambizione Fellowship, 2016
Finalist, Tomorrow’s PI Prize, Swiss Life Science Annual Meeting, 2015
**Faculty Biographies**

**Media Appearances: 2020-21**


**Publications: 2020-21**

- **Refereed Articles:**

**Diane L. Carlisle, PhD**

**Associate Professor**

Diane Carlisle, PhD, joined the Department of Neurological Surgery in October 2010. She received her undergraduate degree in molecular biology from Washington and Jefferson College and her graduate degree in molecular and cellular oncology from George Washington University where she identified new signaling pathways involved in occupational causes of lung cancer. Dr. Carlisle came to the University of Pittsburgh after a postdoctoral fellowship at Johns Hopkins University under the mentorship of Robert Casero Jr., PhD, in drug development for lung cancer. She then developed an independent research program using stem cells to investigate adult disease. The mission of her laboratory is to use human pluripotent stem cells to model disease. She has an active program using stem cells generated from tissue samples donated by sporadic ALS patients and by Huntington’s Disease patients. By differentiating these cells into mature neurons, she is able to identify neurologic disease specific changes in mitochondrial function. In addition, she uses her expertise in pluripotent stem cell methods and directed differentiation to collaborate in her department, and across the university, in cross disciplinary projects that use pluripotent stem cell technologies. Dr. Carlisle serves as faculty and course coordinator of the NIH-funded stem cell course, Frontiers in Stem Cells and Regeneration, which is held annually at the Marine Biological Laboratories in Woods Hole, Mass.

**Specialized Areas of Interest**

- Fetal basis for adult disease; use of stem cells for developmental modeling and drug discovery; amyotrophic lateral sclerosis (ALS); Huntington’s Disease.
Shaun W. Carlson, PhD

Research Assistant Professor

Shaun Carlson, PhD, joined the faculty of the Department of Neurological Surgery at UPMC Children’s Hospital of Pittsburgh in October of 2017. Dr. Carlson graduated from the University of Kansas in 2007 with a bachelor of science degree in cell biology. He earned his PhD in physiology in 2013 from the University of Kentucky, studying the effects of traumatic brain injury on hippocampal neurogenesis and the efficacy of a growth factor based therapeutic approach to promote neurogenic plasticity and functional recovery after brain injury. He continued his training in 2013 as a postdoctoral fellow at the University of Pittsburgh Department of Neurological Surgery.

Specialized Areas of Interest
Mechanisms of synaptic dysfunction and plasticity and the identification of therapeutic approaches to promote recovery following brain injury.

Professional Organization Membership
American Heart Association
National Neurotrauma Society
Society for Neuroscience

Education & Training
BSc, Cell Biology, University of Kansas, 2007
PhD, Physiology, University of Kentucky, 2013
Postdoctoral Fellowship, Neurological Surgery, University of Pittsburgh, 2017

Editorial Service
• Ad Hoc Reviewer:
  Acta Biomaterialia
Shaun W. Carlson, PhD

Faculty Biographies

**Interdepartmental and Medical Center Activities**

- **University of Pittsburgh:**
  - Institutional Animal Care and Use Committee Voting Committee Member, University of Pittsburgh
  - Co-Chair, Safar Center for Resuscitation Research COVID Response Team

**Professional Activities**

- Membership Committee, National Neurotrauma Society

**Honors and Awards**

- Ruth L. Kirschstein National Research Service Award (NIH), 2015-17
- Nancy Caroline Fellow Award, Safar Center for Resuscitation Research, 2016
- Murray Goldstein Award of Excellence, National Neurotrauma Symposium, 2013
- Anthony Marmarou Award of Excellence, National Neurotrauma Symposium, 2012
- Brian J. Hardin Award for Research, Department of Physiology, University of Kentucky, 2008

**Publications: 2020-21**

- **Refereed Articles:**
  


- **Presentations:**
  


Invited Lectures: 2020-21
• Virtual:

Yue-Fang Chang, PhD
Research Associate Professor

Yue-Fang Chang, PhD, joined the Department of Neurological Surgery as a research associate in June of 2000. She received her doctoral degree in statistics from the University of Illinois and Master in Public Health in epidemiology from the University of Pittsburgh. Dr. Chang has worked in a variety of areas, such as brain tumor, traumatic brain injury, health outcome, neuroimaging study, women's health and diabetes epidemiology. She serves as the statistician in several epidemiological studies including Cardiovascular Health Study, Women’s Health Initiative and Study of Women’s Health Across the Nation. Over the years she has been involved in numerous grant preparations, providing statistical expertise in design, analysis and power/sample size calculations.

Specialized Areas of Interest
Longitudinal data analysis; survival analysis; statistical computing; research methodology; injury epidemiology.

Education & Training
BS, Statistics, National Chung-Hsing University, Taiwan, 1984
MS, Statistics, University of Illinois at Urbana-Champaign, 1987
PhD, Statistics, University of Illinois at Urbana-Champaign, 1991
MPH, Epidemiology, University of Pittsburgh, 1994

Publications: 2020-21
• Refereed Articles:
Donald J. Crammond, PhD

Associate Professor
Associate Director, Movement Disorder Surgery

Donald Crammond, PhD, joined the Center for Clinical Neurophysiology as a staff neurophysiologist in November 1997. Dr. Crammond received his undergraduate education in physiology at the University of Glasgow in Scotland and his graduate education in neurophysiology at the University of Toronto. After postdoctoral studies at the University of Wisconsin and later at the Université de Montréal, he was appointed visiting associate scientist at the National Institute of Mental Health in Bethesda, Md. Dr. Crammond specializes in intra-operative neurophysiological monitoring (IONM) and in systems-level, behavioral neurophysiology, examining the neuronal substrates of higher cognitive processes such as movement planning and speech and the functional interactions between, the cerebral cortex and basal ganglia, and the mechanisms underlying motor control and movement disorders. Dr. Crammond is the associate director for microelectrode recording and subcortical mapping for the Movement Disorder Surgery Program at UPMC. Dr. Crammond is the chairman of the American Board of Neurophysiologic Monitoring (ABNM).
Donald J. Crammond, PhD

**Specialized Areas of Interest**
The application of neurophysiological mapping in the surgical treatment of movement disorders, functional localization in cerebral cortex; motor system physiology, peripheral nerve regeneration and intraoperative neurophysiological monitoring (IONM).

**Board Certifications**
American Board of Neurophysiological Monitoring

**Hospital Privileges**
Armstrong County Memorial Hospital
Exela Health - Westmoreland and Latrobe Hospitals
Indiana Regional Medical Center
UPMC Altoona
UPMC Bedford
UPMC Children's Hospital of Pittsburgh
UPMC East
UPMC Horizon
UPMC Magee-Womens Hospital
UPMC McKeepsport
UPMC Mercy
UPMC Northwest
UPMC Passavant
UPMC Passavant, Cranberry
UPMC Presbyterian
UPMC St. Margaret
UPMC Shadyside
UPMC Somersket
UPMC Susquehanna
UPMC Western Maryland

**Professional Organization Membership**
American Clinical Neurophysiology Society
American Society for Neurophysiological Monitoring
Movement Disorder Society
Society for Neuroscience

**Education & Training**
BSc (Hons), Physiology, University of Glasgow, 1980
PhD, Neurophysiology, University of Toronto, 1988
Fellowship, Neurophysiology, University of Wisconsin, 1987
Fellowship, Neurophysiology, Université de Montreal, 1992
Fellowship, Clinical Neurophysiology, University of Pittsburgh, 1999

**Editorial Service**
- Ad Hoc Reviewer: 
  *World Neurosurgery*

**Interdepartmental and Medical Center Activities**
- University of Pittsburgh:
  Institutional Review Board, Data and Safety Monitoring Board (DSMB) Committee
Faculty Biographies

Donald J. Crammond, PhD

• UPMC:
UPMC Advanced Practice Professionals (APP) Credentialing Committee

• Department of Neurological Surgery:
Chair, Large Animal Research Protocol Review Committee

• Carnegie Mellon University:
Institutional Review Board, Data and Safety Monitoring Board (DSMB) Committee

Professional Activities
Chairman, American Board of Neurophysiologic Monitoring
Education Committee, American Society of Neurophysiologic Monitoring

Publications: 2020-21

• Refereed Articles:


• Virtual Presentations:

C. Edward Dixon, PhD

Neurotrauma Chair Professor
Vice Chair, Research
Director, Brain Trauma Research Center

C. Edward Dixon, PhD, received his PhD degree in physiological psychology from the Virginia Commonwealth University in 1985. That year, he was awarded a National Research Service Award for Postdoctoral Fellows by the National Institutes of Health and joined the Division of Neurological Surgery at the Medical College of Virginia. In 1986, he became a
C. Edward Dixon, PhD

postdoctoral fellow in the Biomedical Science Department of the General Motors Technical Center in Warren, Mich. Dr. Dixon was named assistant professor in the Division of Neurosurgery at the Medical College of Virginia in 1987 and became an assistant professor in the Department of Neurological Surgery at the University of Texas Health Science Center in Houston in 1991. In 1995, he joined the Brain Trauma Research Center in the Department of Neurological Surgery at the University of Pittsburgh as associate professor. He became the director of the center in October 2002. Dr. Dixon received his adjunct faculty positions with the Department of Anesthesiology in 1995; the Department of Neurobiology in 2000 and the Department of Physical Medicine/Rehabilitation in 2003. In 2001, he became a co-director of the Safar Center for Resuscitative Research. In May of 2004, Dr. Dixon was named full professor of neurological surgery at the University of Pittsburgh and was later appointed vice chairman of research in the Department of Neurological Surgery in 2008. In 2011, Dr. Dixon was honored with one of the highest honors the university can present a faculty member when he was awarded The Neurotrauma Chair in Neurosurgery at the University of Pittsburgh. Dr. Dixon served as president of the National Neurotrauma Society for the 2002-2003 term and continued as councilor of the society for terms 2004-2007 and 2009-2012. He also has continued as a study section participant of several public and private grant review panels. His research has dealt primarily with mechanisms of post-traumatic memory deficits, rodent models of traumatic brain injury, and functional outcomes. Dr. Dixon has published 243 papers in refereed journals, two books (coeditor), 29 book chapters, and two editorials.

Specialized Areas of Interest
Mechanisms of induction and recovery of functional deficits following traumatic brain injury; neurotransmitter agonist therapies for recovery of post traumatic functional deficits; models of traumatic brain injury; clinical studies of pharmacotherapy.

Professional Organization Membership
American Association for the Advancement of Science
Congress of Neurological Surgeons
International Behavioral Neuroscience Society
International Neurotrauma Society
National Neurotrauma Society (Charter Member)
Pittsburgh Chapter of Society for Neuroscience
Society for Neuroscience

Education & Training
BA, Psychology, Virginia Commonwealth University, 1981
MS, Physiology/Psychology, Virginia Commonwealth University, 1984
PhD, Physiology/Psychology, Virginia Commonwealth University, 1985
NIH-NHRSA Fellow, Medical College of Virginia, 1986
Fellowship, General Motor Research Laboratories, 1987

Editorial Service
• Editorial Board:
Frontiers in Neurotrauma
International Neurochemistry
Journal of Neurotrauma
Metabolic Brain Disease
Neural Regeneration Research
C. Edward Dixon, PhD

- Ad Hoc Reviewer:
  
  Brain Injury  
  Brain Research  
  Frontiers in Neurology  
  Journal of Biomechanical Engineering  
  Journal of Cerebral Blood Flow and Metabolism  
  Journal of Neurochemistry  
  Journal of Neurosurgery  
  Journal of Neuroscience  
  Journal of Neuroscience Methods  
  Learning and Memory  
  Neurobiology of Disease  
  NeuroMolecular Medicine  
  Neuropathology and Applied Neurobiology  
  Neuroscience  
  Pharmacology, Biochemistry, and Behavior  
  PLOS  
  Stroke  
  Therapeutic Hypothermia and Temperature Management

Interdepartmental and Medical Center Activities

- University of Pittsburgh:

  Faculty Promotions Committee, Department of Neurosurgery  
  Co-Chair, Research Executive Committee, Department of Neurosurgery  
  Director, Walter L. Copeland Neurosurgery Research Laboratories  
  Associate Director, Safar Center for Resuscitation Research, University of Pittsburgh  
  Graduate Faculty Member, Center for Neuroscience and Neurobiology Training Program  
  Training Faculty Member, NIH-NICHD Training Grant in Neurointensive Care Training  
  Faculty  
  Member, Center for Neuroscience at the University of Pittsburgh

- Pittsburgh VA Healthcare System:

  Chair, Institutional Animal Care and Use Committee  
  Member, R&D Committee  
  Member, Research Scientific Evaluation Committee

Professional Activities

- Co-Chair, NIH/NINDS, Working group for preclinical common data elements for TBI  
- Scientific Board Member, Texas Institute for Rehabilitation Research  
- Grant Reviewer, Congressionally Directed Medical Research Programs (CDMRP)  
- Study Section Member, Kentucky Spinal Cord & Head Injury Study Section  
- Member Conflict Panel, National Institute of Health  
- Adult Review Team Member, Colorado TBI Trust Fund Research Grant Program  
- Award Peer Review Panel Member, Department of Defense Psychological Health/Traumatic Brain Injury (PHTBI) Longterm Impact of Military-Relevant Brain Injury Consortium (LIMBIC).

Publications: 2020-21

- Refereed Articles:

C. Edward Dixon, PhD

Faculty Biographies


Invited Lectures: 2020-21
• Virtual:
Dixon CE. “Targeting the Synapse to Treat Cognitive Deficits Following Traumatic Brain Injury.” Fridays with Friedlander webcast, Department of Neurological Surgery, University of Pittsburgh, Pittsburgh, Pa., April 23, 2021.

Matt El-Kadi, MD, PhD
Clinical Professor
Vice Chair
Chief, Neurosurgery, UPMC Passavant
Director, UPMC Passavant Spine Center

Matt El-Kadi, MD, PhD, FACS, joined the Department of Neurological Surgery as a clinical assistant professor in September of 1999. He became clinical associate professor in January 2003 and clinical professor in June 2006. He became vice chairman of the Department of Neurological Surgery in 2010 and has been chief of neurosurgery at UPMC Passavant since 2005. Dr. El-Kadi is also director of the UPMC Passavant Spine Center and is a member of the Tri-State Neurosurgical Associates. Dr. El-Kadi is board-certified in neurological surgery and has been nominated as one of Pittsburgh’s best doctors in the region since 2012 and as one of the best doctors in America by Castle Connelly since 2009. He specializes in the treatment of complex spine disorders, including spinal fusion and instrumentation, and minimally invasive spinal surgery for both the cervical and lumbar spine, with a special interest in the removal of primary and secondary spinal tumors. He has authored seven books and book chapters and has over 100 publications in circulation. He is an active participant in professional societies. Before joining UPMC, Dr. El-Kadi received training in complex spinal surgery at Allegheny General Hospital in Pittsburgh. He completed his neurosurgery residency training at West Virginia University and a one-year clinical fellowship in neurosurgery at Hartford Hospital, University of Connecticut. Dr. El-Kadi began his surgical career doing brain surgery. The minimally invasive and microscopic techniques used then on the brain have served him well as a spine surgeon for minimally invasive approaches and has been reflected in his patients’ shorter hospital stays and good outcome.
Faculty Biographies

Matt El-Kadi, MD, PhD

Specialized Areas of Interest
Minimally invasive spine surgery; complex spine disorders; spinal stabilization; spinal tumors.

Board Certifications
American Board of Neurological Surgeons

Hospital Privileges
Grove City Medical Center
Heritage Valley Hospital, Sewickley
UPMC Mercy
UPMC Passavant
UPMC Presbyterian
The Washington Hospital

Professional Organization Membership
Allegheny County Medical Society
American Academy of Anti-Aging Medicine
American Association of Neurological Surgeons
American Medical Association
Congress of Neurological Surgeons
International Spinal Injections Society
North American Spine Society
Ohio County Medical Society
Pennsylvania Medical Society
Pennsylvania Neurosurgical Society

Education & Training
MD, Second Moscow State Pirogov Medical Institute, 1983
Residency, Neurosurgery, Burdenko Neurosurgical Institute, 1989
Fellowship, Brain Tumor Research, LAC + USC Medical Center, 1992
Fellowship, Neurosurgery, University of Connecticut, 1994
Fellowship, Neurosurgery, Allegheny General Hospital, 1998
Residency, Neurosurgery, West Virginia University, 1999

Interdepartmental and Medical Center Activities
• UPMC Passavant:
  Chief of Neurosurgery
  Credentialing Committee
  Critical Care Committee
  Director, Spine Center
  Medical Executive Committee
  Operating Room Committee

• UPMC Passavant Hospital Foundation:
  Board of Directors Chair, Development Committee
  Financial Committee

Honors and Awards
Pittsburgh’s Best Doctors, Pittsburgh Magazine, 2012-20
Marquis Who’s Who in America, 2019-20
Castle Connolly Top Doctors, 2009-20
Salem El-Zuway, MD
Clinical Assistant Professor

Salem El-Zuway, MD, FRCSC, FAANS, FACS, is a board-certified neurosurgeon by the Royal College of Physicians and Surgeons of Canada. He received his medical degree from the University of Garyounis in Libya and completed his neurosurgery residency training at McMaster University in Canada followed by a neuro spine fellowship at Hamilton Health Sciences, Canada, with additional year of complex spine/trauma fellowship at Sunnybrook Hospital at University of Toronto. Before joining UPMC, Dr. El-Zuway attended at St. Michael’s hospital in Toronto and completed a three-year term of clinical associateship in neuro trauma, open cerebrovascular surgery and skull base surgery with the renown doctors R. Loch Macdonald, MD, PhD and Michael Cusimano, MD, PhD. Dr. El-Zuway has a wide scope of neurosurgery training experience managing complex cranial and spinal conditions. He is also involved in clinical research with interest focused in cranial neurotrauma and spine focusing on cervical spondylotic myelopathy. He is also interested in advancement of medical education and medical student teaching programs including problem-based medicine.

Specialized Areas of Interest
Neuro oncology; complex spinal surgery; open cerebrovascular surgery; neuro-trauma; neuro-endoscopy; minimally invasive spinal surgery; Chiari malformation; hydrocephalus, pseudotumor cerebri.

Board Certifications
Royal College of Physicians and Surgeons of Canada

Hospital Privileges
UPMC Hamot

Professional Organization Membership
American Association of Neurological Surgeons
College of Physicians and Surgeons of Ontario
Congress of Neurological Surgeons
Ontario Medical Association
Pennsylvania State Board of Medicine
Royal College of Physicians & Surgeons of Canada

Education & Training
MD, Garyounis University, 2000
Residency, Hamilton Health Sciences, McMaster University, 2006-12
Fellowship, neurospine, Hamilton Health Sciences, McMaster University, 2012-13
Fellowship, complex spine/trauma, Sunnybrook Hospital, University of Toronto, 2013-14
Clinical Associate, St. Michael’s Hospital, Toronto, 2014-17

Editorial Service
• Editorial Board:
  Journal of Neuroscience and Neurological Surgery, (editor)

Honors and Awards
Surgical Foundations Research Award, third rank, McMaster University, 2008
Faculty Biographies

Salem El-Zuway, MD

The Libyan National Assembly of High Achievers and Talent Award, 2001
Undergraduate Academic Excellence Award, University of Benghazi, 2000

Publications: 2020-21
• Refereed Articles:

Chikezie I. Eseonu, MD, FAANS
Clinical Assistant Professor

Chikezie Eseonu, MD, is a clinical assistant professor at UPMC Pinnacle. He received his undergraduate degree at Harvard University in biomedical engineering in 2007 and completed his medical education at Yale School of Medicine in 2011. Following medical school, Dr. Eseonu completed his neurosurgery residency at Johns Hopkins Hospital in Baltimore, Md., where he also completed an enfolded neuro-oncology/endoscopic/skull base fellowship. Dr. Eseonu’s clinical interests embrace several aspects of brain tumor treatment, including open surgical, minimally invasive or radiosurgical techniques. He is also involved in the treatment of trigeminal neuralgia, Chiari malformation, hydrocephalus, and other general neurosurgical conditions including degenerative spine, spinal stenosis, disc herniation, trauma and carpal tunnel. Dr. Eseonu’s research has encompassed such areas as surgical technique and outcome studies for gliomas, pituitary adenomas, trigeminal neuralgia, and awake craniotomy for brain tumors, as well as cost efficacy studies in neurosurgery. He has published over 30 peer reviewed papers and book chapters. He is licensed to practice in Pennsylvania, and is a member of the American Association of Neurological Surgeons, the Congress of Neurological Surgeons, and the Facial Pain Association.

Specialized Areas of Interest
Brain tumors; radiosurgery; trigeminal neuralgia; Chiari malformation; spine surgery.

Board Certifications
American Board of Neurological Surgery

Hospital Privileges
UPMC Pinnacle

Professional Organization Membership
American Association of Neurological Surgeons
Congress of Neurological Surgeons
Facial Pain Association

Education & Training
BA, Biomedical Engineering, Harvard University, 2007
MD, Yale School of Medicine, 2011
Neuro-oncology/Endoscopic/Skull Base Fellowship, Johns Hopkins Hospital, 2017
Neurosurgery Residency, Johns Hopkins Hospital, 2018

Invited Lectures: 2020-21
• Virtual:
Wendy Fellows-Mayle, PhD
Research Assistant Professor
Coordinator, The Walter Copeland Laboratory

Wendy Fellows-Mayle, PhD, joined the faculty of the Department of Neurological Surgery at the University of Pittsburgh in July of 1999. She received her bachelor degree at the University of Pittsburgh in 1994 and her doctoral degree at the University of Pittsburgh in 2004. Dr. Fellows-Mayle is the director of the histology core laboratory for the Department of Neurological Surgery and the coordinator for the Walter Copeland Laboratory for Neurological Research.

Specialized Areas of Interest
Immunotherapy of brain tumors; gene therapy of brain tumors; epilepsy; intracranial pressure; craniosynostosis; traumatic brain injury

Education & Training
BA, Physical Anthropology, University of Pittsburgh, 1994
MA, Physical Anthropology, University of Pittsburgh, 1998
PhD, Physical Anthropology, University of Pittsburgh, 2004

Interdepartmental and Medical Center Activities
• University of Pittsburgh:
  Oversight of Anatomical Specimens Committee

• Department of Neurological Surgery:
  Director, Histology Core Laboratory
  Coordinator, Walter Copeland Laboratory for Neurological Research

Robert M. Friedlander, MD
Chair, Walter E. Dandy Distinguished Professor
Head of Cerebrovascular Neurosurgery
Director, Complex Brain Surgery Program
Co-Director, UPMC Neurological Institute

Robert Friedlander, MD, MA, is the Walter E. Dandy Distinguished Professor, chair of the University of Pittsburgh Department of Neurological Surgery and co-director of the UPMC Neurological Institute, positions he has held since 2010. Before coming to the University of Pittsburgh, Dr. Friedlander was a professor at Harvard Medical School. He was also vice-chairman of neurosurgery, associate director of cerebrovascular surgery and co-director of the Neuroscience Research Center at the Brigham and Women’s Hospital in Boston. Dr. Friedlander has received a number of significant academic awards, most significantly an induction into the prestigious National Academy of Medicine in 2019. 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. He has also received the Bayer Cerebrovascular Award from the Joint Section of Cerebrovascular Surgery, the International Charcot Prize for Motor Neuron Diseases, the Award from the Academy of Neurological Surgeons, the H. Richard Winn Prize from the Society of Neurological Surgeons, and the Distinguished Chancellor University of Pittsburgh Research Award. Dr. Friedlander is an elected member of the prestigious American Society for Clinical Investigation, and the Association of American Physicians. As a sign of his prominence as a clinician and scientist, Dr. Friedlander is one of a very select group of authors to have been invited by the New England Journal of Medicine to write both a basic science review
Robert M. Friedlander, MD

Faculty Biographies

(mechanisms of neuronal cell death), as well as a clinical review (management of AVMs). Clinically, Dr. Friedlander focuses on the operative management of complex cerebrovascular disorders, brain tumors and Chiari malformations. Dr. Friedlander’s major research interests lie in the study of the mechanistic pathways of the caspase apoptosis gene family. His work includes the evaluation of treatment strategies for neurodegenerative diseases (Huntington’s and ALS), stroke, brain trauma, and spinal cord injury through the modulation of the caspase-family apoptotic pathways. He was first to demonstrate activation and a functional role of caspase cell death pathways in neurological diseases. His research has received significant media attention. His major work has been published in the highest impact journals, most notably four publications in Nature, two in Science, one in Nature Medicine, one in Nature Neuroscience and eight in PNAS. For over two decades, he has had continuous NIH support as a principal investigator, as well numerous foundation awards. He directs a busy and prolific laboratory. Dr. Friedlander served on the National Advisory Council of the National Institutes of Neurological Disorders and Stroke (NINDS). Additionally, a rewarding aspect of Dr. Friedlander’s activities is his involvement in organized neurosurgery. He was a member of the executive committee of the Congress of Neurological Surgeons, as well as chair of the CNS Research Committee, the CNS Membership Committee, and the CNS Publications Committee. He directed the Society of Neurological Surgeons RUNN (Research Update in Neuroscience for Neurosurgeons) Course from 2004 to 2018 and served as chair of the Society of Neurological Surgeons research committee. He is a past chair of the AANS/CNS Joint Section of Cerebrovascular Surgery. A native of Caracas, Venezuela, Dr. Friedlander came to the United States in 1983 and earned a joint BA and MA in biochemistry from Brandeis University in 1987. In 1991, he graduated from Harvard Medical School and went on to fulfill his internship in general surgery and residency in neurosurgery at Massachusetts General Hospital.

Specialized Areas of Interest
Aneurysms, vascular malformations, brain tumors, carotid disease, cerebrovascular disease, Chiari malformation, spinal cord tumors. Research focuses on mechanisms of apoptosis, Huntington’s disease, ALS, and stroke.

Board Certifications
American Board of Neurological Surgeons

Hospital Privileges
UPMC Altoona
UPMC Children’s Hospital of Pittsburgh
UPMC Hamot
UPMC Magee-Womens Hospital
UPMC Mercy
UPMC Passavant
UPMC Presbyterian
UPMC Shadyside

Professional Organization Membership
American Academy of Neurological Surgeons
American Association for the Advancement of Science
American Association of Neurological Surgeons
American Association of Physicians
American Society for Clinical Investigation
Brain Aneurysm Foundation, Medical Advisory Board
Congress of Neurological Surgeons
Robert M. Friedlander, MD

Faculty Biographies

Joint Section of Cerebrovascular Surgery
National Academy of Medicine
Pennsylvania Neurosurgical Society
Sociedad Venezolana de Neurocirugía
Society for Neurological Surgeons
Society for Neuroscience

Education & Training
BA, Brandeis University, 1987
MA, Biochemistry, Brandeis University, 1987
MD, Harvard Medical School, 1991

Editorial Service
• Editorial Board:
  Neurological Surgery
  Neurosurgery
  U.S. Neurology

• Ad Hoc Reviewer:
  Annals of Neurology
  Cell Death and Differentiation
  EMBO
  Experimental Neurology
  Human Molecular Genetics
  Journal of Biological Chemistry
  Journal of Neurochemistry
  Journal of Neuroscience
  Letters in Drug Design and Discovery
  Nature
  Nature Biotechnology
  Nature Cell Biology
  Nature Genetics
  Nature Medicine
  Nature Neuroscience
  Nature Reviews Molecular Biology
  Neurobiology of Disease
  Neuron
  Neuropharmacology
  Neuroscience Letters
  Neurosurgery
  New England Journal of Medicine
  Proceedings of the National Academy of Sciences
  Science
  Science and Transitional Medicine
  Trends in Neuroscience

Interdepartmental and Medical Center Activities
• UPMC Presbyterian:
  Medical Executive Committee

• University of Pittsburgh:
  School of Medicine Executive Committee
Robert M. Friedlander, MD

Faculty Biographies

• UPMC:
  Global Care Steering Committee

• University of Pittsburgh Physicians:
  Chair of Chairs Compensation Committee
  Finance Committee
  MD/Administrator, CSI Committee

• University of Pittsburgh Cancer Institute:
  Comprehensive Stereotactic Radiosurgery Program Meetings

• UPMC Health Plan:
  Clinical Leadership Team Committee

Professional Activities
Society of Neurological Surgeons:
  Director, Research Update of Neurosciences for Neurosurgeons (RUNN Course)
  Research Committee
NINDS National Advisory Council:
  Clinical Trials Subcommittee
  Fellowships and Training Subcommittee
  Basic Science Subcommittee
American Association of Neurological Surgeons:
  Annual Meeting Committee
  Research Committee
The American Academy of Neurological Surgery:
  Chair, Scientific Program Committee
  Chair, AANS/CNS Joint Cerebrovascular Surgery Section

Fridays with Friedlander weekly webcast, neurosurgery.pitt.edu

Honors and Awards
Distinguished Chancellor University of Pittsburgh Research Award, 2021
Pittsburgh’s Best Doctors, Pittsburgh Magazine, 2012-21
National Academy of Medicine induction, 2019
Honored Guest, US Ambassador, Belgrade, Serbia, 2013
America’s Top Surgeons, 2013
Castle Connolly Top Doctor in the Field of Neurological Surgery, 2013, 2020
H. Richard Winn Prize for Neurosurgical Research, 2012

Media Appearances: 2020-21


Faculty Biographies

Robert M. Friedlander, MD

Publications: 2020-21
• Refereed Articles:


• Virtual Presentations:

Invited Lectures: 2020-21
• Local/Regional:

• Virtual:

Paul A. Gardner, MD
Peter J. Jannetta Professor
Executive Vice Chair, Surgical Services
Neurosurgical Director, Center for Cranial Base Surgery
Director, Surgical Neuroanatomy Lab

Paul A. Gardner, MD, joined the faculty at the University of Pittsburgh Department of Neurological Surgery in 2008 after completing his residency and fellowship training at the University of Pittsburgh. He completed his undergraduate studies at Florida State University,
Paul A. Gardner, MD

majoring in biochemistry, and received his medical degree from the University of Pittsburgh School of Medicine. Dr. Gardner completed a two-year fellowship in endoscopic endonasal pituitary and endoscopic and open skull base surgery. His research has focused on evaluating patient outcomes following these surgeries and more recently on genomic and molecular analysis of rare tumors. Dr. Gardner has been the neurosurgical director of the Center for Cranial Base Surgery at the University of Pittsburgh Medical Center since April of 2008, and leads a renowned course on endoscopic endonasal surgery three times a year. Dr. Gardner is co-author of the book Skull Base Surgery, part of the Master Techniques in Otolaryngology: Head and Neck Surgery series published by Wolters Kluwer. The book offers step-by-step expert instruction on more than 45 procedures, covering both open and minimally invasive approaches to the skull base. He is also the primary editor of the upcoming book *Vascular Challenges in Skull Base Surgery* published by Thieme and he is an author on over 300 peer-reviewed articles.

**Specialized Areas of Interest**
Endoscopic endonasal and open skull base surgery; pituitary tumors; vascular surgery; cranial nerve disorders; minimally invasive surgery; peripheral nerve surgery.

**Board Certifications**
American Board of Neurological Surgeons

**Hospital Privileges**
UPMC Children’s Hospital of Pittsburgh
UPMC Mercy
UPMC Presbyterian

**Professional Organization Membership**
Acoustic Neuroma Association
American Academy of Neurological Surgeons
American Association of Neurological Surgeons
American Medical Association
Congress of Neurological Surgeons
International Federation of Neuroendoscopy
North American Skull Base Society
Pituitary Network Society

**Education & Training**
AA, Okaloosa-Walton College, 1993
BS, Biochemistry, Florida State University, 1997 (Magna cum Laude)
MD, University of Pittsburgh, 2001
Fellowship, Endoscopic and Open Skull Base Surgery, 2007
Residency, Neurosurgery, University of Pittsburgh, 2008

**Editorial Service**
- Editorial Board:
  *Operative Neurosurgery*

- Ad Hoc Reviewer:
  *Journal of Neuroscience and Rehabilitation*
  *Journal of Neurosurgical Sciences*
  *Neurosurgery*
  *World Neurosurgery*
  *British Journal of Neurosurgery*
Faculty Biographies

Paul A. Gardner, MD

**Interdepartmental and Medical Center Activities**
- **UPMC Presbyterian:**
  Surgical Services Oversight Committee
  Executive Vice Chairman, Surgical Services
  Neurosurgical Director, Center for Skull Base Surgery
  Surgical Director, Pituitary Tumor Center of Excellence

- **University of Pittsburgh:**
  Advisory Board, Collaborative Research Education and Technology Enhancement in Surgery (CREATES)
  International Telemedicine Services Workgroup Committee

**Professional Activities**
- Skull Base Committee, American Association of Neurological Surgeons and Congress of Neurological Surgeons Tumor Section
- Course Co-Director, “Multidisciplinary Management of Pituitary Tumors Virtual Update,” UPMC, Pittsburgh, Pa.
- Course Co-Director, “Masters of Skull Base Surgery Multi-Institutional Course,” UPMC, Pittsburgh, Pa.

**Community Activities**
- Advisory Board Member, Chordoma Foundation
- Mentor, Walavan Sivakumar, MD, John Wayne Cancer Institute

**Honors and Awards**
- Pittsburgh’s Best Doctors, *Pittsburgh Magazine*, 2012-21

**Publications: 2020-21**
- **Refereed Articles:**


**Published Abstracts:**


**Invited Lectures: 2020-21**

- **Local/Regional:**
  
  Gardner P. "Proposed clinical trials." Topics in Experimental Neuropathology Conference, Department of Pathology, University of Pittsburgh School of Medicine, Pittsburgh, Pa., August 27, 2020.
  
  Gardner P. "Endoscopic Transmaxillary Approaches: Creating New Indications From an Old Approach." Department of Neurological Surgery, University of Pittsburgh School of Medicine, Pittsburgh, Pa., September 23, 2020.
  
  Gardner P. "Endoscopic Endonasal Surgery for Pituitary Adenoma, Indications and Advantages." Department of Neurological Surgery, University of Pittsburgh School of Medicine, Pittsburgh, Pa., October 1, 2020.
Paul A. Gardner, MD

**Faculty Biographies**


- **Virtual:**


Faculty Biographies


• Visiting Professorships:


Peter C. Gerszten, MD, MPH
Peter E. Sheptak Professor
Vice Chair, Quality Improvement
Director, Percutaneous Spine Service

Peter C. Gerszten, MD, MPH, is the Peter E. Sheptak Professor of Neurosurgery at the University of Pittsburgh. Dr. Gerszten joined the Department of Neurological Surgery and the UPMC Spine Services Division in 1999. He received his undergraduate degree from the University of Virginia and completed his medical degree at the Johns Hopkins School of Medicine. He completed his residency in neurological surgery at the University of Pittsburgh Medical Center. Dr. Gerszten obtained a master of public health degree from the University of Pittsburgh Graduate School of Public Health. He completed a fellowship in spinal surgery at the University of Pittsburgh Medical Center. Dr. Gerszten specializes in disorders of the spine, focusing on spinal neoplasms. His clinical interests include minimally invasive approaches to the treatment of spinal disorders and spinal tumors. Dr. Gerszten’s area of research is the application of outcomes research to spinal surgical interventions. He is a pioneer in the field of spine radiosurgery. Dr. Gerszten is co-editor of the 2015 second edition Spine Radiosurgery, an authoritative textbook—and the first of its kind—on all aspects of spine radiosurgery. He is also co-editor of the book Controversies in Stereotactic Radiosurgery: Best Evidence Recommendations, a 277-page look into an evidence-based approach to stereotactic radiosurgery for the brain and spine. Dr. Gerszten currently serves on the editorial boards of Neurosurgery, The Spine Journal, and The Journal of Radiosurgery and SBR.

Specialized Areas of Interest
Outcomes research applied to neurosurgical interventions; failed back syndrome; stereotactic radiosurgery of spinal lesions; minimally invasive spine surgical techniques; sacroiliac dysfunction; compression fractures and percutaneous cement techniques.

Board Certifications
American Board of Neurological Surgery
Peter C. Gerszten, MD, MPH

**Hospital Privileges**
UPMC Magee-Womens Hospital
UPMC Presbyterian
UPMC Shadyside
Veterans Affairs Pittsburgh Healthcare System

**Professional Organization Membership**
Allegheny County Medical Society
American Academy of Neurological Surgery
American Association of Neurological Surgeons
American College of Surgeons
American Medical Association
Congress of Neurological Surgeons
Delta Omega Public Health National Honor Society
International Stereotactic Radiosurgery Society
Joint Section on Disorders of the Spine and Peripheral Nerves
North American Spine Society
Paleopathology Society
Pennsylvania Neurosurgical Society
Pennsylvania State Medical Society
The Radiosurgery Society

**Education & Training**
BA, University of Virginia, 1988
MD, Johns Hopkins School of Medicine, 1992
MPH, University of Pittsburgh Graduate School of Public Health, 1998
Residency, Neurological Surgery, University of Pittsburgh, 1999
Fellowship, Spine Surgery, University of Pittsburgh, 2000

**Editorial Service**
• Editorial Board:
  *The Journal of Radiosurgery and SBRT*
  *Neurosurgery*
  *The Spine Journal*

• Ad Hoc Reviewer:
  *International Journal of Radiation Oncology Biology Physics*
  *Iranian Red Crescent Medical Journal*
  *Journal of Neuro-Oncology*
  *The Journal of Radiosurgery and SBRT*
  *Neuro-Oncology*
  *The Neurosciences Journal*
  *Neurosurgery*
  *Oncology*
  *Practical Radiation Oncology*
  *Radiation Oncology*
  *The Spine Journal*
  *World Neurosurgery*

**Interdepartmental and Medical Center Activities**
• University of Pittsburgh:
  Rehabilitation Neural Engineering Laboratories
Peter C. Gerszten, MD, MPH

Faculty Biographies

- **UPMC Presbyterian:**
  Physician Unit Partner 6D

- **UPMC Presbyterian/Shadyside:**
  Hospitals Quality and Safety Committee

- **UPMC Physician Services Division:**
  Physician Clinical Quality Leadership Committee

- **Department of Neurological Surgery:**
  Vice Chairman, Quality Improvement
  Director, Percutaneous Spine Surgery
  Director, Spine Radiosurgery
  Editor, Department of Neurological Surgery Neurosurgery News
  Promotions Committee
  Readmissions Reduction Committee

**Professional Activities**
Associate Appointment, Carnegie Mellon University, The Neuroscience Institute
Board of Directors, The Radiosurgery Society
Course Lecturer, Principles and Practice of Gamma Knife Radiosurgery, University of Pittsburgh School of Medicine, Pittsburgh, Pa.
Spine Surgery Anatomy Course Lecturer, Cadaver Practical Course for MS2, University of Pittsburgh Medical School of Medicine, Pittsburgh, Pa., November 4, 2020

**Community Activities**
The Portrait Society, The Warhol Museum
Gerszten Family Endowment for the Andy Warhol Museum
The Patron’s Society, Carnegie Museums of Pittsburgh
Carnegie Museums of Pittsburgh Engagement Committee
Peter C. Gerszten Endowed Fund for Research in Anthropology, University of Virginia
Gerszten Family Lectureship in Spanish Literature, University of Virginia

**Honors and Awards**
Pittsburgh’s Best Doctors, *Pittsburgh Magazine*, 2020-21

**Publications: 2020-21**
- Refereed Articles:
Faculty Biographies


• Books:

• Book Chapters:


**Invited Lectures: 2020-21**

• International:

• National:

• Local/Regional:

Avniel Singh Ghuman, PhD
Associate Professor,
Director, Cognitive Neurodynamics Lab

Avniel Singh Ghuman, PhD, joined the Department of Neurological Surgery in September of 2011. Dr. Ghuman received his undergraduate education in math and physics at The Johns Hopkins University. He completed his doctoral education in biophysics at Harvard University. He completed his postdoctoral training at the National Institute of Mental Health prior to joining the faculty at the University of Pittsburgh. As director of MEG (Magnetoencephalography) Research, one of Dr. Ghuman’s primary roles is to facilitate, develop, and advance clinical and basic neuroscience research using MEG. To this end, he is helping to develop new research applications for MEG in collaboration with researchers throughout the community. MEG is the most powerful functional neuroimaging technique for noninvasively recording magnetic fields generated by electrophysiological brain activity, providing millisecond temporal resolution and adequate spatial resolution of neural events. Dr. Ghuman’s research focuses on how our brain turns what falls upon our eyes into the rich meaningful experience that we perceive in the world around us. Specifically, his lab studies the neural basis of the visual perception of objects, faces, words, and social and affective visual images. His lab examines the spatiotemporal dynamics of how neural activity reflects the stages of information processing and how information flow through brain networks responsible for visual perception. To accomplish these research goals, Dr. Ghuman’s lab records electrophysiological brain activity from humans using both invasive (intracranial EEG; iEEG — in collaboration with Jorge Gonzalez-Martinez, MD, PhD) and non-invasive (magnetoencephalography; MEG) measures. In conjunction with these millisecond scale recordings they use multivariate machine learning methods, network analysis, and advanced signal processing techniques to assess the information processing dynamics reflected in brain activity. Additionally, his lab uses direct neural stimulation to examine how disrupting and modulating brain activity alters visual perception. This combination of modalities and analysis techniques allow Dr. Ghuman to ask fine-grained questions about neural information processing and information flow at both the scale of local brain regions and broadly distributed networks.

Specialized Areas of Interest
The dynamics of brain interactions; visual cognition; magnetoencephalography (MEG), intracranial EEG (iEEG); face recognition; reading; social and affective perception.

Professional Organization Membership
Cognitive Neuroscience Society
Organization for Human Brain Mapping
Society for Neuroscience
Vision Sciences Society
Avniel Singh Ghuman, PhD

Education & Training
BA, Math and Physics, The John Hopkins University, 1998
PhD, Biophysics, Harvard University, 2007

Editorial Service
• Editorial Board:
  Social Cognitive and Affective Neuroscience, Consulting Editor

• Ad Hoc Reviewer:
  American Journal of Psychiatry
  Brain
  Cerebral Cortex
  Cognition
  Current Biology,
  European Journal of Neuroscience
  eLife
  Frontier in Brain Imaging Methods
  Frontiers in Neuroscience
  Human Brain Mapping
  Journal of Cognitive Neuroscience
  Journal of Neurophysiology
  Journal of Neuroscience
  Nature Communications
  Neurocase
  Neuroimage
  Neuron
  Neuropsychologia
  Neuroscience
  Perception
  Perception Science & Brain Imaging Methods
  Psychological Science
  Psychonomic Bulletin and Review
  Scientific Data
  Visual Cognition

Honors and Awards
Young Investigator Award, NARSAD, 2012
Award for Innovative New Scientists, National Institute of Mental Health, 2015

Publications: 2020-21
• Refereed Articles:


Jorge A. González-Martínez, MD, PhD

Professor
UPMC Endowed Chair in Epilepsy Surgery
Adjunct Professor, Biomedical Engineering, Carnegie Mellon University
Director, Epilepsy & Movement Disorders Program
Co-Director, University of Pittsburgh Epilepsy Center
Director, Cortical Systems Laboratory

Jorge González-Martínez, MD, PhD, FAANS, is a board-certified and world-renowned neurosurgeon subspecializing in epilepsy and functional neurosurgery. He is director of the University of Pittsburgh Department of Neurological Surgery Epilepsy & Movement Disorders Program, co-director of the UPMC Epilepsy Center, and director of the University of Pittsburgh Cortical Systems Laboratory. He currently holds the UPMC endowed chair in Epilepsy Surgery. Dr. González-Martínez is a medical pioneer in novel surgical methods for treating medically refractory seizures such as stereo-electroencephalography, SEEG guided laser ablative procedures, neuromodulatory interventions and robotic guided surgeries, bringing for the first time innovative surgical interventions to the United States and other countries. His particular field of interest and academic drive is related to neuro-electrophysiology, intracranial signal processing and behavioral neuroscience studies. Combined, the clinical and basic science efforts have been guiding his academic and clinical pathway for safer and more efficient methods for treating patients with severe seizures and abnormal movement disorders, promoting the improvement of symptoms, in combination with better functional and quality of life outcomes. Dr. González-Martínez has published more than 200 peer-reviewed articles and book chapters related to epilepsy surgery and methods of brain mapping for patients with medically intractable epilepsy and movement disorders. He has been a member of the American Society of Stereotactic and Functional Neurosurgery executive committee since 2013, developing high relevant projects and topics related to the field of functional neurosurgery and epilepsy. He is also a member of the American Association of Neurological Surgery, Congress of Neurological Surgery and American Epilepsy Society.

Specialized Areas of Interest
Adult and pediatric epilepsy surgery; movement disorder surgery; neuro-oncology; general neurosurgery.

Board Certifications
American Board of Neurological Surgeons

Hospital Privileges
UPMC Children’s Hospital of Pittsburgh
UPMC Hamot
UPMC Presbyterian
UPMC Shadyside

Professional Organization Membership
American Association of Neurological Surgeons
American Epilepsy Society
American Society of Stereotactic and Functional Neurosurgery
Congress of Neurological Surgeons

Education & Training
MD, University of Sao Paulo Medical School, 1994
PhD, University of Sao Paulo Medical School, 2002
Faculty Biographies

Jorge A. González-Martínez, MD, PhD

Neuro-oncology Fellowship, Wayne State University, 2001
Functional Neurosurgery Fellowship, Cleveland Clinic, 2002
Epilepsy Surgery Fellowship, Cleveland Clinic, 2003
Neurosurgery Residency, Cleveland Clinic, 2008
Epilepsy & Stereotactic Fellowship, University of Grenoble, France, 2009

Editorial Service
• Editorial Board:
  Neurosurgery
  Operative Neurosurgery
  World Neurosurgery
  Stereotactic and Functional Neurosurgery
  Frontiers in Neurology

• Ad Hoc Reviewer:
  Epilepsia
  Frontiers
  Lancet

Interdepartmental and Medical Center Activities
• UPMC:
  U.S. News Committee

Honors and Awards
Best Doctor in Pittsburgh, Pittsburgh Magazine, 2020, 2021
Legacy Award, Cleveland Epilepsy Association, 2017
Harvey Cushing Award, Congress of Neurological Surgeons, 2005
Preuss Award, National Brain Tumor Foundation, 2002

Media Appearances: 2020-21

Publications: 2020-21
• Refereed Articles:
Faculty Biographies


Invited Lectures: 2020-21

- **Virtual:**

- **International:**


- **National:**

Stephanie Greene, MD
Associate Professor
Director, Vascular Neurosurgery, UPMC Children's Hospital of Pittsburgh
Director, Perinatal Neurosurgery, UPMC Children's Hospital of Pittsburgh

Stephanie Greene, MD, joined the faculty of the Department of Neurological Surgery in the pediatric neurosurgery division at UPMC Children’s Hospital of Pittsburgh in 2009. Dr. Greene graduated from Dartmouth College in 1993 with a degree in biology and psychology, and a concentration in neuroscience. She earned her medical degree from Albany Medical College, and completed her neurosurgical residency at Harvard University in the Brigham & Women's and Children's Hospital of Boston program. Her fellowship in pediatric neurosurgery was completed through the University of Washington at Seattle Children’s Hospital in 2005. She is board certified in both adult and pediatric neurosurgery. She was the director of pediatric neurosurgery at Hasbro Children’s Hospital, affiliated with Brown University, prior to accepting her position at UPMC Children’s Hospital of Pittsburgh. She is the director of vascular neurosurgery and perinatal neurosurgery at Children’s Hospital of Pittsburgh.

Specialized Areas of Interest
Vascular malformations; MoyaMoya syndrome; Chiari malformation; spinal dysraphism; peripheral nerve disorders; brain tumors; fetal surgery.

Board Certifications
American Board of Neurological Surgery
American Board of Pediatric Neurological Surgery

Hospital Privileges
UPMC Children’s Hospital of Pittsburgh
UPMC Magee-Womens Hospital

Professional Organization Membership
American Association of Neurological Surgeons
American Society of Pediatric Neurosurgeons
AANS/CNS Joint Section on Pediatric Neurosurgery
AANS/CNS Joint Section on Tumors
Congress of Neurological Surgeons
Pediatric Craniocervical Society
Pennsylvania Neurological Society
Sigma Xi
Women in Neurosurgery
World Federation of Neurological Societies

Education & Training
AB, Biology/Psychology, Dartmouth College, 1993
MD, Albany Medical College, 1998
Residency, Neurological Surgery, Penn State University, 2000
Residency, Neurological Surgery, Harvard University, 2004
Fellowship, Pediatric Neurological Surgery, 2005

Editorial Service
• Editorial Board:
  Journal of Neurosurgery: Pediatrics
Faculty Biographies

Stephanie Greene, MD

• Ad Hoc Reviewer:
  Anesthesia and Analgesia
  Child’s Nervous System
  Case Reports in Ophthalmology
  Cancer Medicine
  Fetal Diagnosis and Therapy
  Interdisciplinary Neurosurgery
  Journal of Neurochemistry
  Journal of Neuro-oncology
  Journal of Pediatric Neurology
  Neurosurgery
  Pediatric Neurosurgery
  Spinal Cord Injury Rehabilitation
  Therapeutics and Clinical Risk Management
  Ultrasound in Obstetrics and Gynecology
  World Neurosurgery

Interdepartmental and Medical Center Activities

• University of Pittsburgh:
  Admissions Interview Committee, School of Medicine
  Mentor for Pitt Physician-Scientist Training Program
  Mentor for Pitt Med Association of Women Surgeons
  Hereditary Hemorrhagic Telangiectasia (HHT) Center of Excellence
  Neurological Surgery Residency Interview Committee

• UPMC Children’s Hospital of Pittsburgh:
  Brachial Plexus Birth Trauma Committee
  Fetal Diagnosis and Treatment Committee
  Neurological Surgery Site Residency Director
  Pediatric Neuro-oncology Board
  Vascular Anomalies Committee

Professional Activities

Abstract Reviewer, CNS Annual Meetings
Abstract Reviewer, AANS Annual Meetings
AANS Resident Mentorship Program
Steering Committee, North American Fetal Treatment Network
Grant Review Committee, Walter L. Copeland Fund, Pittsburgh Foundation
Oral Board Examiner, American Board of Neurological Surgeons

Community Activities

Dartmouth College Admissions Interview Committee

Honors and Awards

Marquis Who’s Who in the World, 2018-present
Marquis Who’s Who in America, 2018-present
Castle Connolly Exceptional Women in Medicine, 2017-present
American’s Most Honored Professionals (American Registry), 2017-present
Castle Connolly Regional Top Doctor, 2017-present
Castle Connolly Metro Area Top Doctor, 2016-present
Castle Connolly Top Doctor, 2016-present
Patients’ Choice 5-Year Honoree, 2013-present
Bradley Gross, MD
Assistant Professor
Director, Endovascular Neurosurgery
Program Director, Endovascular Neurosurgery/Interventional Neurology Fellowship

Bradley Gross, MD, joined the Department of Neurological Surgery as an assistant professor in July of 2016 specializing in cerebrovascular disease. His particular clinical and research interests include the comprehensive management of aneurysms, arteriovenous malformations, arteriovenous fistulas and cavernous malformations of the brain and spinal cord. He also performs embolization of brain and spinal cord tumors, revascularization for acute ischemic stroke as well as cervical, intracranial and venous stenting. Dr. Gross graduated Summa Cum Laude from Northwestern University and then earned his medical degree from Northwestern University Medical School. He completed his internship and neurosurgical residency at Brigham and Women’s Hospital/Boston Children’s Hospital/ Harvard Medical School. He then had the privilege to serve as an endovascular fellow at the Barrow Neurological Institute.

Specialized Areas of Interest
Intracranial aneurysms; arteriovenous malformations; arteriovenous fistulas; cavernous malformations; brain tumors; carotid stenosis; intracranial stenosis; venous sinus stenosis; ischemic stroke.

Board Certifications
American Board of Neurological Surgery

Hospital Privileges
UPMC Children’s Hospital of Pittsburgh
UPMC Mercy
UPMC Presbyterian
UPMC Shadyside

Professional Organization Membership
Alpha Omega Alpha
American Association of Neurological Surgeons
AANS/CNS Joint Section of Cerebrovascular Neurosurgery
Congress of Neurological Surgeons
Society of Neurointerventional Surgery
Phi Beta Kappa

Education & Training
BA with Honors, Chemistry, Northwestern University, 2004
MD, Feinberg School of Medicine, Northwestern University, 2008
Internship, Harvard Medical School, 2009
Bradley Gross, MD

Residency, Harvard Medical School, 2015
Fellowship, Endovascular Neurosurgery, Barrow Neurological Institute, 2016

Editorial Service

- Ad Hoc Reviewer:
  - American Journal of Neuroradiology
  - Journal of Neurointerventional Surgery
  - Neurology
  - Neurosurgery
  - World Neurosurgery

Professional Activities


Publications: 2020-21

- Refereed Articles:


Faculty Biographies

Bradley Gross, MD


• Books:

• Book Chapters:


• Presentations:

Faculty Biographies

Invited Lectures: 2020-21

• National:


• Virtual:
  Gross BA. “Dural Arteriovenous Fistulas,” Fridays with Friedlander webcast, Department of Neurological Surgery, University of Pittsburgh, Pa., January 8, 2021.

D. Kojo Hamilton, MD
Professor
Co-Director, Spine Fellowship Program
Residency Site Program Director, UPMC Mercy

D. Kojo Hamilton, MD, a recognized leader in scoliosis, adult spinal deformity and trauma, joined the faculty at the University of Pittsburgh Department of Neurological Surgery in July of 2014. He received his medical degree and residency training from the University of Virginia in Charlottesville, Va. He underwent further subspecialty training in complex spine, spinal deformity, scoliosis and spine surgical oncology, with a combined neurosurgical and orthopedic (AOSpine) fellowship, at the University of Virginia. Dr. Hamilton further received subspecialty training in Auckland City Hospital in Auckland, New Zealand. He is board certified in neurological surgery and a fellow of the American Association of Neurological Surgeons and a candidate member of the Scoliosis Research Society. After training, Dr. Hamilton received appointments at the University of Maryland School of Medicine and Maryland Shock Trauma Hospital where he treated patients with complex spine deformity and severe spine and brain trauma. Before joining UPMC, Dr. Hamilton was at the Oregon Health and Science University Spine Center where he treated patients with neurological trauma as well as spinal deformity conditions including adult idiopathic scoliosis, spondylolisthesis and general back and neck pain. Dr. Hamilton is nationally involved in teaching advanced and current techniques in scoliosis and adult spine deformity. He has an extensive research background in spine surgery and has presented nationally and internationally on the subject. Dr. Hamilton has received several awards and accolades from his patients, nurses and peers, including best doctor awards—locally and nationally, 6 years in a row—since his first year at the University of Pittsburgh School of Medicine.

Specialized Areas of Interest
Scoliosis; adult and pediatric spinal deformity; cranial and spine trauma; degenerative conditions of the spine; revision and reconstructive spine surgery.

Board Certifications
American Board of Neurological Surgery
Fellow of the American Association of Neurological Surgeons
Faculty Biographies

D. Kojo Hamilton, MD

Hospital Privileges
UPMC Children’s Hospital of Pittsburgh
UPMC Hamot Medical Center
UPMC Magee-Womens Hospital
UPMC Mercy
UPMC Presbyterian

Professional Organization Membership
American Association of Neurological Surgeons (AANS)
AANS/CNS Joint Section of Disorders of the Spine and Peripheral Nerves
AANS/CNS Joint Section of Neurotrauma and Critical Care
AOSpine North America (AOSNA)
International Spine Study Group
Scoliosis Research Society

Education & Training
BS (High Honors), Biochemistry, University of Maryland, 1998
MD, University of Virginia, 2003
Fellowship, Brain and Spine, Auckland City Hospital, 2008
Residency, University of Virginia, 2009
Fellowship, Complex Spine, University of Virginia, 2010

Editorial Service
• Editorial Board:
  European Spine Journal
  Neurosurgery

• Ad Hoc Reviewer:
  Global Spine Journal
  Journal of Neurosurgery
  Journal of Neurosurgery: Neurosurgical Focus
  Journal of Neurosurgery: Spine
  Neurosurgery
  The Spine Journal

Interdepartmental and Medical Center Activities
• UPMC Presbyterian:
  Reviewing Committee, Neurological Surgery Cranial and Spine Research Grant applications
  Resident Clinical Competency Committee, Core Faculty
  Technology and Innovative Practice Assessment Committee

• Department of Neurological Surgery:
  Grant Application Review Committee, Cranial and Spine Research

Professional Activities
IMAST Committee, Scoliosis Research Society
MOC/CME Committee, American Association of Neurological Surgeons
AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves:
  Executive Committee
  Scientific Program Committee
  DSPN Drugs & Devices Committee
ABNS Exam/Extra-Mural Writing Committee, American Board of Neurological Surgery
D. Kojo Hamilton, MD

**Honors & Awards**
- Pittsburgh's Best Doctors, *Pittsburgh Magazine*, 2016-21
- Faculty Teaching Award, Department of Neurological Surgery, 2020
- Distinguished Alumni, Univ of Virginia Summer Medical and Dental Education Program

**Publications: 2020-21**
- Refereed Articles:
Faculty Biographies


- Virtual Presentations:


Faculty Biographies

Luke C. Henry, PhD
Assistant Professor

Luke Henry, PhD, joined the Department of Neurological Surgery in November of 2015. Dr. Henry completed his doctorate in clinical neuropsychology, specializing in research and intervention, at the Université de Montréal in 2011. He then moved to Pittsburgh where he completed a post-doctoral fellowship at the UPMC Sports Concussion Program. Dr. Henry worked for two years as a clinical instructor within the concussion program before joining the Department of Neurological Surgery. In his current role, Dr. Henry is responsible for pre- and post-operative neuropsychological testing for a variety of pathologies/conditions including movement disorders, epilepsy, Chiari malformations, brain tumors and post-TBI assessments. He is also actively involved with various research endeavors with other faculty members within the department.

Specialized Areas of Interest
Neuropsychological function; clinical outcomes.

Hospital Privileges
UPMC Mercy
UPMC Presbyterian
UPMC Shadyside
Faculty Biographies

Luke C. Henry, PhD

Professional Organization Membership
International Neuropsychological Society
National Academy of Neuropsychology
Sports Neuropsychology Society

Education & Training
BS, Psychology, University of Calgary, 2003
MS, Behavioral Neuroscience, University of Calgary, 2006
PhD, Clinical Neuropsychology, Université de Montréal, 2011
Fellowship, Clinical Neuropsychology, UPMC, 2013

Interdepartmental and Medical Center Activities
• University of Pittsburgh:
  Adjunct Professor, Department of Psychology

Publications: 2020-21
• Refereed Articles:

Baoli Hu, PhD
Assistant Professor
Director, Brain Tumor Evolution & Therapy Lab

Baoli Hu, PhD, joined the faculty of the University of Pittsburgh Department of Neurological Surgery at Children’s Hospital of Pittsburgh of UPMC in July of 2017. Dr. Hu received his bachelor’s and master’s degrees from the Northwest A&F University in Yangling, China in 2001. He earned his PhD degree in microbiology from Wuhan University in Wuhan, China in 2004 and completed his postdoctoral training in molecular oncology at H. Lee Moffitt Cancer Center and Research Institute in Tampa, Fla. in 2007. Prior to joining the faculty at the University of Pittsburgh School of Medicine, Dr. Hu was a senior research scientist in the Department of Genomic Medicine and Cancer Biology at the University of Texas, MD Anderson Cancer Center from 2011-17, working in the lab of Ronald DePinho, MD. From 2007-11 he worked with Dr. DePinho as a research scientist in the Department of Medical Oncology and Belfer Institute for Applied Cancer Science at Dana-Farber Cancer Institute at the Harvard Medical School. Dr. Hu’s research is focused on understanding the molecular mechanisms of brain tumors evolution, including tumor progression and recurrence after the treatment; and developing new strategies for the treatment of these devastating diseases.

Specialized Areas of Interest
Oncobiology of glioma and medulloblastoma; cancer stem cells; functional cancer genomics; mechanisms of tumor initiation, progression, treatment resistance, and recurrence; translational research in drugable targets and biomarkers discovery.

Hospital Privileges
UPMC Children’s Hospital of Pittsburgh
UPMC Hillman Cancer Center

Professional Organization Membership
American Association for Cancer Research
Faculty Biographies

Baoli Hu, PhD

Society for Neuro-Oncology
Children’s Brain Tumor Tissue Consortium (CBTTC)

Education & Training
BS, Animal Science and Technology, Northwest A&F University, 1998
MS, Animal Breeding and Genetics, Northwest A&F University, 2001
PhD, Microbiology, Wuhan University, 2004
Fellow, Molecular Oncology, Moffitt Cancer Center & Research Institute, 2007

Editorial Service
• Editorial Board:
  Glioma
  Molecular Carcinogenesis
  Frontiers in Oncology

• Ad Hoc Reviewer:
  Aging
  Cancers
  Journal of Clinical Investigation
  Journal of Clinical Medicine
  Journal of Neuro-Oncology
  Molecular Carcinogenesis
  Molecular Therapy
  Neuroscience Bulletin
  Cell Death & Disease
  Seminars in Cancer Biology

Interdepartmental and Medical Center Activities
• Department of Neurological Surgery:
  Review Committee, Neurological Surgery Cranial and Spine Research grant applications

Honors and Awards
Richard King Mellon Scholar, UPMC Children’s Hospital of Pittsburgh, 2018
UPMC Competitive Medical Research Fund Award, 2018
B*CURED Brain Cancer Research Investigator Award, 2018
Caroline Ross Endowed Fellowship Award, MD Anderson Cancer Center, 2017

Publications: 2020-21
• Refereed Articles:
Faculty Biographies


**Invited Lectures: 2020-21**

• Virtual:  


**Esther Paulina Jane, PhD**  
*Research Assistant Professor*

Esther Jane, PhD, graduated from Madurai Kamaraj University in India. She did her postdoctoral training in Case Western Reserve University in Cleveland, Ohio, on the molecular mechanisms underlying regulation of homeotic gene expression during Drosophila development. Before joining the University of Pittsburgh Department of Neurological Surgery, she worked in the Pittsburgh Development Center in studying the cell biology of human embryonic stem cells before and after differentiation towards neuronal lineage. Dr. Jane is currently working on a project examining compounds that inhibit the function of individual kinases using diverse panel of malignant glioma cell lines.

**Specialized Areas of Interest**  
Mode of action of multi-target tyrosine kinase inhibitors in glioma cells.

**Professional Organization Membership**  
American Association for Cancer Research

**Education & Training**  
BSc, Zoology, Sarah Tucker College, 1983  
MSc, Zoology, The American College, 1986  
PhD, Biology, The Madurai Kamaraj University, 1992

**Editorial Service**  
• Ad Hoc Reviewer:  
*Cancer Letters*

**Publications: 2020-21**  
• Refereed Articles:  
Hideyuki Kano, MD, PhD
Research Associate Professor
Director, Clinical Research, Center for Image-Guided Neurosurgery

Hideyuki Kano, MD, PhD, joined the faculty in the Department of Neurological Surgery Center for Image-Guided Neurosurgery in 2008 as a visiting research assistant professor and is now a research associate professor in the department. He was named clinical research director at the center in 2014. Dr. Kano received his medical training from the Shiga University of Medical Science in Otsu, Japan, earning his medical degree in 1997. He subsequently received his residency training at the Kyoto University School of Medicine, Kyoto, Japan and Osaka Saiseikai Izuo Hospital, Osaka, Japan in 2000. From 2000 to 2004, he received his residency training and then fellowship program of stereotactic radiosurgery and received a certificate of board of neurological surgery in Japan in 2004. In 2006, Dr. Kano received his PhD from the Graduate School of Medicine Kyoto University, Kyoto, Japan. From 2004 to 2007, Dr. Kano worked as a neurosurgeon-in-chief at Kishiwada City Hospital in Japan. He completed his fellowship program of image-guided neurosurgery at the University of Pittsburgh in 2008. In 2009, Dr. Kano received the National Brain Tumor Society Mahaley Clinical Research Award from the Joint Section on Tumors of the AANS/CNS. In 2012, Dr. Kano received the Integra Foundation Award from the Joint Section on Tumors of the AANS/CNS. In 2013, Dr. Kano received the Leksell Radiosurgery Award from the AANS and the Synthes Skull Base Surgery Award from the CNS. Dr. Kano is currently working on a clinical study about stereotactic radiosurgery for benign and malignant brain tumors, arteriovenous malformation and functional disease. He has published more than 200 articles in refereed journals, 38 book chapters and/or invited publications, and has edited two books.

Specialized Areas of Interest
Gamma Knife stereotactic radiosurgery; malignant and benign brain tumors; vascular malformations; functional disorders

Board Certifications
Japanese Board of Neurological Surgery

Professional Organization Membership
AANS/CNS Joint Section on Tumors
Congress of Neurological Surgeons
International Stereotactic Radiosurgery Society
Japanese Society of Neurosurgery
Japanese Society of Stereotactic Radiosurgery
The Japan Society of Neuro-Oncology

Education & Training
MD, Shiga University of Medical Science, 1997
PhD, Kyoto University Graduate School of Medicine, 2004
Residency, Neurosurgery, Kyoto University Hospital, 2004
Fellowship, Center for Image-Guided Neurosurgery, University of Pittsburgh, 2008

Editorial Service
• Editorial Board:
BMC Neurology
Scientific Reports
Faculty Biographies

Hideyuki Kano, MD, PhD

- Ad Hoc Reviewer:
  - American Journal of Neuroradiology
  - American Journal of Case Reports
  - BMJ Open
  - BMJ Case Reports
  - Cancer Research
  - CNS Oncology
  - Cancer Biology & Medicine
  - Cephalalgia
  - Expert Review of Anticancer Therapy
  - Expert Review of Medical Devices
  - International Journal of Case Reports in Medicine
  - International Journal of Molecular Sciences
  - International Journal of Radiation Oncology, Biology, Physics
  - Journal of Clinical Medicine and Research
  - Journal of Clinical Oncology
  - Journal of Neurosurgery
  - Journal of Neurology, Neurosurgery & Psychiatry
  - Journal of Neuro-oncology
  - Journal of Pediatric Neuroradiology
  - Journal of Pregnancy
  - Journal of the Neurological Sciences
  - Journal of Zhejiang University SCIENCE B - Biomedicine & Biotechnology
  - Medical Imaging and Radiology
  - Neurosurgical Review
  - New England Journal of Medicine
  - Pain Management
  - Technology in Cancer Research and Treatment
  - QJM: An International Journal of Medicine
  - World Neurosurgery

Honors and Awards
- Marquis Who’s Who in the World, 2018
- Marquis Who’s Who in America, 2014-16
- Synthes Skull Base Surgery Award, AANS/CNS Joint Section on Tumors, 2013
- Leksell Radiosurgery Award, AANS, 2013
- Integra Foundation Award, AANS/CNS Joint Section on Tumors, 2012
- Osaka Medical Research Foundation for Incurable Diseases Grant Award, 2007-09, 2011-12
- National Brain Tumor Society Mahaley Clinical Research Award, 2009

Publications: 2020-21
- Refereed Articles:


**Adam S. Kanter, MD**

*Professor*

*Chief, UPMC Presbyterian Spine Service*

*Director, Minimally Invasive Spine Program*

*Co-Director, Spine Fellowship Program*

Adam S. Kanter, MD, joined the faculty of the Department of Neurosurgery in January of 2008 as director of the department’s minimally invasive spine program. Dr. Kanter performed his undergraduate work at the University of Massachusetts in Amherst, graduating
Adam S. Kanter, MD

Faculty Biographies

with Cum Laude honors. He obtained his master’s degree from Boston University and his medical degree from the University of Vermont in 2001. Dr. Kanter then completed his neurosurgical residency at the University of Virginia in 2007. He completed subspecialty fellowship training in minimally invasive spine surgery at the University of California in San Francisco and Auckland City Hospital in Auckland, New Zealand. Dr. Kanter is board certified in neurological surgery and was promoted to professor in 2021. He was named chief of spine services in 2014 and continues to push the surgical envelope in minimally invasive spine procedures utilizing many of the innovative portals that he has helped to develop. Dr. Kanter is principal investigator in several research studies evaluating the use of stem cell derived biologics to induce spinal fusion. His research focuses on patient derived clinical outcome measures, specifically appraising the utility of minimally invasive and lateral access surgical corridors. Dr. Kanter has published numerous papers in refereed journals and authored several book chapters. He provides editorial service to several peer reviewed journals and is a key member of several major neurosurgical societies. He resided as chairman of the 2016 Spine Summit’s scientific program, recording the highest attendance in the history of the section’s conference. Dr. Kanter has also received numerous accolades for his clinical expertise, including top doctor, most compassionate doctor, and patient’s choice awards.

Specialized Areas of Interest
Minimally invasive spine surgery; lateral access spine surgery; artificial disc technology; spinal tumors; experimental therapies for spinal fusion.

Board Certifications
American Board of Neurological Surgery

Hospital Privileges
UPMC Magee-Women’s Hospital
UPMC Passavant
UPMC Presbyterian
UPMC St. Margaret
UPMC Shadyside

Professional Organization Membership
Allegheny County Medical Society
American Association of Neurological Surgeons
AANS/CNS Section on Disorders of the Spine & Peripheral Nerves
AANS/CNS Section of Neurotrauma & Critical Care
AANS/CNS Section on Tumors
American College of Surgeons
American Medical Association
Congress of Neurological Surgeons
North American Spine Society
Pennsylvania Medical Society
Society of Lateral Access Surgeons (SOLAS)
Society of Minimally Invasive Spine Surgeons (SMISS)
World Spinal Column Society

Education & Training
BS, Psychology, University of Massachusetts, 1993
MS, Medical Sciences, Boston University, 1997
MD, University of Vermont, 2001
Residency, Neurosurgery, University of Virginia, 2007
Fellowship, Spine Surgery, University of California, San Francisco, 2007

Editorial Service
• Editorial Board:
  International Journal of Spine Surgery
  The Physician & Sports Medicine
  SpineLine

  • Ad Hoc Reviewer:
    Journal of Neurosurgery
    Neurosurgery
    Neurosurgical Focus
    The Spine Journal

Interdepartmental and Medical Center Activities
• University of Pittsburgh:
  Medical Executive Committee
  Value Analysis Team

Professional Activities
AANS/CNS Division of Spine & Peripheral Nerves:
  Annual Meeting Chair
  Executive Committee Member
  Scientific Program Chairman
  Secretary
Society of Minimally Invasive Spine Surgeons:
  Secretary
Society of Lateral Access Surgery:
  North American Regional Director
  CNS Spine Complications Course

Honors and Awards
Pittsburgh’s Best Doctors, Pittsburgh Magazine, 2012-21
Patients’ Choice Award, UPMC, 2012-21
Top 10 Doctor, Vitals Neurosurgical Specialists, 2012-21
Most Compassionate Doctor Award, UPMC, 2012-21
UPMC ‘ACES’ Award for Commitment & Excellence in Service, 2019

Publications: 2020-21
• Refereed Articles:
  Walker CT, Kim HJ, Park P, Lenke LG, Weller MA, Smith JS, Nemergut EC, Scuibba DM,
  Wang MY, Shaffrey C, Deviren V, Mummaneni PV, Chang JM, Mummaneni VP, Than KD,
  Berjano P, Eastlack RK, Mundis GM Jr, Kanter AS, Okonkwo DO, Shin JH, Lewis JM, Koski T,
  Hoh DJ, Glassman SD, Vinci SB, Daniels AH, Clavijo CF, Turner JD, McLawhorn M, Uribe JS.
  Neuroanesthesia Guidelines for Optimizing Transcranial Motor Evoked Potential Neuro-
  monitoring During Deformity and Complex Spinal Surgery: A Delphi Consensus Study.

  Agarwal N, Salvetti DJ, Nowicki KW, Alan N, Ghandoke GS, Kanter AS, Okonkwo DO, Ham-
  ilton DK. Preoperative Chronic Opiate Use and Patient Reported Outcomes Following Adult
Faculty Biographies


David L. Kaufmann, MD
Clinical Assistant Professor
Chief, Neurosurgery, UPMC Mercy

David L. Kaufmann, MD, is clinical assistant professor of neurological surgery at the University of Pittsburgh School of Medicine and is chief of neurosurgery at UPMC Mercy. He maintains a general neurosurgery practice with an emphasis on treating degenerative disorders of the spine and traumatic injuries of the brain and spine. He also has an interest in complex spinal reconstructive surgery for conditions involving spinal deformity and brain tumors. Dr. Kaufmann received his medical degree from the Albert Einstein College of Medicine in New York City and completed a general surgery internship at the Johns Hopkins Hospital in Baltimore. He performed his neurosurgical residency at Montefiore Medical Center and the Hyman-Newman Institute for Neurology and Neurosurgery at Beth Israel Medical Center in New York City. He is board certified in neurological surgery. Dr. Kaufmann is a member of the American Association of Neurological Surgeons, the Congress of Neurological Surgeons and the Pennsylvania Neurosurgical Society.

Specialized Areas of Interest
Spinal decompression and fusion surgery; complex spine surgery; brain and spine trauma; brain tumors; neurosurgical treatment of pain.

Board Certifications
American Board of Neurological Surgeons

Professional Organization Membership
American Association of Neurological Surgeons
Congress of Neurological Surgeons
Pennsylvania Neurosurgical Society

Education & Training
BA, Philosophy, Emory University, 1989
MA Candidate, Columbia University, 1990
MD, Albert Einstein College of Medicine, 1994
Residency, Montefiore Medical Center, 2000
Residency, Beth Israel Medical Center, 2000
Robert Kellogg, MD
Assistant Professor

Robert Kellogg, MD, joined the Department of Neurological Surgery, as an assistant professor in September of 2020 specializing in pediatric neurosurgery. His clinical and research interests include the comprehensive management of spasticity and movement disorders and craniofacial surgery. Dr. Kellogg grew up in Connecticut but has spent most of the last decade in the Chicago area. He is married and has two sons. Dr. Kellogg received his medical education from Indiana University School of Medicine and did his internship and residency training in neurological surgery at Rush University Medical Center in Chicago. Dr. Kellogg completed a pediatric neurosurgery fellowship at UPMC Children’s Hospital of Pittsburgh.

Specialized Areas of Interest
Spasticity and movement disorders; EEA/pituitary tumors; back/spine pain; craniofacial/craniosynostosis; plagiocephaly.

Board Certifications
American Board of Neurological Surgery
American Board of Pediatric Neurological Surgery

Hospital Privileges
UPMC Children’s Hospital of Pittsburgh
UPMC Magee Women’s Hospital

Professional Organization Membership
American Association of Neurological Surgeons
AANS/CNS Joint Section on Pediatric Neurosurgery
Congress of Neurological Surgeons

Education & Training
BA, Indiana University, 2005
MD, Indiana University School of Medicine, 2009
Residency, Rush University Medical Center, 2015
Fellowship, University of Pittsburgh, 2016

Publications: 2020-21
• Refereed Articles:

Invited Lectures: 2020-21
• Virtual:
Kellogg R. “Selective Dorsal Rhizotomy,” Fridays with Friedlander webcast, Department of Neurological Surgery, University of Pittsburgh, Pittsburgh, Pa., February 19, 2021.

Gary Kohanbash, PhD
Assistant Professor
Director, PNIO Laboratory

Gary Kohanbash, PhD, joined the faculty of the Department of Neurological Surgery at UPMC Children’s Hospital of Pittsburgh in January of 2017. Dr. Kohanbash graduated from the University of Pittsburgh in 2007 with a bachelor of science honors degree in neuroscience, specializing in neurodegenerative diseases. He then earned his masters of science degree in infectious diseases and microbiology in 2009, and a doctorate in philosophy in 2012, both from the University of Pittsburgh Graduate School of Public Health. While there, he identified novel pathways of immunosuppression in gliomas and participated in multiple phase I/II immunotherapy clinical trials. Dr. Kohanbash subsequently completed a post-doctoral fellowship in the University of Pittsburgh Department of Neurological Surgery in 2014. He continued his training as a postdoctoral fellow at the University of California, San Francisco (UCSF) Department of Neurological Surgery. While at UCSF, Dr. Kohanbash was privileged to complete a prestigious T32 training program in translational brain tumor research.

Specialized Areas of Interest
Immunotherapy for pediatric and adult central nervous system tumors.

Professional Organization Membership
American Association for Cancer Research
Society for Immunotherapy of Cancer
Society for Neuro-Oncology

Education & Training
BS, (hons), Neuroscience, University of Pittsburgh, 2007
MS, Infectious Diseases and Microbiology, University of Pittsburgh, 2009
PhD, Brain Tumor Immunology, University of Pittsburgh, 2012
Postdoctoral Fellow, Neurological Surgery, University of Pittsburgh, 2014
Postdoctoral Fellow, Neurological Surgery, University of California, San Francisco, 2016

Editorial Service
• Editorial Board:
  Cancers

• Ad Hoc Reviewer:
  Cancer Immunology Immunotherapy
  Cancers
  Journal of Clinical Investigation
  Journal of Clinical Investigation Insight
  Journal of Neuro-Oncology
  Journal of Nuclear Medicine
  Medicines
  Neuro-Oncology
  OncoImmunology

Professional Activities
Co-Chair, Immunotherapy Session, Society for Neuro-Oncology Annual Meeting
Pediatric Brain Tumor Consortium Immunology Section
Scientific Committee Member, Childhood Brain Tumor Tissue Consortium
**Faculty Biographies**

Gary Kohanbash, PhD

**External Grant Advisor, University of Toledo**
**Study Section, St. Baldrick’s Foundation Fellowship**
**University of Pittsburgh Senate Library Committee**

**Honors and Awards**
Research Travel Award, Society for Immunotherapy of Cancer, 2014-15
Honoree, The Annual Convocation of the University of Pittsburgh, 2010, 2014
Best Dissertation Award, Department of Infectious Diseases and Microbiology, University of Pittsburgh, 2013
Top Oral Presentation, Translational Research Cancer Center Consortium (TRCCC), 2013
International Research Travel Award, Japanese Society for Brain Tumor Pathology, 2012
Best Graduate Thesis Award, Department of Infectious Diseases and Microbiology, University of Pittsburgh, 2010
Top Poster Award, Translational Research Cancer Center Consortium (TRCCC), 2009

**Invited Lectures: 2020-21**
- Virtual:
  Kohanbash G. “Innovative Approaches for Adult and Pediatric Brain Tumor Immunotherapy,” *Fridays with Friedlander* webcast, Department of Neurological Surgery, University of Pittsburgh, Pittsburgh, Pa., September 11, 2020.

**Michael J. Lang, MD**

*Assistant Professor*

Michael J. Lang, MD, joined the University of Pittsburgh in 2019 as a vascular and endovascular neurosurgeon who specializes in treatment of vessel diseases of the brain, including aneurysms, stroke, carotid artery stenosis, arteriovenous malformations and fistulas, cavernomas, and intracerebral hemorrhage. He performs both minimally invasive endovascular and traditional open & skull base surgery, allowing a comprehensive approach in the treatment of cerebrovascular disease. He also has subspecialty training in functional/epilepsy neurosurgery. Dr. Lang completed his undergraduate work at the University of Wisconsin. He received his medical degree from Ohio State University, graduating with honors. Dr. Lang completed his neurosurgical residency and fellowships in both endovascular neurosurgery and functional & epilepsy surgery at Thomas Jefferson University. He then completed the prestigious fellowship in open cerebrovascular and skull base surgery at the Barrow Neurological Institute with extensive training in cerebral bypass surgery and removal of vascular lesions of the brainstem. Dr. Lang has published numerous papers and book chapters, participated in clinical trials, and delivered lectures to audiences all over the world. His research interests include clinical outcomes in the treatment of cerebrovascular disease and epilepsy surgery, as well as MRI-compatible robotics.

**Specialized Areas of Interest**
Intracranial aneurysms, arteriovenous malformations, arteriovenous fistulas, cavernous malformations, brain tumors carotid stenosis, intracranial stenosis, venous sinus stenosis, ischemic stroke, trigeminal neuralgia, and epilepsy.

**Hospital Privileges**
UPMC Children’s Hospital of Pittsburgh
UPMC Mercy
UPMC Presbyterian
UPMC Shadyside
Daniela Leronni, PhD
Research Instructor

Daniela Leronni, PhD, has been a research instructor at the University of Pittsburgh Department of Neurological Surgery since January 2017. She earned her BS/MS in biological sciences with a thesis in molecular biology at the University of Bari, Italy, in 2007. She completed her doctorate in genetics and molecular evolution at the University of Bari, in 2011. Dr. Leronni’s early work as a PhD student and research assistant at the University of Bari from 2008 to 2011 focused on the functional characterization of genetics elements in the genome of model organisms with a low number of chromosomes, such as Drosophila Melanogaster (fruit fly) and Culex Quinquefasciatus (southern house mosquito). She studied the insulator activity of retrotransposons, genomic elements present in all organisms’ genome. The study of the genetics of regulatory elements was the basis for Dr. Leronni’s background in molecular biology and her interest in gene therapy. In 2009, Dr. Leronni was offered a fellowship as a visiting research student in the Department of Surgery at Harvard University. Here she contributed to the finding that demonstrates that mitochondria host segregated cAMP cascades with distinct functional and kinetic signatures. In this way, she began to investigate biological mechanism at a cellular level and applied her knowledge in molecular biology to carry on research in cellular biology. In 2012, Dr. Leronni joined the University of Pittsburgh via the Department of Microbiology and Molecular Genetics as a postdoctoral associate. Under the supervision of Joseph C. Glorioso III, PhD, she gained experience in the design and generation of gene therapy vectors that can be used to deliver multiple protective genes simultaneously to neurons, with the long-term goal of using these vectors as new approaches to neurological disease. In 2015, Dr. Leronni was recruited by Robert Friedlander, MD, as postdoctoral associate to develop novel approaches for gene therapy for Huntington’s
Daniela Leronni, PhD

Faculty Biographies

disease (HD) and amyotrophic lateral sclerosis (ALS) and to study the basic mechanism of these diseases. One of the main objectives of her research is the creation of gene therapy vectors for HD, including, vectors targeting melatonin synthesis, which plays a protective role in the brain. Additionally, Dr. Leronni leads a research project investigating mitochondrial dysfunction in neurodegenerative disease and mitochondria signal transduction.

Specialized Areas of Interest
Molecular biology; neurodegenerative diseases; gene therapy; mitochondria.

Board Certifications
Biologo Professionista, Italy

Professional Organization Membership
American Association for the Advancement of Science
National Center for Faculty Development & Diversity

Education & Training
BS/MS, Biology/Molecular Genetics, Università degli Studi Aldo Moro, Bari, Italy, 2007
Research Scholar, Cell Signaling, Harvard Medical School, 2010
PhD, Genetics and Molecular Evolution, Università degli Studi Aldo Moro, Bari, Italy, 2011
Postdoctoral Fellowship, Molecular Genetics/Gene Therapy, University of Pittsburgh, 2014
Postdoctoral Fellowship, Neurodegenerative Diseases, University of Pittsburgh, 2016

Interdepartmental and Medical Center Activities
• University of Pittsburgh:
  Mentor, First Experiences in Research, University of Pittsburgh Dietrich School of Arts and Sciences

Publications: 2020-21
• Refereed Articles:

Witold Lipski, PhD
Research Instructor

Witold Lipski, PhD received his undergraduate education in physics at Colby College in Waterville, Maine. He completed his doctoral degree in neuroscience at the Center for Neuroscience at the University of Pittsburgh, where he studied the neurophysiological mechanisms involved in the effects of stress on motivated behavior. There, he also became interested in the therapeutic mechanisms of deep brain stimulation (DBS), and investigated the behavioral and physiological effects of DBS in a rat model of obsessive compulsive disorder. In 2013, he joined the University of Pittsburgh Department of Neurological Surgery as a post-doctoral scientist, where he helped establish a basic research program aimed at understanding the pathophysiology of Parkinson’s disease and essential tremor and the therapeutic action of DBS in these disorders. He was also involved in studies aimed at examining the network
Witold Lipski, PhD

Faculty Biographies

dynamics leading to seizures in epilepsy, and answering other basic research questions using neurophysiological recordings in epilepsy patients undergoing intracranial seizure monitoring. After joining the department as a research instructor in 2017, Dr. Lipski has continued to use his expertise in neurophysiological recording and systems neuroscience to pursue both basic science and clinical research questions.

Specialized Areas of Interest
Basal ganglia contributions to production of speech and language; neural network dynamics in epilepsy; neurophysiological mechanism of motivated behavior.

Professional Organization Membership
American Epilepsy Society
Society for Neuroscience
Society for the Neurobiology of Language

Education & Training
BA, Physics, Colby College, 2000
PhD, Neuroscience, University of Pittsburgh, 2011

Publications: 2020-21
- Refereed Articles:

L. Dade Lunsford, MD

*Lars Leksell Distinguished Professor*
*Director, Center for Image-Guided Neurosurgery*

L. Dade Lunsford, MD, is the Lars Leksell Professor and Distinguished Professor at the Department of Neurological Surgery at the University of Pittsburgh. He is also director of the Center for Image-Guided Neurosurgery at the University of Pittsburgh Medical Center and an internationally recognized authority on stereotactic surgery, radiosurgery, and minimally invasive surgery. In 1987, Dr. Lunsford was responsible for bringing the Gamma Knife to the University of Pittsburgh Medical Center, the first center in the United States to offer this state-of-the-art, minimally invasive form of brain surgery. Dr. Lunsford received his medical degree in 1974 from the Columbia University College of Physicians and Surgeons. He completed his internship in surgery at the University of Virginia Hospital and his residency in neurological surgery at the University of Pittsburgh training under Peter Jannetta. Following a one-year fellowship in stereotactic and functional neurosurgery at the Karolinska Institute in Stockholm, Sweden—where he studied with professors Lars Leksell and Erik-Olof Backlund—he joined the Department of Neurological Surgery faculty in 1981. He is an active staff member of several UPMC hospitals and was president of the medical staff at UPMC Presbyterian from 1999-2001 and past president of the Council of Clinical Chairs for the University of Pittsburgh School of Medicine in 2001-2003. Dr. Lunsford chairs the UPMC Health System Technology and Innovative Practice (TIPAC) committee and co-chairs the UPMC Brain Mapping (MEG) Center. Dr. Lunsford has been board-certified by the American Board of Neurological Surgery since 1983. He is the author of more than 1,400 published articles, abstracts, and book chapters and has served as the editor or co-editor of 16 books. Dr. Lunsford served as department chairman for ten years, before stepping down in July of 2006 to devote more time to his clinical work, clinical investigation, and resident and fellow training. He also served as the department residency director from 1987 until 2020. Since
2012, he has served as a team physician (neurosurgeon) for the National Hockey League’s Pittsburgh Penguins. In 2016, Dr. Lunsford received the Cushing Award for Technical Excellence and Innovation in Neurosurgery from the American Association of Neurological Surgery. In December of 2017, he received the prestigious Herbert Olivecrona Award—known by some as the “Nobel Prize of Neurosurgery”—from the Karolinska Institute & Karolinska University Hospital in Stockholm, Sweden. In April of 2018, he was honored to present the 2018 Van Wagenen Lecture during the American Association of Neurological Surgeons Annual Meeting in New Orleans. On June 19, 2020, via live stream, he delivered the inaugural Dan Leksell Lecture at the 4th IRRF/ISRS Biennial Radiosurgery Research and Education meeting.

**Specialized Areas of Interest**
Brain tumor management; Gamma Knife stereotactic radiosurgery; movement disorders and trigeminal neuralgia; vascular malformations; concussion and sports medicine.

**Board Certifications**
American Board of Neurological Surgery

**Hospital Privileges**
UPMC Children’s Hospital of Pittsburgh
UPMC Presbyterian
UPMC Shadyside

**Professional Organization Membership**
AANS/CNS Joint Section for Stereotactic and Functional Neurosurgery (Chair, 1995-97)
Allegheny County Medical Society
American Academy of Neurological Surgery
American Association of Neurological Surgeons, Fellow
American College of Surgeons, Fellow
American Medical Association
American Society for Stereotactic and Functional Neurosurgery (President, 1995-97)
Congress of Neurological Surgeons
Florida Medical Association
Focused Ultrasound Surgery Foundation, Data Safety Monitoring Board
International Radiosurgery Research Foundation, Founding Chairman
North American Skull Base Society
Pennsylvania Medical Society
Pennsylvania Neurosurgical Society
Society of Neurological Surgeons

**Education & Training**
BA, University of Virginia, 1970
MD, Columbia University, 1974
Internship, General Surgery, University of Virginia, 1975
Residency, University of Pittsburgh, 1980
Fellowship, Stereotactic and Functional Neurosurgery, Karolinska Sjukhuset, 1981

**Editorial Service**
* Editorial Board:
  - *Egyptian Journal of Neurological Progress in Neurological Surgery* (Editor)
  - *Stereotactic and Functional Neurosurgery*
Faculty Biographies

L. Dade Lunsford, MD

- Ad Hoc Reviewer:
  *Acta Neurologica Scandinavica*
  *American Journal of Otology*
  *British Journal of Neurosurgery*
  *Cancer*
  *Headache*
  *International Journal of Radiation Oncology, Biology and Physics*
  *Journal of Neurosurgery*
  *Neurosurgery*

- Interdepartmental and Medical Center Activities
  - **UPMC Presbyterian:**
    *Director, Center for Image Guided Neurosurgery*
    *Co-Chair, Brain Mapping (MEG) Center*
  - **University of Pittsburgh:**
    *Radiation Safety Committee*
  - **UPMC:**
    *Associate Director, Neurological Surgery Residency Program*
    *Chair, Technology and Innovative Practice Committee*
    *Value Analysis Executive Steering Committee*

- Professional Activities
  - Course Co-Director, Principles and Practices of Gamma Knife Radiosurgery, Pittsburgh Pa.
  - Past Chair and Founder, International Gamma Knife Radiosurgery Foundation
  - Team Co-Neurosurgeon, Pittsburgh Penguins, National Hockey League

- Honors and Awards
  - Pittsburgh's Best Doctors, *Pittsburgh Magazine*, 2012-21
  - Excellence in Patient Experience Award, UPMC, 2018
  - Van Wagenen Lecturer, American Association of Neurological Surgeons Annual Meeting, 2018
  - Herbert Olivecrona Award, Karolinska Institute & Karolinska University Hospital, 2017
  - AANS Cushing Award for Technical Excellence and Innovation in Neurosurgery, 2016
  - American Most Honored Professionals, Top 1%, 2016
  - America's Top Doctors for Cancer, Castle Connolly Medical, Ltd., 2005-16
  - Best Doctors in America, 2005-16
  - Best Doctors in America database, 2010-16
  - Pioneers in Radiosurgery Award, Leksell Gamma Knife Society, 2010
  - Leading Health Professionals of the World, 2010
  - Faculty Teaching Award, Department of Neurosurgery 1997, 1999, 2000, 2010
  - Guide to America's Top Surgeons, 2006-09
  - Allegheny County Medical Society Ralph C. Wilde Award, 2008
  - Castle Connolly Medical Ltd. National Physician of the Year Award, 2008
  - Distinguished Professor, University of Pittsburgh, 2007
  - Congress of Neurological Surgeons Honored Guest, 2007
  - AANS Young Neurosurgeon Award, 2005
L. Dade Lunsford, MD

Faculty Biographies

Academic Keys Who’s Who in Medical Sciences Education, 2005
Lars Leksell Provost Lecture, 2000
International Stereotactic Radiosurgery Jacob Fabrikant Award, 1997
William S. McEllroy Award, University of Pittsburgh School of Medicine, 1997
Good Housekeeping. Best Doctors, 1996
William P. Van Wagenen Fellowship, AANS, 1980
Phi Beta Kappa - University of Virginia, 1970
BA with High Honors - University of Virginia, 1970

Publications: 2020-21
• Refereed Articles:


Faculty Biographies


• Letters to the Editor:

• Book Chapters:

Invited Lectures: 2020-21

• Virtual:


  Lunsford, LD. “Advancing Radiosurgical Education,” *Fridays with Friedlander* webcast, Department of Neurological Surgery, University of Pittsburgh, Pittsburgh, Pa., May 14, 2021.


Joseph C. Maroon, MD
Clinical Professor
Heindl Scholar in Neuroscience

Joseph C. Maroon, MD, is a board-certified clinical professor of neurological surgery at the University of Pittsburgh Medical Center, and the Heindl Scholar in Neuroscience. His clinical and research interests have been in the areas of the development of minimally invasive surgical procedures to the brain and spine, the prevention and treatment of traumatic injuries to the central nervous system, innovative approaches to pituitary and other brain tumors and more recently complimentary approaches to inflammatory diseases associated with aging. Working with neuropsychologist, Mark Lovell, PhD, he co-developed ImPACT® (Immediate Post-Concussion Assessment and Cognitive Testing). This is the first computerized system to determine concussion severity and the timing for return to contact sports. It is now the standard of care for concussion management in the National Football League, National Hockey League, Major League Baseball, NASCAR and is used in over 12,000 colleges and high schools in the United States. For over 20 years he has served as the neurosurgical consultant to professional and college athletes in football, baseball, golf, hockey and soccer and has been the team neurosurgeon to the Pittsburgh Steelers for 39 years. He has been honored by the neurosurgical societies of Japan, Korea, Thailand, Egypt, Brazil, Lebanon and China for his neurosurgical contributions. He was honored by his peers when he was elected president of the Congress of Neurological Surgeons, the largest society of neurosurgeons in North America. Other outside activities include a former member of the board of directors and chairman of the scientific and technology committee of Mylan Laboratories, the largest generic drug manufacturer in the world; former chairman of the scientific advisory board to General Nutrition Corporation (GNC); and, chairman of the medical and scientific advisory board to Stemedica. He also serves on the NFL Head, Neck and Spine Committee and, in 2008, he became medical director of the World Wrestling Entertainment Corporation (WWE). Also in 2008, he was named senior vice president of the American Academy of Anti-Aging Medicine (A4M). Honored as one of America’s best neurosurgeons for 12 consecutive years he has written over 290 papers, 40 book chapters and five books. His most recent book, published in February of 2017 and re-released in December of 2018, is entitled Square One: A Simple Guide to a Balanced Life that takes a look at the importance of understanding where you are in life and the need to keep all elements of your life in proper “balance." He has also authored Fish Oil: The Natural Anti-Inflammatory, published in 2006, and The Longevity Factor: How Resveratrol and Red Wine Activate Genes for Longer and Healthier Life, published in 2008. In his early years, his athletic abilities earned him a football scholarship to the University of Indiana where he was selected as Scholastic All-American in football. Despite his busy professional schedule, Dr. Maroon remains an avid athlete and has competed in over 78 triathlon events. These include eight Ironman distant triathlons (2.4 mile swim, 112 mile bike and 26.2 run) in Hawaii (1993, 2003, 2008, 2010 and 2013), Canada (1995), New Zealand (1997) and Europe (2000). He placed sixth in the Senior U.S. Olympics Triathlon in 2005. In 1999, he—along with Joe Montana and Kareem Abdul Jabbar—was inducted into the Lou Holtz Upper Ohio Valley Hall of Fame for his athletic accomplishments and contributions to sports medicine. On May 2, 2009, he was inducted into the Western Pennsylvania Sports Hall of Fame, and on March 14, 2010, he was inducted into the National Fitness Hall of Fame in Chicago. In June of 2017, Dr. Maroon was selected as Man of the Year by the Saints and Sinners Club of America, and in September of 2018, he was named Humanitarian of the Year by the Jerome Bettis Bus Stops Here Foundation. As medical director of the Live Free African Freedom Tour, on February 26, 2014, Dr. Maroon and his daughter, Isabella—along with a group of amputees—climbed Mt. Kilimanjaro in Africa, the highest free standing mountain in the world. In May of 2015, Dr. Maroon completed The Crucible Extreme Hike, a 3-day, 70-mile hike in the Laurel Mountains of
Pennsylvania to raise awareness for wounded veterans. In February of 2020, Dr. Maroon was named recipient of the UPMC Clinician of Courage Award. To further honor Dr. Maroon, upon presenting the award, UPMC announced that the award would be renamed the Joseph Maroon Clinician of Courage Award for future award winners.

**Specialized Areas of Interest**
Microdiscectomy; lumbar laminectomy; anterior cervical discectomy; Arnold-Chiari Malformation; pituitary tumors; orbital tumors; acoustic tumors; brain tumors; concussion; sports medicine.

**Board Certifications**
American Board of Neurological Surgery

**Professional Organization Membership**
Allegheny County Medical Society
American Academy of Anti-Aging Medicine
American Association of Neurological Surgeons
American College of Sports Medicine
American College of Surgeons
American Medical Association
Congress of Neurological Surgeons
Mid-Atlantic Neurosurgical Society
National Association for Disabled Athletes
National Football League Physicians Society
Neurosurgical Society of America
Pennsylvania Medical Society
Pennsylvania Neurosurgical Society

**Education & Training**
AB, Anatomy & Physiology, Indiana University, 1961
MD, Indiana University, 1965
Residency, General Surgery, Georgetown University, 1967
Residency, Neurological Surgery, Indiana University, 1968
Residency, Neurological Surgery, Oxford University, 1969
Fellowship, Vermont College of Medicine, 1972

**Editorial Service**
- **Editorial Board:**
  - Anti-Aging News Journal
  - Neurological Research
  - The Physician and Sportsmedicine
  - Surgical Neurology International

- **Ad Hoc Reviewer:**
  - Annals of Otolgy, Rhinology and Laryngology
  - Canadian Journal of Neurological Surgery
  - Chinese Journal of Neural Regeneration Research
  - European Journal of Pain
  - Journal of Cranial Base Surgery
  - Journal of Neurotrauma
  - Journal of the American College of Surgeons
  - Neurology India
Faculty Biographies

Joseph C. Maroon, MD

Neurosurgery
Pharmacogenics
Stroke
Surgical Neurology
Spine Surgery Today
World Neurosurgery

Professional Activities
Medical Advisory Panel, The Chuck Noll Foundation for Brain Injury Research
Team Neurosurgeon, Pittsburgh Steelers
Medical Consultant, Mylan Laboratories
Medical Director, WWE
Senior Vice President, American Academy of Anti-Aging Medicine (A4M)
Senior Advisor, NFL Head, Neck and Spine Committee
World Advisory Board of the International Sports Hall of Fame
Chairman, Medical and Scientific Advisory Board, Stemedica
Consulting Neurosurgeon, Operation Backbone

Honors and Awards
UPMC Physician Excellence Award: Clinician of Courage, 2020
Inaugural Chuck Noll Foundation Lecture on Sports Related Trauma, American Association of Neurological Surgeons Annual Scientific Meeting, San Diego, 2019
Humanitarian of the Year, Jerome Bettis Bus Stops Here Foundation, 2018
Man of the Year, Circus Saints & Sinners Club, Bob Prince Tent, 2017
Pittsburgh’s Best Doctors, Pittsburgh Magazine, 2017-19
Lifetime Leadership Award for Concussion Research, UPMC Sports Medicine Concussion Program, 2016
Listed in The Best Doctors in America, 2000-14
Honorary President, World Association of Lebanese Neurosurgeons, 1999-2012
Ohio Valley Athletic Conference Hall of Fame Class of 2012
Pioneer Award, 25th Anniversary UPMC Center for Cranial Base Surgery, Pittsburgh, Pa., 2012
Distinguished Alumni Service Award, Indiana University, Bloomington, Ind., 2011
National Fitness Hall of Fame, 2010
Western Pennsylvania Chapter of the Sports Hall of Fame, 2009
Lou Holtz/Upper Ohio Valley Hall of Fame inductee, for excellence in athletics and medicine, June 1999

Media Appearances: 2020-21

Publications: 2020-21
• Refereed Articles:
Faculty Biographies


**Invited Lectures: 2020-21**

- **Virtual:**
  - Maroon JC. “From Icarus to Aequanimitas, Revisited.” Annual Neuro-Oncology Brain Tumor Symposium, Hospital of the University of Pennsylvania, October 30, 2021.
Maroon JC. “The Rx of Emotional and Behavioral Disorders Through the Eyes of a Brain Surgeon.” *Fridays with Friedlander* webcast, Department of Neurological Surgeons, University of Pittsburgh, Pittsburgh, Pa., March 5, 2021.


**Vincent J. Miele, MD**

*Clinical Associate Professor*

Vincent J. Miele, MD, joined the University of Pittsburgh Department of Neurosurgery as a clinical assistant professor on January 1, 2014 and was promoted to clinical associate professor in July of 2018. He is the former director of the neurosurgical spine service at West Virginia University. Dr. Miele received his undergraduate degree at Northeastern University in Boston where he graduated summa cum laude and was inducted into the Rho Chi Academic Pharmacy Honor Society as well as the Phi Kappa Phi Honor Society. He was also awarded the Northeastern University Alumni of the Year President’s Award in 2001. Dr. Miele completed medical school and his neurosurgical residency at West Virginia University where he was elected to the medical honor society Alpha Omega Alpha and won the Gandee-Massey Award based on academic achievement. He is fellowship-trained in complex spine surgery from Cleveland Clinic Foundation, where he remains adjunct faculty in the Spine Research Laboratory. Dr. Miele’s research has encompassed such areas as spinal biomechanics, concussion management and return to play, as well as accelerometer and MEMs technology translation into clinical applications. He has published more than 30 papers in refereed journals, authored 20 book chapters, and has presented scientific lectures both nationally and internationally. His research has lead to invited written editorials in prominent media such as the New York Times. He has been actively involved in the Congress of Neurological Surgeons, American Association of Neurological Surgery, and North American Spine Society and is an ad hoc reviewer for various journals. Dr. Miele’s major clinical interests embrace many aspects of neurosurgery, but are focused on spinal disorders including pathologies associated with degeneration and trauma, complex spinal instrumentation, revision spinal surgery, and spinal tumors. His areas of expertise include minimally invasive spine surgery and the newer motion preservation technologies as well as the larger surgeries required for conditions such as adolescent/adult spinal deformity and the multidisciplinary treatment of spinal tumors. Dr. Miele also has a strong background in cranial neurosurgery and treats peripheral nerve conditions such as carpal tunnel syndrome. Dr. Miele frequently evaluates and manages sports-related head and spine injuries, and works at a national level with athletes on return to play issues. He is involved in the development of devices used to detect and prevent concussion and is frequently invited to speak on this subject nationally. He also is an independent neurosurgical consultant for the National Football League and the Pittsburgh Steelers. He is licensed to practice in Pennsylvania, Ohio, and West Virginia and has established clinics in Coraopolis, Monroeville, Mt. Morris, Bethel Park, UPMC Mercy and Bridgeville in Pennsylvania.

**Specialized Areas of Interest**

Spinal disorders and injuries, spine tumors, revision spinal surgery, adult deformity/scoliosis surgery, sports-related brain and spine injuries, peripheral nerve disorders, and spinal fusions.

**Board Certifications**

American Board of Neurological Surgery
Faculty Biographies

Vincent J. Miele, MD

Hospital Privileges
UPMC Mercy
UPMC Presbyterian

Professional Organization Membership
Alpha Omega Alpha Medical Honor Society
American Association for the Improvement of Boxing
American Association of Neurological Surgeons
American Association of Professional Ringside Physicians
American College of Sports Medicine
Congress of Neurological Surgeons
International Federation of Sports Medicine
North American Spine Society
Ohio State Medical Society
Pennsylvania State Medical Society
United States Amateur Boxing Ringside Physicians
West Virginia State Medical Society

Education & Training
MD, West Virginia University, 2001
Residency, West Virginia University, 2007
Fellowship, Complex Spine, Cleveland Clinic, 2008

Editorial Service
• Editorial Board:
  World Neurosurgery

• Ad Hoc Reviewer:
  BioMed Central Neurology
  Clinical Neurology and Neurosurgery
  Journal of Neurology, Neurosurgery & Psychiatry
  Neurology India

Interdepartmental and Medical Center Activities
• Department of Neurological Surgery:
  Director, Neurosurgery Sports Fellowship

Honors and Awards
Best Faculty Teacher, University of Pittsburgh Department of Neurological Surgery, 2021
Pittsburgh’s Best Doctors, Pittsburgh Magazine, 2016-20

Publications: 2020-21
• Refereed Articles:

Faculty Biographies


Invited Lectures: 2020-21
• Virtual:

John J. Moossy, MD
Professor
Director, Center for Pain Management
Chief, Neurosurgery, VA Pittsburgh Healthcare System

John J. Moossy, MD, joined the faculty of the Department of Neurological Surgery at the University of Pittsburgh in 1986. He is now chief of neurosurgery at the Veterans Affairs Pittsburgh Healthcare System. He attended medical school at Tulane University, earning an MD degree in 1980. He completed a surgical internship and the residency program in neurosurgery at Duke University. Prior to that, he was an undergraduate student at Wake Forest University in Winston Salem, North Carolina, and at the University of Pittsburgh. His clinical practice is one of general neurosurgery with a special interest in the surgical management of medically intractable pain. Dr. Moossy's publications include 32 articles in refereed journals and nine book chapters.

Specialized Areas of Interest
The surgical treatment of intractable pain problems through neuro-augmentative and neuro-ablative procedures.

Board Certifications
American Board of Neurological Surgery

Hospital Privileges
Latrobe Area Hospital
UPMC Presbyterian
UPMC Shadyside
Veterans Affairs Pittsburgh Healthcare System

Professional Organization Membership
Allegheny County Medical Association
American Association of Neurological Surgeons (AANS)
American Medical Association
Carroll F. Reynolds History of Medicine Society
Ajay Niranjan, MD
Professor
Associate Director, Center for Image-Guided Neurosurgery
Director, Radiosurgery Research
Director, UPMC Brain Mapping Center

Dr. Niranjan received his medical training at the King George’s Medical College in Lucknow, India from 1980 to 1985, graduating with a bachelor of medicine and bachelor of surgery degree. Dr. Niranjan completed general surgery residency in 1989 and neurological surgery residency 1992. Dr. Niranjan joined the University of Pittsburgh as a fellow in image-guided neurosurgery in 1997 and completed his fellowship in 2000. He joined the faculty of neurological surgery in July of 2000. Dr. Niranjan’s major research interest is the analysis of clinical outcomes gamma Knife radiosurgery for tumors, vascular malformations and functional disorders of brain. His another research interest is in the development of pre-surgical brain mapping using magnetoencephalography (MEG). His other research interests include development of strategies to enhance the effect of radiosurgery on brain tumors. His laboratory has studied the radiobiological effects of radiation on brain-tumor microenvironment and has evaluated the effects of radiation on neural stem cells implantation in the brain.

Dr. Niranjan serves as principal investigator on the project: “Thalamic Segmentation using Advanced MR Imaging Techniques.” Dr. Niranjan has co-authored over 220 articles in refereed journals, over 175 book chapters and five books. His recent book, *Leksell Radiosurgery*—presenting an update on state-of-the-art radiosurgery technology, including outcomes—was published in May of 2019. He has contributed guidelines for stereotactic radiosurgery for trigeminal neuralgia, pituitary adenomas, arteriovenous malformation, acoustic tumors, and brain metastases. Dr. Niranjan is the director of UPMC Brain Mapping Center which houses a magnetoencephalography unit. MEG is performed for pre-surgical mapping of critical brain functions in patients with brain tumors and for localization of seizure focus in patients with long standing epilepsy.

**Specialized Areas of Interest**
Radiosurgery for benign and malignant brain tumors; radio surgery for brain vascular malformations; radiosurgery for functional brain disorders; pre-surgical brain mapping using MEG.

**Hospital Privileges**
UPMC Presbyterian
Ajay Niranjan, MD

Faculty Biographies

**Professional Organization Membership**
- American Clinical MEG Society
- Congress of Neurological Surgeons
- International Radiosurgery Research Foundation
- International Stereotactic Radiosurgery Society

**Education & Training**
- MBBS, King George's Medical College, 1985
- Residency, General Surgery, King George's Medical College, 1989
- Residency, Neurological Surgery, King George's Medical College, 1992
- Fellowship, University of Pittsburgh, 2000
- MBA, University of Pittsburgh, 2009

**Editorial Service**
- **Ad Hoc Reviewer:**
  - Gene Therapy
  - Expert Review of Neurotherapeutics
  - Interdisciplinary Neurosurgery: Advanced Techniques and Case Management
  - Journal of Neurosurgery
  - Neurology India
  - Neurosurgery
  - Radiation Oncology
  - Technology In Cancer Research And Treatment (TCRT)
  - World Neurosurgery
  - World-Science

**Interdepartmental and Medical Center Activities**
- **UPMC Presbyterian:**
  - Radiation Safety Committee
  - Director of Operations, UPMC Brain Mapping Center
  - Total Quality & Patient Safety Council
- **University of Pittsburgh:**
  - Radiation Safety Committee

**Professional Activities**
- Board Member, American Association of Neurological Surgeons
- Board Member, American Society for Radiation Oncology (ASTRO)
- Member, International Radiosurgery Research Foundation

**Honors and Awards**
- UPMC Excellence in Patient Experience, Physician and Medical Staff Honor Roll, 2017

**Publications: 2020-21**
- **Refereed Articles:**
Faculty Biographies


Invited Lectures: 2020-21

- Virtual:

David O. Okonkwo, MD, PhD

Professor
Director, Neurotrauma Clinical Trials Center
Director, Scoliosis and Spinal Deformity Program
Special Advisor, UPMC Enterprises

David Okonkwo, MD, PhD, is professor of neurological surgery and director of the Neurotrauma Clinical Trials Center at the University of Pittsburgh. He is also director of neurotrauma and the scoliosis and spinal deformity program at UPMC Presbyterian. Dr. Okonkwo is currently chair of the AANS/CNS Section on Neurotrauma and Critical Care. In addition, Dr. Okonkwo is a member of the medical staff for the Pittsburgh Steelers Football Club. Dr. Okonkwo completed his undergraduate work at the University of Virginia, where he was a Howard Hughes Undergraduate Biomedical Research Scholar. He completed his medical and doctoral education through the MD/PhD program of the Medical College of Virginia of Virginia Commonwealth University. He joined the University of Pittsburgh Department of Neurological Surgery in 2006 following completion of neurosurgical residency at the University of Virginia and a fellowship at Auckland Public Hospital in Auckland, New Zealand. He has additional specialized training in scoliosis surgery. Dr. Okonkwo’s clinical
interests are traumatic injuries to the brain and spine as well as scoliosis and spinal deformity. His research endeavors involve developing biomarkers, advanced neuroimaging modalities and novel therapeutic interventions for brain and spinal cord injury. Dr. Okonkwo is a principal investigator of a national clinical research network (TRACK-TBI) to advance our understanding and treatment of traumatic brain injury. He is also principal investigator of several ongoing clinical studies in neurotrauma in Pittsburgh. Dr. Okonkwo has published more than 275 papers in refereed journals, authored numerous book chapters, and garnered several awards for his scientific research. He is a member of the American Association of Neurological Surgeons, the Congress of Neurological Surgeons and the National and International Neurotrauma Societies.

Specialized Areas of Interest
Brain and spine trauma; scoliosis; spinal deformity; minimally invasive spine surgery; sports medicine; experimental therapies for brain and spinal cord injuries.

Board Certifications
American Board of Neurological Surgery

Hospital Privileges
UPMC Children’s Hospital of Pittsburgh
UPMC Mercy
UPMC Presbyterian

Professional Organization Membership
Alpha Omega Alpha Medical Honor Society
American Academy of Neurosurgery
American Association of Neurological Surgery
Congress of Neurological Surgeons
International Spine Study Group
National Neurotrauma Society
Society of Lateral Access Surgery

Education & Training
BA, Biology, University of Virginia, 1994
MD, Virginia Commonwealth University, 2000
PhD, Anatomy, Virginia Commonwealth University, 2000
Fellowship, Neurosurgery, Auckland Public Hospital, 2005
Residency, Neurosurgery, University of Virginia, 2006

Editorial Service
• Editorial Board:
  Therapeutic Hypothermia

• Ad Hoc Reviewer:
  Journal of Neurosurgery
  Journal of Neurotrauma
  Neurosurgery

Interdepartmental and Medical Center Activities
• UPMC Presbyterian:
  Trauma Medical Audit Committee
Faculty Biographies

David O. Okonkwo, MD, PhD

- **University of Pittsburgh:**
  Institutional Review Board

- **UPMC:**
  Enterprises, Special Advisor

**Honors and Awards**
Best Doctors in Pittsburgh, *Pittsburgh Magazine*, 2018-21

**Media Appearances: 2020-21**


**Publications: 2020-21**

- **Refereed Articles:**


Faculty Biographies

David O. Okonkwo, MD, PhD


• Invited Papers:

• Book Chapters:
Invited Lectures: 2020-21

• Local/Regional:

• Virtual:


  Okonkwo DO. "Long-Term Outcomes in Traumatic Brain Injury: implications for clinical trial design” International Neurotrauma Society Meeting, Melbourne, Australia, February 9, 2021.


• Visiting Professorships:


  University of Texas, Austin Neurosurgery Virtual Visiting Professor, Austin, Texas: “Precision Medicine in Traumatic Brain Injury.” October 13, 2020.


Eva F. Pamias-Portalatin, MD
Clinical Assistant Professor

Eva F. Pamias-Portalatin, MD, received her undergraduate degree at The University of Puerto Rico where she received a BS in biology and then completed her medical education at Universidad de Monterrey School of Medicine where she was an active member of altruistic organizations, graduating with honors and ranking at the top of her class. Following medical school, she completed a sub-internship year at The University of Texas and Methodist Health Care System in San Antonio, Texas and her neurosurgery residency at The University of Puerto Rico Medical Science Campus where she served as chief resident. While in residency she completed an enfolded research fellowship in brain tumors at The Johns Hopkins Hospital in Baltimore, Md. After the completion of her residency training, she completed a surgical fellowship in skull base, endoscopic and oncologic neurosurgery at The Mayo Clinic in Jacksonville, Fla. Dr. Pamias-Portalatin left the department in August of 2020.

Ian F. Pollack, MD
A. Leland Albright Distinguished Professor
Vice Chair, Academic Affairs
Chief, Pediatric Neurosurgery, UPMC Children's Hospital of Pittsburgh
Co-Director, Neurosurgical Oncology
Professor of Clinical and Translational Science

Ian Pollack, MD, is chief of pediatric neurosurgery at UPMC Children's Hospital of Pittsburgh, A. Leland Albright Professor of Neurosurgery at the University of Pittsburgh School of Medicine, and co-director of the Neurosurgical Oncology Program at the Hillman Cancer Institute. Prior to joining the faculty of the Department of Neurological Surgery at the University of Pittsburgh in 1992, he was awarded the 1991 Van Wagenen Traveling Fellowship, which afforded him a year of subspecialty training in the Department of Neurosurgery at the Hospital for Sick Children in Toronto, the Neuro-Oncology Laboratory of the University of Lausanne in Switzerland, and the Laboratory of Tumor Biology of the University of Uppsala in Sweden. Dr. Pollack graduated magna cum laude from Emory University in 1980, where he earned a BS degree in chemistry. He received his medical degree from the Johns Hopkins University School of Medicine in 1984, then completed a surgical internship and neurosurgical residency at the University of Pittsburgh School of Medicine. He also was a research fellow in neuropathology and neurobiology during some of that time. Dr. Pollack has published more than 380 papers in refereed journals, numerous book chapters and invited papers, and has edited three books on childhood brain tumors. He is co-editor of the book *Principles and Practice of Pediatric Neurosurgery*—currently in its third edition—and an accompanying atlas *Operative Techniques In Pediatric Neurosurgery* as well as *Brain and Spinal Tumors of Childhood*, a multinational state-of-the-art text. He is currently a principal investigator on NIH grants focusing on novel therapies for brain tumors, including immunotherapy in childhood brain tumors. Dr. Pollack was named vice chair of academic affairs for the department in July of 2008. He also chaired the Children’s Oncology Group CNS Tumor Committee from 1999-2009, and co-chaired the National Cancer Institute Brain Malignancy Steering Committee between 2010 and 2017. He is currently vice-chair of the American Board of Pediatric Neurosurgery and a director on the Accreditation Council for Pediatric Neurosurgery Fellowships.
Ian F. Pollack, MD

Faculty Biographies

Specialized Areas of Interest
Pediatric neurosurgery; pediatric neuro-oncology; craniofacial surgery; congenital spinal abnormalities; brain tumor clinical trials.

Board Certifications
American Board of Neurological Surgery
American Board of Pediatric Neurosurgery

Hospital Privileges
UPMC Children’s Hospital of Pittsburgh
UPMC Magee-Women’s Hospital
UPMC Presbyteran

Professional Organization Membership
Academy of Neurological Surgeons
Alpha Omega Alpha
American Academy of Pediatrics
American Association for the Advancement of Science
American Association for Cancer Research
American Association of Neurological Surgeons (AANS)
American College of Surgeons
American Society for Pediatric Neurosurgery
American Society for Clinical Investigation
Association of American Physicians
Children’s Oncology Group
Congress of Neurological Surgeons
John Hopkins Medical and Surgical Society
Joint Section on Tumors (AANS/CNS)
Phi Beta Kappa
Society of Neurological Surgeons
Society for Neuro-Oncology
Society of Surgical Oncology

Education & Training
BS, Chemistry, Emory University, Magna cum Laude, 1980
MD, Johns Hopkins University School of Medicine, 1984
Fellowship, University of Pittsburgh, 1990
Residency, University of Pittsburgh, 1991
Fellowship, Hospital for Sick Children, 1991
Fellowship, University of Lausanne, 1991
Fellowship, University of Uppsala, 1992

Editorial Service
• Editorial Board:
ASCO-PLWC
Child’s Nervous System

Interdepartmental and Medical Center Activities
• University of Pittsburgh:
Director, Pediatric Neuro-Oncology Laboratory
• **University of Pittsburgh Cancer Institute:**
  Co-Director, Brain Tumor Program

• **UPMC Children’s Hospital of Pittsburgh:**
  Co-Director, Pediatric Neuro-Oncology Tumor Board
  Perioperative Executive Committee

**Professional Activities**
Pediatric Brain Tumor Consortium:
  Institutional PI
  Steering Committee
  Executive Committee
  Chair, Translational Biology Committee
Institutional PI, Hydrocephalus Clinical Research Network
Institutional PI, Synostosis Research Group
Vice-Chair, American Board of Pediatric Neurological Surgery
Director, Accreditation Council for Pediatric Neurosurgery Fellowships

**Honors and Awards**
Pittsburgh’s Best Doctors, *Pittsburgh Magazine*, 2012-21
Joan Venes Lectureship, University of Michigan, 2019
Albert Nelson Marquis Lifetime Achievement Award, Marquis *Who’s Who*, 2018
Castle Connolly’s America’s Top Doctors, 2002-21
*Who’s Who in America*, Marquis, 2005-20
*Who’s Who in the World*, Marquis, 2008-20
Castle Connolly’s America’s Top Cancer Doctors, 2005-21
Certificate of Appreciation for BMSC Co-chairship, National Cancer Institute, 2017
E. Bruce Hendrick Visiting Professor in Pediatric Neurosurgery, University of Toronto, 2016
Columbia Softball Charity Award, American Association of Neurological Surgeons Annual Meeting, 2016
Children’s Brain Tumor Foundation, Award for Scientific Excellence, 2016
Winn Prize, Society of Neurological Surgeons, 2015
Van Wagenen Lecturer, American Association of Neurological Surgeons Annual Meeting, 2014

**Publications: 2020-21**
• **Refereed Articles:**


Faculty Biographies


Faculty Biographies

Ian F. Pollack, MD


• Letters to the Editor:


• Books:

• Book Chapters:


• Published Abstracts:


**Invited Lectures: 2020-21**

- **Virtual:** Pollack IF. “The Evolving Role of Surgery and Molecular Profiling for Childhood Brain Tumors,” *Fridays with Friedlander* webcast, Department of Neurological Surgery, University of Pittsburgh, Pittsburgh, Pa., April 9, 2021.

Daniel R. Premkumar, PhD
Research Assistant Professor

Prior to joining the faculty of the Department of Neurological Surgery at the University of Pittsburgh in 2008, Daniel R. Premkumar, PhD, was a senior scientist at a biotechnology company. He graduated from Madurai Kamaraj University in India where he earned his masters and doctorate degrees. Dr. Premkumar then completed his post-doctoral training at Case Western Reserve University in Cleveland. Dr. Premkumar has published more than 50 papers in refereed journals and has been awarded patents to characterize protein-protein interaction biosensors for cellular systems biology profiling. He is currently examining the efficacy of promising various receptor inhibitors, for inhibiting glioma proliferation in vitro, using genotypically diverse panel of malignant glioma cell lines to identify potential genotype-response associations.

Specialized Areas of Interest
Major research emphasis is directed towards understanding the molecular mechanisms of receptor tyrosine kinase inhibition and signaling in malignant human glioma cell lines.

Professional Organization Membership
American Association for Cancer Research
American Society of Pharmacology and Experimental Therapeutics

Education & Training
BS, Biology, Madura College, 1982
MS, Animal Sciences, Madurai Kamaraj University, 1984
PhD, Entomology, Madurai Kamaraj University, 1990

Editorial Service
• Editorial Board:
  Journal of Neurology and Neurosciences
  Journal of Neurology and Neurosurgery

• Ad Hoc Reviewer:
  Carcinogenesis
  Journal of Cellular Physiology
  Molecular Carcinogenesis
  PLoS ONE

Publications: 2020-21
• Refereed Articles:
Ava Puccio, RN, PhD  
Assistant Professor  
Co-Director, Neurotrauma Clinical Trials Center

Ava M. Puccio, RN, PhD, is an assistant professor in the department of neurological surgery and also co-director of the Neurotrauma Clinical Trials Center in collaboration with David O. Okonkwo, MD, PhD. Dr. Puccio received her bachelor of science degree in neuroscience in 1988 and bachelor degree in nursing in 1994, both from the University of Pittsburgh. In 1995, she joined the Department of Neurological Surgery as a nurse coordinator on the National Acute Brain Injury Study: Hypothermia (NABIS:H) study and also the coordinator for the Brain Trauma Research Center. Throughout her years of employment as a nurse coordinator, she pursued part-time advanced schooling to graduate with a master’s degree in nursing from the University of Pittsburgh in 2000 and as a university scholar (top 2% of class) from the University of Pittsburgh School of Nursing with a doctoral degree, emphasis in neuroscience in 2008. Her dissertation, “Effect of short periods of normobaric hyperoxia on local brain tissue oxygenation and cerebrospinal fluid oxidative stress markers in severe traumatic brain injury” was published in the *Journal of Neurotrauma* in 2009. Dr. Puccio was appointed assistant professor in the Department of Neurological Surgery at the University of Pittsburgh in 2010 and received her adjunct faculty position with The School of Nursing, Department of Acute/Tertiary Care in 2010 with collaborations with Yvette Conley, PhD and Richard Henker, RN, PhD. Her research has focused on improving outcomes in traumatic brain injury patients, with clinical venues of controlled normothermia, mechanisms of brain oxygenations and exploring genetic variances and expression on outcome and was awarded a K99/R00 NINR grant in 2014, entitled “Transcriptomics in Traumatic Brain Injury: Relationship to Brain Oxygenation and Outcomes.” With over 25 years of clinical trial design, involvement and management, several traumatic brain and spine injury research studies have been completed and are ongoing. Many cutting-edge biomarker and high definition fiber tracking imaging and additional observational research studies are being conducted. Dr. Puccio is very involved in the Transforming Research and Clinical Knowledge in TBI (TRACK-TBI) consortium and was awarded a Department of Defense grant as PI of the Biospecimen Repository which collects, catalogues and stores cerebrospinal fluid, blood, serum DNA and RNA samples obtained from mild, moderate and severe TBI patients at 17 clinical sites. Analyses from these samples has provided additional validation to the recent FDA-approval of the use of 2 biomarkers, glial fibrillary acidic protein (GFAP) and ubiquitin C-terminal hydrolase L1 (UCH-L1) obtained within 12 hours of a suspected TBI in determining the need for a brain CT scan, and is the central PI of the biorepository for a FDA-pivotal trial with Abbott Laboratories which is ongoing. The success of this biorepository has also spring-boarded opportunities to acquire additional ongoing grant support this year through the DoD, as the biorepository for the biomarkers in the Brain Oxygenation Optimization Study Trial (Bio-BOOST), as well as TRACK-TBI Geriatric Initiative (NIH funded) to further define the elderly TBI cohort and TRACK Precision Medicine. Dr. Puccio is a member of the Neurocritical Care Society, the Society of Critical Care Medicine, and the National and International Neurotrauma Society.

**Specialized Areas of Interest**  
Traumatic brain injury research.

**Board Certifications**  
RN License: Pennsylvania

**Hospital Privileges**  
UPMC Mercy  
UPMC Presbyterian
Ava Puccio, RN, PhD

Professional Organization Membership
- Eastern Nursing Research Society
- National Neurotrauma Society
- Neurocritical Care Society
- Sigma Theta Tau International Nursing Honor Society
- Society of Critical Care Medicine
- Women in Neurotrauma Research (WINTR)/Training, Education and Mentoring (TEAM)

Education & Training
- BS, Neuroscience, University of Pittsburgh, 1988
- BSN, Nursing, University of Pittsburgh, 1994
- MSN, Nursing, University of Pittsburgh, 2000
- PhD, Nursing/Neuroscience, University of Pittsburgh, 2008

Editorial Service
- Ad Hoc Reviewer:
  - Neurocritical Care
  - Pediatric Critical Care
  - Society of Critical Care Medicine
  - State of the Science Congress on Nursing Research
  - Therapeutic Hypothermia and Temperature Management

Interdepartmental and Medical Center Activities
- UPMC Presbyterian:
  - Nursing Neuroscience Critical Care Course, UPMC
  - Annual residents’ training for TBI Management and Mayfield Technique
- University of Pittsburgh:
  - Co-Director, Neurotrauma Clinical Trials Center
  - Mentor for one medical student; one doctoral of nursing student and two post-doctoral fellows.

Professional Activities
- Guest Lecturer, Pathophysiology Across the Lifespan, Nursing Graduate Course, University of Pittsburgh
- Ad Hoc Grant Reviewer NIH/NINDS, Copeland Foundation Grant Committee, University of Pittsburgh
- Abstract Reviewer, Professor Walk Rounds, National Neuroscience Society, Society of Critical Care Medicine, Safar Symposium, University of Pittsburgh
- Biomarker Working Group, TRACK-TBI, University of California, San Francisco
- Working Group, Genetic Associations in Neurotrauma (GAIN) Consortium
- Biomarker Working Group, International TBI Research (InTIBIR)
- Executive and Steering Committee, TRACK-TBI, University of California, San Francisco

Honors and Awards
- Cold Spring Harbor Scholarship, 2012
- Ruth Perkins Kuehn Nursing Research Award, 2011
- Cameos of Caring Nursing Scholarship, 2007
- Society of Critical Care Nursing Section Award, 2006
Faculty Biographies

**Ava Puccio, RN, PhD**

**Publications: 2020-21**

- Refereed Articles:


**Invited Lectures: 2020-21**
  • Virtual:

**Rodwan K. Rajjoub, MD**

*Clinical Assistant Professor*

*Neurosurgery Director, UPMC Susquehanna*

Rodwan K. Rajjoub, MD, joined UPMC Susquehanna in March of 2017 after 38 years in private practice. He served his residency at George Washington University and the National Institute of Health after receiving his medical degree and undergraduate degree from Damascus University in Syria. He is married, a father of five physicians and enjoys playing tennis in his spare time.

**Specialized Areas of Interest**

Brain tumor; spinal disorders; peripheral nerves.

**Board Certifications**

American Board of Neurological Surgery, Diplomate

**Hospital Privileges**

Divine Providence Hospital
Evangelical Community Hospital
Jersey Shore Hospital
Muncy Valley Hospital
Williamsport Regional Medical Center

**Professional Organization Membership**

American Association of Neurological Surgeons
American College of Surgeons
Congress of Neurological Surgeons
Pennsylvania Medical Society
Mid-Atlantic Neurosurgical Society
Pennsylvania Neurological Society
Lycoming County Medical Society

**Education & Training**

BA, (Physics, Chemistry, Biology), Damascus University, 1967
MD, Damascus University, 1972
Residency, George Washington University, 1979

**Honors and Awards**

Continuing Education Award, American Association of Neurological Surgeons, 2019
Michael J. Rutigliano, MD
Clinical Associate Professor
Director, Westmoreland County Community Neurosurgery

Michael J. Rutigliano, MD, MBA, was appointed to the University of Pittsburgh faculty in 1996. An active staff member of the University of Pittsburgh Medical Center, Dr. Rutigliano lives in Greensburg, Pa., and the primary focus of his clinical practice is in Westmoreland County at the hospitals of the Excela Health System through a cooperative venture between UPMC and Excela Health. His clinical interests include a wide range of neurosurgical diseases, focusing mostly in the areas of spinal and peripheral nerve disorders, and concussion and other sports-related injury. Surgical procedures performed include simple spinal surgery such as lumbar and cervical discectomy, laminectomies for spinal stenosis, and more complex spinal reconstructive surgery for spondylolisthesis and scoliosis. Common peripheral nerve surgery includes carpal tunnel release and ulnar neurolysis. He received his medical degree in 1989 from the University of Pittsburgh School of Medicine. Following an internship in general surgery, he completed residency training in neurological surgery at the University of Pittsburgh Medical Center. During this time, he also obtained an MBA from the Katz Graduate School of Business. Dr. Rutigliano’s academic expertise is in medical economics and cost-effectiveness analysis. He was awarded the Pittsburgh Academy of Medicine Study Scholarship and was honored by the Stroke Council of the American Heart Association with a scholarship for research in cerebrovascular disease. Dr. Rutigliano has retired from the United States Army Reserve and has served in support of Operation Iraqi Freedom at Walter Reed Medical Center from April to July 2003, and in Balad, Iraq from October 2007 to February 2008.

Specialized Areas of Interest
Spinal disorders; peripheral nerve disorders.

Board Certifications
American Board of Neurological Surgery

Hospital Privileges
Lattrobe Area Hospital
UPMC East
UPMC Presbyterian
Westmoreland Hospital

Professional Organization Membership
American Association of Neurological Surgeons
AANS/CNS Joint Section on Spine and Peripheral Nerve
Congress of Neurological Surgeons

Education & Training
BS, Chemistry, University of Pittsburgh, 1985
MD, University of Pittsburgh, 1989
MBA, Joseph Katz School of Business, University of Pittsburgh, 1994
Residency, Neurosurgery, University of Pittsburgh, 1996

Interdepartmental and Medical Center Activities
• University of Pittsburgh:
   Neurosurgery Compensation Committee
Robert J. Schlegel Jr., MD, with over 30 years of experience as a neurosurgeon, joined the University of Pittsburgh Department of Neurological Surgery in April of 2018. He completed his residency at the University of Maryland Medical Center in Baltimore and has a medical degree from the University of New Mexico, Albuquerque.

Board Certifications
American Board of Neurological Surgery

Hospital Privileges
UPMC Pinnacle

Professional Organization Membership
American Association of Neurological Surgeons
American College of Surgeons

Education & Training
MD, University of New Mexico
Residency, University of Maryland

Raymond F. Sekula Jr., MD, MBA, a native of western Pennsylvania, is vice chair of UPMC Central Pa., professor of neurological surgery at the University of Pittsburgh and director of UPMC’s Cranial Nerve and Brainstem Disorders program. He is also director of the department’s residency program. Dr. Sekula is a graduate of Pittsburgh’s Central Catholic High School, the University of Virginia with a degree in classics, the Georgetown University School of Medicine with a degree in medicine, and Carnegie Mellon University with a degree in business administration. An internationally renowned expert in minimally invasive brain surgery, Dr. Sekula performs more than 500 operations each year for patients throughout the United States and beyond for the most complex neurologic disorders. Dr. Sekula has performed more than 2,000 procedures for patients with trigeminal neuralgia, hemifacial spasm, and other cranial neuralgias. Last year, he performed more than 200 operations for patients with cranial neuralgias and 50 operations for patients with brain tumors of all types. He is an expert in minimally invasive brain and spine surgery and has developed techniques in brain surgeries of all types that reduce patients’ hospital stays to one or two days without the need for the intensive care unit after the procedure. Dr. Sekula has been honored with numerous awards including the Young Investigator Award from the American Association of Neurological Surgeons (2009), the Allen Humphrey Excellence in Mentoring Award at the University of Pittsburgh School of Medicine (2016), Pittsburgh Magazine’s
Raymond F. Sekula Jr., MD

“40 under 40” and “Best Doctors” Awards, a UPMC Champion of Nursing Award, UPMC’s ACES Award (2018), the Young Investigator Award from the Congress of Neurological Surgeons (2018), and the University of Pittsburgh School of Medicine Faculty Teaching Award (2021). He has been twice awarded the Department’s annual faculty teaching award. In addition to his clinical and administrative duties at the University of Pittsburgh, Dr. Sekula oversees a preclinical laboratory studying fundamental mechanisms of facial pain, which has recently received funding through the National Institutes of Health. He has published more than 100 scientific articles and is a coeditor of the textbook Microvascular Decompression Surgery, a comprehensive look at MVD surgery, widely accepted as an effective remedy for cranial nerve hyperexcitability disorders including hemifacial spasm, trigeminal neuralgia, and glossopharyngeal neuralgia. Dr. Sekula’s international outreach includes co-founding the World Federation of Cranial Nerve Disorders in 2016. He is a member of the medical advisory board of the Facial Pain Association, an international association dedicated to helping patients with facial pain of all types. In 2015, he traveled to Kazakhstan to help advise the structure of the Republican Scientific Center of Neurosurgery in Astana. In 2015, he was the honored guest of La Sociedad Ecuatoriana de Neurocirugia of South America.

Specialized Areas of Interest
Minimally invasive brain and spine surgery; trigeminal neuralgia; hemifacial spasm; brain and skull base tumors.

Board Certifications
American Board of Neurological Surgery

Hospital Privileges
UPMC Hamot
UPMC Mercy
UPMC Passavant
UPMC Presbyterian
UPMC Shadyside

Professional Organization Membership
Allegheny County Medical Society
American Association of Neurological Surgeons
AANS/CNS Section of Pain
Congress of Neurological Surgeons
Facial Pain Association
Hemifacial Spasm Association
Medical Advisory Board of TNA
Pennsylvania Neurosurgical Society
The Facial Pain Association
Trigeminal Neuralgia Association
World Neurosurgeon Federation of Cranial Nerve Disorders

Education & Training
BA, Classics, University of Virginia, 1994
MD, Georgetown, 2000
Residency, Pediatric Neurosurgery, Children’s Hospital of Pittsburgh, 2004
Residency, Neurosurgery, Allegheny General Hospital, 2006
Fellowship, Microvascular & Skull Base Surgery, 2006
MBA, Carnegie Mellon University, 2009
Raymond F. Sekula Jr, MD

Faculty Biographies

Editorial Service
- Editorial Board:
  Portal

- Ad Hoc Reviewer:
  Neurosurgery Journal
  Journal of Neurology, Neurosurgery, and Psychiatry
  Journal of Pain Research
  World Neurosurgery

Honors and Awards
Faculty Teaching Award, University of Pittsburgh School of Medicine, 2021
Best Doctors in Pittsburgh, Pittsburgh Magazine, 2016-21
UPMC ACES Award, 2018
UPMC Champion of Nursing Nomination, 2017
SANS Challenge Finalist, Congress of Neurological Surgeons, 2017
Faculty Teaching Award, Department of Neurological Surgery, 2014-2015, 2015-2016
Allen L. Humphrey Excellence in Mentoring, University of Pittsburgh School of Medicine, 2016

Media Appearances: 2020-21
“Allegheny Co. Woman Gets Life-Saving Diagnosis After Multiple Car Crashes In Year,” KDKA-TV2 Evening News, February 1, 2021.

Publications: 2020-21
- Refereed Articles:
Faculty Biographies

Nilkantha Sen, PhD
Associate Professor

Nilkantha Sen, PhD, joined the University of Pittsburgh Department of Neurological Surgery in March of 2017 as an associate professor. After graduating from Indian Institute of Chemical Biology, he joined Johns Hopkins University in 2010 as a post-doctoral fellow and later joined Georgia Regents University in 2012. While at the University of Pittsburgh, Dr. Sen studied the underlying molecular and cellular mechanisms responsible for numerous secondary mechanisms associated with traumatic brain injury. Dr. Sen left the department in June of 2021.

Tanusree Sen, PhD
Research Assistant Professor

Tanusree Sen, PhD, earned her BSc degree in chemistry and MSc degree in biochemistry from Calcutta University in 1998 and 2000. She also earned a PhD in brain aging from Calcutta in 2006. In 2012, Dr. Sen joined Augusta University as a postdoctoral fellow and extended her expertise of cellular-molecular biology in the field of immunology, autoimmunity, and traumatic brain injury. In 2015, Dr. Sen worked as a research assistant professor at the University of Georgia studying the mechanism of diet-induced vagal nerve injury specifically in the context of the gut-microbiota-inflammation-brain axis. Her research interest at the University of Pittsburgh dealt with traumatic brain injury before leaving the department in February of 2021.

Mingui Sun, PhD
Professor

Mingui Sun, PhD, received a BS degree in instrumental and industrial automation in 1982 from the Shenyang Chemical Engineering Institute in Shenyang, China, and an MS degree in electrical engineering in 1986 from the University of Pittsburgh, where he also earned a PhD degree in electrical engineering in 1989. He was later appointed to the faculty in the Department of Neurological Surgery. Dr. Sun’s research interests include neurophysiological signals and systems, biosensor designs, brain-computer interface, bioelectronics and bioinformatics. He has more than 460 publications.

Specialized Areas of Interest
Biomedical engineering; biomedical instrumentation; biomedical signal processing, computational neurophysiology, image and video processing; computer-assisted neurosurgery and diagnosis.

Professional Organization Membership
American Institute for Medical and Biological Engineering
Institute of Electrical and Electronics Engineers
IEEE Engineering in Medicine and Biology Society
IEEE Circuit and Systems Society

Education & Training
BS, Instrumentation/Industrial Automation, Shenyang Chemical Institute, 1982
MS, Electrical Engineering, University of Pittsburgh, 1986
PhD, Electrical Engineering, University of Pittsburgh, 1989
Faculty Biographies

Mingui Sun, PhD

Editorial Service

• Editorial Board:
  Journal of Healthcare Engineering

• Ad Hoc Reviewer:
  National Institutes of Health
  National Science Foundation
  University Grants Committee (Hong Kong)

Professional Activities
Fellow, American Institute of Biological and Medical Engineers (AIBME)
Technical Committee, Biomedical and Life Science Systems, Circuit and Systems Society, IEEE

Publications: 2020-21

• Refereed Articles:

• Online:

Fadi Sweiss, MD

Clinical Assistant Professor

Fadi Sweiss, MD, joined the University of Pittsburgh Department of Neurological Surgery in August of 2020, practicing at UPMC Williamsport in north central Pennsylvania. Dr. Sweiss specializes in the diagnosis and treatment of degenerative, traumatic, and oncologic spinal conditions using traditional, open surgical techniques and advanced, minimally invasive techniques. Dr. Sweiss received his medical degree from Northeast Ohio Medical University, Rootstown, Ohio, and completed his residency in neurosurgery at George Washington University Hospital, Washington, D.C. “As long as I can remember, I’ve wanted to be a doctor,” said Sweiss. “My brother is a neurosurgeon and the field fascinated me. I enjoy being able to care for and build relationships with my patients. It never ceases to amaze me how the proper care can transform and change a patient’s life and that’s what it is all about for me.”
Specialized Areas of Interest
Complex spine disorders; adult spine revision surgery and deformity correction, cervical, thoracic and lumbar surgery; neurotrauma.

Hospital Privileges
UPMC Williamsport

Education & Training
BS, Biology, Virginia Tech, 2006
MD, Northeast Ohio Medical University, 2013
Residency, George Washington University, 2020

Parthasarathy D. Thirumala, MD
Professor
Director, Center of Clinical Neurophysiology

Parthasarathy D. Thirumala, MD, joined the Center of Clinical Neurophysiology in June 2008. He specializes in intraoperative neurophysiological monitoring to adult and pediatric neurosurgical, orthopedic, ENT, vascular and interventional neuroradiology procedures. Dr. Thirumala completed his neurology residency and clinical neurophysiology fellowship training at the University of Pittsburgh Medical Center. He completed his internship in internal medicine training at Brookdale University Hospital and Medical Center in Brooklyn, N.Y. Prior to clinical training he completed his masters degree in biomedical engineering at the University of Illinois at Chicago. Dr. Thirumala completed his medical training in India at Stanley Medical College in Chennai, India. His clinical and research interests include intraoperative neurophysiological monitoring during expanded endonasal approach, functional cortical mapping during awake craniotomies, ICU EEG. He has published over 90 peer reviewed articles, book chapters, and invited articles in the journals including JAMA, Neurology, Neurology, Neurosurgery, Journal of Neurosurgery, and Journal of Clinical Neurophysiology. He has given lectures both nationally and internationally on the value of intraoperative neurophysiological monitoring.

Specialized Areas of Interest
Intraoperative neurophysiological monitoring; functional cortical mapping during awake craniotomies; neurophysiological monitoring during minimally invasive endonasal approach to skull base surgeries, electroencephalography in the intensive care unit.

Board Certifications
American Board of Clinical Neurophysiology: Intraoperative Monitoring
American Board of Neuroimaging
American Board of Neurophysiologic Monitoring
American Board of Psychiatry and Neurology

Hospital Privileges
Jameson Hospital
Monongahela Valley Hospital
UPMC Children’s Hospital of Pittsburgh
UPMC Hamot
UPMC Horizon
UPMC Magee-Womens Hospital
UPMC Mercy
UPMC Passavant
Parthasarathy D. Thirumala, MD

Faculty Biographies

UPMC Presbyterian
UPMC St. Margaret
UPMC Shadyside

Professional Organization Membership
American Academy of Neurology
American Association of Neuromuscular and Electrodiagnostic Medicine
American Clinical Neurophysiology Society
American Epilepsy Society
American Medical Association
American Society of Neuroimaging
American Society of Neuromonitoring
America’s Registry of Outstanding Professionals
North American Spine Society

Education & Training
MBBS, Stanley Medical College, 1997
MS, University of Illinois, Bioengineering, 2001
Residency, Neurology, University of Pittsburgh, 2006
Fellowship, Clinical Neurophysiology, University of Pittsburgh, 2007

Editorial Service
• Ad Hoc Reviewer:
  American Journal of Electroneurodiagnostic Technology
  Brain and Behavior
  European Neurology
  Frontiers in Neuroscience
  Journal of Biomedical and Health Informatics present
  Journal of Clinical Computation and Research
  Journal of Clinical Neurophysiology
  Journal of Neurological Surgery Part B
  Journal of Neurology, Neurosurgery and Psychiatry
  PLOS One
  Neurohospitalist
  Neurological Research
  Neurology
  Scientific Reports
  Transactions on Neural Systems and Rehabilitation Engineering

Professional Activities
Co-Course Director, Principles and Practice of Intraoperative Monitoring, UPMC, November 2020.

Publications: 2020-21
• Refereed Articles:


**Invited Lectures: 2020-21**

- Virtual:

Daniel A. Wecht, MD, MSc
Clinical Professor
Chief, Neurosurgery, UPMC McKeesport
Chief, Neurosurgery, UPMC St. Margaret
Chief, Neurosurgery, UPMC Shadyside

Daniel A. Wecht, MD, joined the Department of Neurological Surgery as a clinical assistant professor in September of 1999. He was promoted to clinical associate professor in 2002 and full clinical professor in 2008. He was born and raised in Pittsburgh. After graduating from Harvard University, Dr. Wecht attended medical school at the University of Pennsylvania. He completed his neurosurgery residency at Baylor College and then completed a two-year neurovascular surgery fellowship at Yale University School of Medicine. He was board-certified with the American Board of Neurological Surgery in 2000 and was recertified in 2010. Dr. Wecht specializes in the treatment of brain tumors and cerebrovascular diseases such as stroke, aneurysms and vascular malformations. He also has an active spine and general neurosurgery practice. He has co-authored or authored several articles and publications. Dr. Wecht has been a neurosurgical faculty member at Yale University, University of New Mexico and Allegheny University of the Health Sciences (Pittsburgh, Pa.). He is an active participant in multiple professional and scientific societies. He is licensed to practice in Pennsylvania and New Mexico.

Specialized Areas of Interest
Vascular neurosurgery (aneurysms and vascular malformations); brain tumors; spinal and peripheral nerve microsurgery; trigeminal neuralgia, chiari malformation and hydrocephalus.

Board Certifications
American Board of Neurological Surgery

Hospital Privileges
UPMC McKeesport
UPMC Presbyterian
UPMC St. Margaret
UPMC Shadyside

Professional Organization Membership
AANS/CNS Joint Section on Cerebrovascular Surgery
AANS/CNS Joint Section on Trauma
American Association of Neurological Surgeons

Education & Training
AB, Anthropology, Harvard University, 1985
MS, Anthropology, University of Pennsylvania, 1989
MD, University of Pennsylvania, 1995
Residency, Baylor College of Medicine, 1995
Fellowship, Neurovascular, Yale University, 1997

Professional Activities
Team Neurosurgeon, The Pittsburgh Penguins Hockey Club
Fang-Cheng Yeh, MD, PhD
Assistant Professor
Director, High-Definition Fiber Tractography Lab

Fang-Cheng (Frank) Yeh, MD, PhD, joined the Department of Neurological Surgery in 2016 as a tenure-track assistant professor. Prior to joining the faculty at the University of Pittsburgh, Dr. Yeh received his MD degree from National Taiwan University and completed his PhD study in biomedical engineering at Carnegie Mellon University in 2014. Dr. Yeh is currently working on diffusion MRI and its role as image biomarkers for neurological and psychiatric disorders. His research focuses on novel applications of computational methods to brain connectome research, a challenging field with a lot of known unknowns and unsolved questions that require extensive technological development. He has developed several diffusion MRI methods and applied them to both clinical and translational studies. Dr. Yeh is known for his development of DSI Studio, an integrated platform for diffusion MRI analysis, fiber tracking, and 3D tractography visualization. In 2020 alone, DSI Studio facilitated more than 100 peer-reviewed publications. DSI Studio provides the core technique for “high accuracy fiber tracking,” which has been widely used by many research groups to investigate how major fiber pathways are affected by neurological and psychiatric diseases. In an open competition sponsored by the International Society for Magnetic Resonance in Medicine (ISMRM) in 2015, Dr. Yeh’s method achieved the highest valid connection score (92.49%, ID:03) among 96 different approaches submitted by a total of 20 groups from around the world.

Specialized Areas of Interest
Diffusion MRI, tractography, network analysis, medical image analysis, pathology informatics.

Professional Organization Membership
International Society for Magnetic Resonance in Medicine

Education & Training
MD, National Taiwan University, 2006
PhD, Biomedical Engineering, Carnegie Mellon University, 2014

Editorial Service
• Ad Hoc Reviewer:
  Journal of Magnetic Resonance Imaging
  Neuroimage
  Neurosurgery

Interdepartmental and Medical Center Activities
• UPMC Presbyterian:
  Advisory Board, MR Research Center, Department of Radiology

Honors and Awards
Chancellor’s Commercialization Fund Award, Pitt Ventures First Gear Program, University of Pittsburgh, 2019

Publications: 2020-21
• Refereed Articles:
  Banihashemi L, Peng CW, Verstynen T, Wallace ML, Lamont DN, Alkhars HM, Yeh FC, Beene
  ney JE, Aizenstein HJ, Germain A. Opposing relationships of childhood threat and depriva


### Virtual Presentations:


Georgios A. Zenonos, MD
Assistant Professor
Associate Director, Center for Cranial Base Surgery

Georgios A. Zenonos, MD, joined the University of Pittsburgh Department of Neurological Surgery as associate director of Center for Cranial Base Surgery in July of 2019 after having received extensive formal sub-specialization in the field. He is one of a handful of neurosurgeons to have completed two fellowships in skull base surgery, one focusing on endoscopic and minimally invasive approaches at the University of Pittsburgh, and another focusing on complex cranial neurosurgery and cerebrovascular neurosurgery at the University of Miami with the renown Jacques J. Morcos, MD, and Roberto C. Heros, MD.

Dr. Zenonos completed his internship, residency and chief residency in neurosurgery at the University of Pittsburgh from 2011-18. During this time, he received several distinctions and awards, including an award for achieving the highest score in the nation on the American Board of Neurological Surgery written exam. Other awards include the Robert J. Dempsey Award by the CNS/AANS Joint Cerebrovascular Section, the University of Pittsburgh Stuart N. Rowe Research Award, first place in the North American Skull Base Society knowledge competition, and four Walter L. Copeland Awards for cranial research. In addition, Dr. Zenonos has published extensively, has given numerous presentations nationally and internationally, and has been frequently invited as a scientific reviewer by prominent neurosurgical journals. Before residency, Dr. Zenonos, a native of Greece, graduated as valedictorian from the University of Athens School of Medicine in Greece, which he attended with a scholarship from the Ministry of Education. Winning the Alexander S. Onassis Award, he then pursued a basic science post-doctoral research fellowship at Harvard Medical School to study the mechanisms of programmed cell death. “I understand that having to see a neurosurgeon, or needing a neurosurgical procedure has to be one of the most frightening experiences in someone’s life,” Dr. Zenonos says. “My goal is to always provide the best care possible for each and every one of my patients, one that utilizes the latest technologies and techniques, and one that is founded by evidence-based medicine – the same care I would want for my family, my friends, or myself. Putting myself in the patient’s shoes, and understanding the unique difficulties they are facing is always step one.”

Dr. Zenonos’ research interests include genetics of skull base tumors; surgical anatomy (refinement of skull base approaches, and surgical technique); skull base outcomes research; and high-definition fiber tactography.

Specialized Areas of Interest
Endoscopic endonasal neurosurgery; minimally invasive neurosurgery; skull base tumors; skull base pathology; neuro-oncology; cerebrovascular neurosurgery; cranial nerve disorders; radiosurgery.

Board Certifications
American Board of Neurological Surgery (board eligible)

Hospital Privileges
UPMC Altoona
UPMC Children’s Hospital of Pittsburgh
UPMC Hamot
UPMC Mercy
UPMC Presbyterian
UPMC Shadyside
Georgios A. Zenonos, MD

**Professional Organization Membership**
American Association of Neurological Surgeons  
American Medical Association  
Congress of Neurological Surgeons  
North American Skull Base Society  
Alexander S. Onassis Scholars Society

**Education & Training**
MD, National & Kapodistrian University of Athens School of Medicine, 2002-08  
Post-Doctoral Research Fellowship, Harvard Medical School, 2009-10  
Residency, neurological surgery, UPMC, 2011-18  
Fellowship, Minimally Invasive, and Open Skull Base Neurosurgery, University of Pittsburgh, 2015-17  
Fellowship, Complex Skull Base and Cerebrovascular Neurosurgery, University of Miami, 2019

**Editorial Service**
- Ad Hoc Reviewer:  
  *American Journal of Rhinology & Allergy*  
  *Archives of Case Reports in Clinical Medicine*  
  *British Medical Journal-Case Reports*  
  *Computer Methods in Biomechanics and Biomedical Engineering*  
  *Interdisciplinary Neurosurgery: Advanced Techniques and Case Management*  
  *Journal of Brain and Spine Cancer*  
  *Journal of Neurosurgery*  
  *Laryngoscope*  
  *Melanoma Research*  
  *Neurosurgery*  
  *Operative Neurosurgery*  
  *Scott Becker Reviews/Becker Healthcare*  
  *World Journal of Surgical Oncology*  
  *World Neurosurgery*

**Professional Activities**
Proctor, Anatomy of the Skull Base, Cranial Nerves, Dura and Venous Sinuses Hands-On Anatomical Workshop, First-Year Medical Students, University of Pittsburgh School of Medicine.  
Director, Neurosurgery Preceptorship Program, University of Pittsburgh School of Medicine.  
Director, Integrated Life Sciences Neurosurgery and ENT Dissection Course, Fourth-Year Medical Students.  
Supervisor, PGY7 neurosurgery resident in the operating room, outpatient office, and ward rounds.  
Supervisor, PGY2 neurosurgery resident in the operating room, outpatient office, and ward rounds.  
Supervisor, skull base fellows in the operating room, outpatient office, ward rounds, and clinical and anatomical research.

**Community Activities**
Online Education Subcommittee, Member, American Association of Neurological Surgeons

**Honors and Awards**
Best Basic Science Abstract, NASBS meeting, 2021 (senior author)  
Best Neurosurgical Fellow Teacher Award, University of Miami, 2019
First Place, North American Skull Base Society Jeopardy Knowledge Competition, 2018

p clinical abstract presentation shortlist, North American Skull Base Society Annual Meeting, 2018

The Walter L. Copeland Award for Cranial Research, 2012-13, 2015, 2017
Runner-Up Presentation Award, Stuart N. Rowe Society Lectureship, 2017
Best Presentation Award, Stuart Rowe Society Lectureship, 2016
Award for achieving the highest score in the nation, ABNS Primary Examination, 2016
Chordoma Foundation Travel Scholarship, 2016
Robert J. Dempsey Joint AANS/CNS Cerebrovascular Section Award, 2015
3rd Best Abstract – Stereotactic and Functional Section, American Association of Neurological Surgery Annual Scientific Meeting, 2014
Alexander S. Onassis Award, 2010
Valedictorian, National and Kapodistrian University of Athens, School of Medicine, 2008
National Scholarship Foundation Award: 2003-08
Baronos Award for Excellence in Pharmacology, 2005
Ministry of Education Scholarship, 2002-08
First ranking graduate, Military Officer Academy, 2001
National Physics Olympiad Prize, 2000

Publications: 2020-21
• Refereed Articles:


• Published Abstracts:

• Virtual Presentations:

Zenonos GA. "Aggressive and conservative cavernous sinus case discussion." Microsurgery for Cerebrovascular Disease and Skull Base Tumors: An International Interactive Lecture Series, Department of Neurological Surgery, University of Miami, July 16, 2020.

Zenonos GA. "The current state-of-the-art in the treatment of pituitary disease." Department of Neurological Surgery Webinar Series, University of Pittsburgh School of Medicine, July 17, 2020.


Zenonos GA. Moderator: Moderator: Molecular and translational advances in skull base tumors. The Path to Successful career as a surgeon-scientist. The Ins and outs, ups and downs of doing it right both ways. AANS Front Row Series, June 2, 2021.

Invited Lectures: 2020-21

• Virtual:

• Local/Regional:
  - Zenonos GA. “Layers of the head.” Grand Rounds, Department of Neurological Surgery, University of Pittsburgh School of Medicine, Pittsburgh, Pa., March 3, 2021.

Pascal O. Zinn, MD, PhD

Assistant Professor
Associate Director, Adult Neurosurgical Oncology
Director, Molecular Tumor Biology and Personalized Precision Therapy Lab
Director, Neurosurgical Oncology Tissue Bank

Pascal O. Zinn, MD, PhD, joined the University of Pittsburgh Department of Neurological Surgery in 2019. He is an assistant professor and director of the adult neurosurgical oncology program. Dr. Zinn has undergone subspecialty training in tumor biology and neurosurgical oncology at the Dana-Farber Harvard Cancer Institute and the MD Anderson Cancer Center in state-of-the-art, patient-tailored treatment paradigms. At UPMC Hillman Cancer Center, Dr. Zinn is the principal investigator of a molecular biology laboratory, studying approaches in personalized tumor treatments and patient care. Dr. Zinn strongly believes in the individuality of every patient and is an expert in patient-tailored treatment approaches throughout the course of diagnosis (imaging/biopsy), possible surgical tumor removal/medical management, and follow-up. Dr. Zinn likes spending time with his patients and their families walking them through this seemingly complex treatment course through discussion, counseling, and review of evidence-based medicine approaches, thus reaching the very best—and most personalized—comprehensive treatment plan.

Specialized Areas of Interest
Neurosurgical oncology; brain, skull base, and spinal cord tumors; personalized precision care for brain and spinal tumor patients; laser ablation treatment for brain tumors.

Hospital Privileges
UPMC Hamot
UPMC Hillman Cancer Center
Faculty Biographies

Pascal O. Zinn, MD, PhD

UPMC Mercy
UPMC Presbyterian
UPMC Shadyside

Professional Organization Membership
American Association of Neurological Surgeons
Congress of Neurological Surgeons
CNS/AANS Joint Tumor Section
Glioma Society
Society for Neuro-Oncology

Education & Training
MD, University of Zurich, Switzerland, 2007
Research Fellowship, Dana-Farber Cancer Institute, Harvard Medical School, 2019
PhD, University of Lausanne, Switzerland, 2012
Research Fellowship, MD Anderson Cancer Center, University of Texas, 2015
Neurosurgery Residency, Baylor College of Medicine and MD Anderson Cancer Center, 2019

Editorial Service
• Ad Hoc Reviewer:
  BMC Cancer
  Journal of Neuro-Oncology
  Journal of Neurosurgery
  Neuro-Oncology
  Neurosurgery
  New England Journal of Medicine
  World Neurosurgery

Professional Activities
Young Neurosurgeons Co-Chair, AANS and CNS Tumor Section, 2020-2022

Honors and Awards
Kinjiro Iwata Award for excellence and leadership in residency training, Baylor College of Medicine, 2019
Caroline Ross Endowed Fellowship for outstanding achievements and dedication in the field of brain cancer research, MD Anderson Cancer Center, 2018
Rosenblum-Mahaley Clinical Research Award, Congress of Neurological Surgeons, 2018
Resident Award, Congress of Neurological Surgeons, 2018
Runner-Up Oral Platform Presentation Competition, Texas Association of Neurological Surgeons Annual Meeting, 2017
National Brain Tumor Society Mahaley Award, Congress of Neurological Surgeons, 2016
Kinjiro Iwata Academic Award, Baylor College of Medicine, 2016
Journal of Neuro-Oncology Award, Congress of Neurological Surgeons, 2015
William R. Cheek Award, Texas Children’s Hospital, 2015
Best Oral Platform Presentation Award, American Society of Neuroradiology, 2015
Best Scientific Poster Award, American Society of Functional Neuroradiology, 2014
Kinjiro Iwata Academic Award, Baylor College of Medicine, 2013
Best Scientific Poster Award, American Society of Functional Neuroradiology, 2013
Travel Award, European Association of Neurological Surgeons, 2013
Best Oral Platform Presentation Award, American Society of Neuroradiology, 2012
Journal of Neuro-Oncology Award, Congress of Neurological Surgeons, 2012
The Thomas H. and Mayme P. Scott Fellowship in Cancer Research Award, 2012
Poster Award, MD Anderson Brain Tumor Center Retreat, 2011
First Prize, Clowes Visiting Professor Research Competition, Beth Israel Deaconess Medical Center, Harvard Medical School, 2010
Cold Spring Harbor Course on Brain Tumors Scholarship, American Brain Tumor Association, 2010
Swiss National Science Foundation two-year fellowship, Harvard Medical School, 2009
Socrates-Erasmus Scholarship, 2004
Acceptance to Swiss Army Special Forces: Honors in Marksmanship, Combat, Commando, and Fit Test, 2000

Media Appearances

Publications: 2020-21
• Refereed Articles:


David S. Zorub, MS, MD
Clinical Professor
Director, Neuro-Intensive Care, UPMC Shadyside

David S. Zorub, MD, joined the faculty of the University of Pittsburgh Department of Neurological Surgery in May of 2014. Dr. Zorub was born in Lebanon and immigrated to the United States at the age of nine. He grew up in Hot Springs, Ark., where he received his primary education. Dr. Zorub received his undergraduate degree from Tulane University College of Arts and Sciences, graduating summa cum laude with a major in history. His subsequent education was at Tulane University School of Medicine where he received his medical degree cum laude and a masters of science in neuroanatomy. Post-graduate education was at Duke University Medical Center where he completed his internship and residency in neurologic surgery. While at Duke he did a special postdoctoral fellowship for the Veteran’s Administration and did research at the Institute of Physiology in Pisa, Italy. Upon completion of training at Duke University Medical Center, Dr. Zorub came to the University of Pittsburgh
and Presbyterian University Hospital where he served as director of residency education and director of stereotactic surgery. He subsequently relocated to Shadyside Hospital and Foundation in 1979 and has served as director of neurosurgery, and subsequently as chief of neurosurgery from January 1979 to September 2014 and director of neuro-intensive care until June 30, 2019. Dr. Zorub served as chief of surgery at Shadyside Hospital from July 1993 to August 31, 2009. Dr. Zorub also functioned as vice president of clinical affairs for Shadyside Hospital for seven years and his responsibilities included the clinical oversight of the merger agreement with UPMC Presbyterian for the Shadyside Board of Trustees as well as serving as vice president overseeing medical staff services, infection control, informatics and process improvement and quality management. He has also been active in organized medicine, having served as president of the Allegheny County Medical Society, chair of its board of trustees, and chair of the ACMS Foundation Board of Trustees. Dr. Zorub continues to be active clinically at UPMC Shadyside. He has served in numerous positions at the hospital, participating in essentially all facets of the institution. His areas of expertise include brain tumors, pituitary microsurgery, cranial nerve disorders like trigeminal neuralgia, hemifacial spasm, treatment for benign and malignant disease and spine surgery. He also specializes in peripheral nerve disorders, having trained under Barnes Woodhall, MD.

**Specialized Areas of Interest**

Brain tumors; pituitary microsurgery; cranial nerve disorders; hemifacial spasm; spine surgery; peripheral nerve surgery; pain management.

**Board Certifications**

American Board of Neurological Surgery

**Hospital Privileges**

UPMC Cancer Center
UPMC Presbyterian
UPMC Shadyside

**Professional Organization Membership**

American Association of Neurological Surgeons
American Association for Stereotactic Surgery
American Medical Association
Congress of Neurological Surgeons
Pennsylvania Medical Society
Pennsylvania Neurosurgical Society

**Education & Training**

MS, Anatomy, Tulane University, 1970
MD, Tulane University, 1970
Residency, Duke University, 1970-76
Fellowship, University of Pisa, 1974
Fellowship, Duke University, 1974
Maroon Receives Clinician of Courage Award

In August of 2020, Joseph Maroon, MD, Heindl Scholar in Neuroscience at the University of Pittsburgh, received the 2020 UPMC Clinician of Courage Award. The award is presented to a UPMC physician who is thriving and/or serving as a leader within their community after having faced and overcome adversity.

In the 1970s, at the age of 41, Dr. Maroon was a world-class neurosurgeon at then Presbyterian University Hospital in Pittsburgh. However, a rapid series of losses and setbacks—including a failed marriage, the death of his father and career burnout—led Dr. Maroon to quit neurosurgery. He was forced to move back to his mother’s West Virginia farmhouse to help handle the heavily mortgaged truck stop left behind by his late father.

“One day I was doing brain surgery at Pitt, and the next week I was flipping hamburgers and filling up 18-wheelers at a truck stop,” Dr. Maroon recently told a Pittsburgh Tribune Review reporter. “I’m in this farmhouse, at a truck stop, and I’m wondering, ‘How did I get here?’ I just had no idea how to get out.”

His ‘unexpected savior’ was the William Danforth book I Dare You! which advocated the proper balance of four key areas—health, spirituality, work and personal relationships—in establishing a strong, successful life. He credits this book with helping reshape his life and rebuilding his medical practice.

Dr. Maroon eventually returned to the world stage as a leading neurosurgeon, specializing in minimally invasive surgery of the spine and brain for over 40 years. He is a nationally-acclaimed expert in sports medicine and innovator in concussion management, personal fitness and nutrition, publishing numerous scientific articles on the subjects. He has guested on countless talk shows and serves as a consultant for such organizations as the National Football League and World Wrestling Entertainment.

He has maintained an active lifestyle, competing in numerous Iron Man competitions and climbing Mt. Kilimanjaro in Africa.

Dr. Maroon chronicled his personal story of hard-learned life lessons in his own book Square One: A Simple Guide to a Balanced Life which takes a look at the keys to establishing a proper ‘balance in life.’

He has also authored other health-related books, including Fish Oil: The Natural Anti-Inflammatory—a look at the health effectiveness of this natural anti-inflammatory supplement—and The Longevity Factor: How Resveratrol and Red Wine Activate Genes for Longer and Healthier Life—an examination of the benefits of natural substances found in red wine.

To further honor Dr. Maroon, UPMC announced that in coming years the courage award would be renamed the ‘Joseph Maroon Clinician of Courage Award’ for future award winners.
Hussam Abou-Al-Shaar, MD
PGY-3 Resident

Hussam Abou-Al-Shaar, MD, received his medical degree from Alfaisal University College of Medicine in Riyadh, Saudi Arabia where he graduated summa cum laude, valedictorian and the top of his class. During medical school, Dr. Abou-Al-Shaar spent several years in the neurogenetics lab studying the genetics and novel therapeutic treatments for Parkinson’s disease patients. After graduating from medical school, Dr. Abou-Al-Shaar completed 10 months of post-doctoral research fellowship in the Department of Neurosurgery at the University of Utah and a year of neurosurgery internship at Hofstra Northwell School of Medicine in New York. Dr. Abou-Al-Shaar is an avid researcher with deep interest in skull base and cerebrovascular neurosurgery. To date, he has published over 120 peer-reviewed articles and 25 book chapters and has spoken at several national and international conferences, with over 70 oral and poster presentations. He is also the section editor on two published books, most recently the tumor section in Neurosurgery Case Review: Questions and Answers, published by Thieme Publishing in January of 2020. He edited The Surgical Handbook, published by Thieme Publishing in July of 2020. Dr. Abou-Al-Shaar is actively involved in teaching medical students interested in neuroscience and neurosurgery. His hobbies outside of neurosurgery include soccer, tennis, and traveling.

Specialized Areas of Interest
Skull base, cerebrovascular neurosurgery, and gamma knife radiosurgery.

Professional Organization Membership
American Association of Neurological Surgeons
American Medical Association
Congress of Neurological Surgeons

Education & Training
MD, Alfaisal University College of Medicine, 2017

Editorial Service
• Editorial Board:
  EC Neurology Journal

  • Ad Hoc Reviewer:
    Cureus
    Neurosurgery Journal
    Operative Neurosurgery
    World Neurosurgery Journal
    Surgical Neurology International

Honors and Awards
Finalist, The Virginia Kaufman Pain Research Challenge, 2021
Best Resident Teacher, Department of Neurosurgery, Northwell Health, 2018-19.
Summa Cum Laude and Valedictorian, Alfaisal University 2017
Academic Dean’s List Scholarship, Alfaisal, 2010-17
Best Poster Presentation, Alfaisal University Annual Research Day Poster Competition, 2015 & 2016
Best Surgical Clerkship Student, PORCHE Award, King Faisal Specialist Hospital and Research Centre, 2013
Teacher of the Year, Alfaisal University, 2012
Resident Biographies

Hussam Abou-Al-Shaar, MD

Publications: 2020-21

• Refereed Articles:


Resident Biographies

Hussam Abou-Al-Shaar, MD

- Books:

- Book Chapters:

- Published Abstracts:

- Virtual Presentations:


• Presentations:


Nitin Agarwal, MD

Chief Resident

Nitin Agarwal, MD, joined the University of Pittsburgh Department of Neurological Surgery residency program in July of 2014. Prior to matriculating into the residency program, Dr. Agarwal received his doctor of medicine from Rutgers New Jersey Medical School. His funded research activities focus on improving patient education to optimize patient outcomes. To date, he has published over 235 peer-reviewed articles and 14 book chapters and has spoken at several regional and national conferences, with over 150 oral and poster presentations. His health literacy related research has been published in several high impact factor journals including JAMA Internal Medicine and featured by prominent healthcare-oriented news outlets such as Reuters Health. He is also the co-editor of the book The Evolution of Health Literacy: Empowering Patients through Improved Education. In October of 2018, his multi-contributor guide for aspiring neurosurgeons, Neurosurgery Fundamentals, was released by Thieme Medical Publishers. Dr. Agarwal also maintains an active role in organized neurosurgery advocating for medical student and patient education. His article entitled “Improving Medical Student Recruitment into Neurological Surgery” was featured online by the American Association of Neurological Surgeons. He was appointed as a member of the Young Neurosurgeons Committee of the American Association of Neurological Surgeons (AANS) and serves as sections division coordinator and Top Gun Competition chair. He was also selected as a Council of State Neurological Societies socioeconomic fellow and continues to serve as a past resident fellow mentor as well as an alternate delegate appointee of the Congress of Neurological Surgeons (CNS). In addition, he is an advocate for philanthropic support and has been placed on the board of directors of the Neurosurgery PAC, as a young neurosurgeon member, and served as a resident liaison for the Neurosurgery Research and Education Foundation. In the fall of 2018, he was selected to be a part of the CNS Resident Fellows program for the 2019-20 term. Prior to completing his residency at the University of Pittsburgh in June of 2021, Dr. Agarwal completed an enfolded fellowship in sports medicine as well as a minimally invasive and complex spine surgery. He plans to complete further training in this subspecialty through a fellowship at the University of California, San Francisco before heading to Washington Hospital in St. Louis. Outside of neurological surgery, Dr. Agarwal is deeply dedicated to martial arts, specifically the disciplines of Taekwondo, Krav Maga, and Jiu-Jitsu.
Resident Biographies

Nitin Agarwal, MD

Specialized Areas of Interest
Scoliosis and complex spinal deformity; minimally invasive spine surgery; traumatic brain and spinal cord injury; patient education and outcomes research; socioeconomic policy in organized neurosurgery.

Professional Organization Membership
American Association of Neurological Surgeons
American Association of South Asian Neurosurgeons
Congress of Neurological Surgeons
Council of State Neurological Societies
International Society for the Advancement of Spine Surgery
Society for Minimally Invasive Spine Surgery
Society of Lateral Access Surgery
North American Spine Society

Education & Training
BS, Biology, The College of New Jersey, 2010
MD, Rutgers, The State University of New Jersey, 2014

Editorial Service
• Ad Hoc Reviewer:
  Journal of Neurosurgery
  Neurosurgery
  Operative Neurosurgery
  The Spine Journal
  World Neurosurgery

Honors and Awards
Resident Teaching Award, Department of Neurological Surgery, 2021
Branch Research Award, AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves, 2021
Scoliosis Research Society North American Meeting Scholarship for Residents and Fellows, 2021
Young Surgeon Grant, International Society for the Advancement of Spine Surgery, 2021
University of Pittsburgh School of Medicine Distinguished Junior Mentor Award, 2020
Neurosurgery Research and Education Foundation Travel Grant, European Association of Neurosurgical Societies Spine Training Course, 2020
Congress of Neurological Surgeons Resident Fellow, 2019-2020
Young Surgeon Grant, Society for Minimally Invasive Spine Surgery Annual Forum, 2019
Young Investigator Award, Annual Society of Lateral Access Surgery Meeting, 2019
First Place History E-poster Award, American Association of Neurological Surgeons Annual Scientific Meeting, 2019
Young Surgeon Travel Grant, Annual Meeting: State of Surgery Think Tank, 2019
Socioeconomics, Health Policy, & Law Top Paper of the Year, Congress of Neurological Surgeons Annual Meeting, 2018
Journalistic and Academic Neurosurgical Excellence (J.A.N.E.) Award, AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves, 2018
Socioeconomic E-poster Award, First Place, AANS Annual Scientific Meeting, 2017
Charlie Kuntz IV Scholar Award, Spine Summit Outstanding Abstract, 2016
Peter W. Carmel, MD, Award in Neurological Surgery, 2014
Kenneth G. Swan, MD, Memorial Award, NJMS Student Affairs, 2014
NJMS Alumni Association Grant, 2011
Richard Pozen and Ann Silver Pozen Community Scholar, 2011
Nitin Agarwal, MD

Resident Biographies

Armstrong Engineering Scholarship Award, 2007
Oval Society Award, Community Service Distinction, 2007

Publications: 2020-21
• Refereed Articles:
Nitin Agarwal, MD

Resident Biographies


- **Book Chapters:**

- **Virtual Presentations:**

Resident Biographies

Invited Lectures: 2020-21
• National:

• Virtual:
  Agarwal N. “Education is Everything. A Chief Resident’s Perspective,” Fridays with Friedlander webcast, Department of Neurological Surgery, University of Pittsburgh, Pittsburgh, Pa., October 2, 2020.

Prateek Agarwal, MD, MBA
PGY-1 Resident

Prateek Agarwal, MD, MBA, joined the University of Pittsburgh Department of Neurological Surgery residency program in July 2020 after earning a dual MD/MBA degree from the Perelman School of Medicine and Wharton School at the University of Pennsylvania. At the Perelman School of Medicine, he was elected into the Alpha Omega Alpha Honor Medical Society and received the Spencer Morris Prize, the School of Medicine’s highest academic honor. Prior to medical and business school, he graduated summa cum laude and Phi Beta Kappa from Harvard University in 2015 with a Bachelor of Arts degree in molecular and cellular biology and secondary field in economics. During medical school, Dr. Agarwal conducted clinical neurosurgical research with an emphasis on employing system-level interventions to improve patient outcomes while reducing costs. Specifically, he investigated the use of behavioral economics principles to reduce neurosurgical postoperative infections and implant costs, which was awarded the 2018 Neurosurgery Paper of the Year in Socioeconomics, Health Policy, and Law, and evaluated the association of overlapping neurosurgery with patient outcomes at Penn Medicine. He also performed translational research on injectable hydrogels for intervertebral disc regeneration, supported by the Neurosurgery Research and Education Foundation (NREF) Medical Student Summer Fellowship. His undergraduate basic neuroscience research in olfaction resulted in publications in Nature Neuroscience and Nature Communications. Dr. Agarwal is active in organized neurosurgery and was elected to serve a four-year term on the Young Neurosurgeons Committee (YNC) beginning in 2021. Previously, he served as the 2018 YNC MISSION Fellow. He is also passionate about entrepreneurship and co-founded the medical device startup Sanguis, which won 1st place at the 2018 Penn Wharton Entrepreneurship Startup Challenge. Dr. Agarwal was born and raised in New Jersey. Outside of neurosurgery, he enjoys aviation, water polo, swimming, tennis, and spending time with his fiancée, family, and friends.

Specialized Areas of Interest
Endovascular neurosurgery; open cerebrovascular neurosurgery; skull base neurosurgery; complex spine surgery; minimally invasive spine surgery; spinal biomechanics; clinical outcomes research; socioeconomics in neurosurgery; organized neurosurgery; health services research; health policy; medical device entrepreneurship.

Professional Organization Membership
Alpha Omega Alpha
American Association of Neurological Surgeons
American Medical Association
Congress of Neurological Surgeons

Education & Training
AB, Molecular and Cellular Biology, Harvard University, 2015
Resident Biographies

Prateek Agarwal, MD, MBA

MD, Perelman School of Medicine at the University of Pennsylvania, 2020
MBA, Health Care Management, The Wharton School at the University of Pennsylvania, 2020

Honors & Awards
Spencer Morris Prize, Perelman School of Medicine, 2020
Palmer Scholar, The Wharton School, 2020
Alpha Omega Alpha, Perelman School of Medicine, 2019
Neurosurgery Paper of the Year in Socioeconomics, Health Policy, and Law, 2018
MISSION Fellowship, Young Neurosurgeons Committee, 2018
Department of Neurosurgery Research Prize, Perelman School of Medicine, 2017
NREF Medical Student Summer Fellowship, 2016
Guggenheim Family Neurosurgery Scholarship, Perelman School of Medicine, 2016
Summa Cum Laude, Harvard University, 2015
Phi Beta Kappa, Harvard University, 2015

Publications: 2020-21
• Refereed Articles:


Nima Alan, MD

Chief Resident

Nima Alan, MD, joined the University of Pittsburgh Department of Neurological Surgery residency program in July of 2015. Prior to matriculating into the residency program, Dr. Alan received his doctorate of medicine with distinction in research and teaching from Case Western Reserve University School of Medicine in Cleveland, Ohio. Dr. Alan has over 40 peer-reviewed journal publications and more than 60 poster and oral presentations in regional, national and international meetings. Dr. Alan’s research interests are in neurophysiology and monitoring, spinal cord injury and spine trauma, deformity surgery, advanced neuroimaging of the spinal cord, spine oncology and stereotactic radiosurgery, and sports medicine. Dr. Alan is interested in diversification of neurosurgery residency training, initiating elective rotations in spine stereotactic radiosurgery, and sports neurosurgery. Dr. Alan has secured funding from national organizations. In 2017, he received a grant from the Society of Lateral Access Surgeons (SOLAS) to study the utility of motor-evoked potential in lateral lumbar interbody fusion. In 2020, he was awarded the Young Investigator Grant (Clinical) by the North America Spine Society (NASS) for the study of quantitative anisotropy in patients with cervical spondylotic myelopathy. Dr. Alan has also worked on industry-sponsored projects. In 2018, he was sub-investigator in a study funded by Zimmer-Biomet to evaluate the application of ROSA robot in minimally-invasive intraparenchymal hematoma evacuation. The study has been published in *World Neurosurgery*, and the *Journal of Clinical Neuroscience*. In 2020, Dr. Alan began a study as sub-investigator funded by Nuvasive to study computational prediction model of global sagittal alignment after spine surgery. This study is ongoing. During his chief residency year, Dr. Alan completed an enfolded fellowship in complex spine surgery at the University of Pittsburgh Medical Center. Subsequently, he plans to complete further training in a minimally invasive deformity surgery fellowship at the Barrow Neurological Institute. He will complete his training in June 2023. Outside
of neurological surgery, Dr. Alan is interested in literary fiction, domestic and international travel, fitness, tennis, and snowboarding.

**Specialized Areas of Interest**
Deformity spine surgery; minimally invasive spine surgery; scoliosis; spine oncology, sports medicine.

**Professional Organization Membership**
- American Academy for Advancement of Science
- American Association of Neurological Surgeons
- American Stroke Association
- Congress of Neurological Surgeons
- North American Spine Society

**Education & Training**
- MD, Case Western Reserve University, 2015
- BA, Physiology, University of British Columbia

**Honors and Awards**
- Mayfield Clinical Science Award, AANS/CNS Spine Summit, 2020
- Travel Award, Nuvasive Spine Foundation, 2020
- CSNS Socioeconomic Fellow, 2019
- Travel Award, Nuvasive Spine Foundation, 2019
- Journalistic and Academic Neurosurgical Excellence Award (coauthor), AANS/CNS Spine Summit, 2018
- Abstract Presentation Award (coauthor), AANS/CNS Spine Summit, 2018
- Seed Grant, Society of Lateral Access Surgeons, 2017
- Charlie Kuntz Scholar Award (coauthor), AANS/CNS Spine Summit, 2016
- Distinction in Research, Case School of Medicine, 2015
- Distinction in Teaching, Case School of Medicine, 2015
- Travel Award (AANS conference), Case School of Medicine, 2014
- Travel Award (AANS conference), Cleveland Clinic Foundation, 2014
- Medical Student Research Fellowship, American Academy of Neurology, 2013
- Best Medical Student Abstract Award, 81st AANS 2013 Conference, 2013
- Best Medical Student Abstract Award, 80th AANS 2012 Conference, 2012
- Best Poster in Molecular & Cell Biology, Am. Assoc. for Advanc. of Science, 2012
- Best Poster in Physical Medicine and Rehabilitation, Cureus Poster Competition, 2012
- Dean's Summer Research Award, Case School of Medicine, 2011
- Best Poster, Master's Level, Canadian Health Research Institute, 2010
- Research Assistant Professional Development Award, University of British Columbia, 2010
- Top Student in Neurophysiology, University of British Columbia, 2009
- Bachelor's Degree with Distinction, University of British Columbia, 2009
- Undergraduate Student Research Award, Natural Sciences Research Council, 2007
- Trek Excellence Scholarship, University of British Columbia, 2007
- Wai-Man Leung Memorial Bursary, University of British Columbia, 2007
- Summer Scholarship, University of British Columbia, 2006
- President's Entrance Scholarship, University of British Columbia, 2005
- Dean's Honor List, University of British Columbia, 2005-09
Ali Alattar, MD, MAS
PGY-2 Resident

Ali Alattar, MD, MAS, joined the University of Pittsburgh Department of Neurological Surgery residency program in July of 2019 after graduating from University of California, San Diego School of Medicine. While at UCSD, Dr. Alattar invested in additional training in clinical and biomedical research and earned a master of advanced studies in clinical research. Dr. Alattar studied biochemistry at Portland State University and graduated summa cum laude with a bachelor of science degree. Dr. Alattar cultivated an interest in neuro-oncology outcomes, especially regarding the impact of extent of surgical resection on survival and developed a novel biomarker platform for diagnosis of glioblastoma, during medical school. In residency, Dr. Alattar has continued to develop his interest in neuro-oncology and is also building his clinical expertise in spine surgery and deformity, skull base, and open and endovascular neurosurgery. Dr. Alattar’s research interests have grown from big data, cost-effectiveness, artificial intelligence, and machine learning to include the application of augmented reality to image-guidance and development of unique biomarkers and molecular therapeutics in the diagnosis and treatment of intracranial aneurysms. He hopes to contribute to new cancer registries, develop clinical decision support systems, and discover genetic risk factors and molecular subtypes of disease. Dr. Alattar was born, raised, and attended college in Portland, Ore. before moving to San Diego for medical school. In his free time, he enjoys reading novels, cooking, hiking, running, and weightlifting.

Specialized Areas of Interest
Neuro-oncology, skull base neurosurgery, open and endovascular neurosurgery, and spine surgery and correction of deformity.

Professional Organization Membership
American Association of Neurological Surgeons
Congress of Neurological Surgeons
Society for Neuro-Oncology

Education & Training
BS, Biochemistry, Portland State University, 2014
MAS, University of California San Diego, 2019
MD, University of California San Diego, 2019

Editorial Service
• Ad Hoc Reviewer:
  Journal of Neurosurgery
  World Neurosurgery

Honors and Awards
Clinical Research Fellowship, UC San Diego School of Medicine, 2017-2018
National Institutes of Health Summer Research Training Grant, 2015
Summa Cum Laude, Portland State University, 2014
Award for Outstanding Performance in General Chemistry, Organic Chemistry, and Biochemistry, Portland State University, 2011-13
Building Our Future Scholarship Award, Portland State University, 2010-11
Hanna Algattas, MD  
PGY-5 Resident

Hanna Algattas, MD, joined the University of Pittsburgh Department of Neurological Surgery residency program in June of 2016 after graduating from the University of Rochester School of Medicine. He previously graduated from summa cum laude from Colgate University with a degree in cellular neuroscience with high honors. Prior to matriculation to medical school, Dr. Algattas worked at the National Institute of Neurological Disorders and Stroke (NINDS). Dr. Algattas has been involved in research regarding traumatic brain injury (TBI) pathophysiology and management, Chronic Traumatic Encephalopathy (CTE), open and endoscopic skull base surgery, cost-effectiveness, and outcome improvement after cranial and spinal surgery. He currently is involved in research regarding complex endoscopic endonasal skull base surgery, neuro-oncology, neurotrauma, and traumatic brain and spinal cord injury. Dr. Algattas was born and raised in Syracuse, N.Y. Interests outside neurosurgery include weightlifting, squash, professional sports, and crossword puzzles.

**Specialized Areas of Interest**
Skull base neurosurgery; expanded endoscopic endonasal approaches; spine deformity surgery; traumatic brain injury; spinal cord injury; sports medicine neurosurgery.

**Professional Organization Membership**
- American Association of Neurological Surgeons
- American Medical Association
- Congress of Neurological Surgeons
- Young Neurosurgeon’s Committee of AANS

**Education & Training**
- BA, Cellular Neuroscience, Colgate University, 2012
- MD, University of Rochester Medical School, 2016

**Editorial Service**
- Ad Hoc Reviewer:  
  *World Neurosurgery*

**Honors and Awards**
- Joseph C. Maroon Aequanimitas Award, Department of Neurological Surgery, 2021
- Neuroscience Research Foundation/Heindl Foundation Research Grant, NRF, 2020
- Young Neurosurgeons Forum Oral Presentation, AANS, 2015
- Office of Medical Education Research Award, University of Rochester SOM, 2013
- James M. Maury MD Endowed Scholarship, Colgate University, 2012
- Elias J. Audi Scholarship, Colgate University, 2012
- Charles A. Dana Scholar, Colgate University, 2012
- Dr. Leo Speno Health Sciences Prize, Colgate University, 2012
- William K. Edmonton Neuroscience Award, Colgate University, 2012

**Publications: 2020-21**
- Refereed Articles:
Resident Biographies


- **Book Chapters:**

- **Published Abstracts:**

- **Virtual Presentations:**


- **Presentations:**
  Algattas H, Abou-Al-Shaar H, Mendelson M, Arnold G, Woerner A, Jenkins L, Drewes S, Greene S. "Familial Cerebral Cavernous Malformation Syndrome with Concomitant Fourth Ventricular Ependymoma: True Association or Mere Coincidence?" American Association of Neurological Surgeons Annual Meeting, Accepted.
Residents Biographies


Edward Andrews, MD
PGY-5 Resident

Edward G. Andrews, MD, began his residency with the University of Pittsburgh Department of Neurosurgery in July of 2016. Dr. Andrews attended the University of Pennsylvania, graduating summa cum laude in 2009 with a degree in neuroscience and ancient Egyptian studies. He subsequently earned his medical degree from Sidney Kimmel Medical College at Thomas Jefferson University in 2016, graduating magna cum laude. During his medical school career, he directed the Future Docs High School Program, a pipeline program aimed at exposing underrepresented minority high school juniors and seniors to different career choices in healthcare fields. He also organized and participated in the primary tutoring services on campus, helping medical students struggling with course material and clinical rotations. His research interests include neuroimmunologic changes in mild traumatic brain injury and immunotherapeutic approaches to glioblastomas. He also has an avid interest in resident and medical student education.

Specialized Areas of Interest
Neuro-oncologic neurosurgery.

Professional Organization Membership
American Association of Neurological Surgeons
American Board of Neurological Surgery
American Medical Association
Congress of Neurological Surgeons

Education & Training
BA, University of Pennsylvania, 2005-09
MD, Sidney Kimmel Medical College, 2012-16

Interdepartmental and Medical Center Activities
• UPMC Presbyterian:
  Founder, Alba Tull Center for Advancing Neuroimaging and Neurotherapeutics

Honors and Awards
e-Poster Award, Pediatric Neurosurgery, AANS Annual Meeting, 2018
Physician Champion of Nursing Award, University of Pittsburgh, 2018
William F. Keller Prize, Sidney Kimmel Medical College, 2016
Dean’s List, University of Pennsylvania, 2006-09

Hansen Deng, MD
PGY-2 Resident

Hansen Deng, MD, joined the University of Pittsburgh Department of Neurological Surgery residency program in July of 2019. Dr. Deng graduated with distinction from the University of California San Francisco School of Medicine, where he was elected into the Alpha Omega Alpha Honor Medical Society. He completed his undergraduate degrees in oil-painting and biology at the University of California Berkeley, where he was elected into the Phi Beta
Resident Biographies

Hansen Deng, MD

Kappa Society. Traumatic brain injury (TBI) is a complex disorder with many diagnostic challenges. Dr. Deng’s research in TRACK-TBI investigates the discriminatory ability of biomarkers to provide precise assessment of injury severity and assist with prognostication after injury. At the Brain Trauma Research Center, he investigates the role that genetic factors can play in the secondary pathophysiology of neurotrauma. Along with optimizing operative management of TBI and spinal cord injury (SCI) patients, his goal is to advance evidence-based clinical practices in the neurocritical intensive care unit. Dr. Deng serves as a mentor for undergraduate and graduate students with interests in medicine and neurosurgery. He enjoys painting, playing basketball, and cooking.

Specialized Areas of Interest
Cerebrovascular; spinal deformity; neurotrauma.

Professional Organization Membership
Alpha Omega Alpha
American Association of Neurological Surgeons
Congress of Neurological Surgeons
National Neurotrauma Society
North American Brain Injury Society
Pennsylvania Neurosurgery Society
Phi Beta Kappa

Education & Training
BA, Oil-Painting and Biology, University of California Berkeley, 2014
MD, University of California San Francisco, 2019

Honors and Awards
ThinkFirst Injury Prevention Award, American Association of Neurological Surgeons, 2020
Best Clinical Research Abstract, Congress of Neurological Surgeons, 2019
Ronald R. Tasker Young Investigator Award, Congress of Neurological Surgeons, 2019
Steinhart Scholarship Award, UCSF School of Medicine, 2019
Distinction in Clinical and Translational Research, University of California, San Francisco, 2019
Storytelling Prize, UCSF Synapse Student Voices, 2019
Journal of Neuro-Oncology Award, American Association of Neurological Surgeons, 2017
AANS/CNS Section on Trauma and Critical Care Finalist, 2017
Dean’s Prize in Research and Scholarship Finalist, UCSF School of Medicine, 2016, 2019
University Grant in Medicine, UCSF School of Medicine, 2015-2019
Sussman Prize in Painting and Exhibition, University of California Berkeley, 2014
Phelan Art Scholarship, University of California Berkeley, 2013
Dean’s Honors, University of California Berkeley, 2012-2014

Media Appearances: 2020-21
“Genetic Factors May Explain Divergent Outcomes in Severe TBI,” July 07, 2020, Medscape Medical News.

Publications: 2020-21
• Refereed Articles:

Resident Biographies


David T. Fernandes Cabral, MD

**PGY-4 Resident**

David T. Fernandes Cabral, MD, received his medical degree from the José María Vargas School of Medicine at the Universidad Central de Venezuela in Caracas, Venezuela where he graduated at the top of his class. While in medical school, Dr. Fernandes was a teacher assistant in the Department of Anatomy and Neuroanatomy, as well as a research assistant at the Department of Pharmacology. After graduating from medical school, David completed two years of mandatory service in a rural community in Venezuela where he served in a leadership role at the health center and was actively involved in teaching medical students during their rural rotations. In 2015, Dr. Fernandes joined the Fiber Tractography Lab at the University of Pittsburgh as a post-doctoral associate research fellow. Dr. Fernandes has been invited to lecture in white matter connectivity of the human brain at the University of Pittsburgh Department of Psychology, and is currently in charge of teaching the practical sessions in the surgical neuroanatomy course for fourth year medical students at the university. During his free time, David enjoys cooking, travelling, biking, watching movies and spending time with his family and friends.

**Specialized Areas of Interest**

Skull base surgery, cerebrovascular surgery, surgical neuro-oncology, diffusion-MRI fiber tractography, microsurgical anatomy, and teaching.

**Professional Organization Membership**

American Association of Neurological Surgeons
American Medical Association
AO Spine
Congress of Neurological Surgeons
Venezuelan Medical Association

Education & Training
MD, Universidad Central de Venezuela, 2017

Honors and Awards
Best Poster Presentation, Venezuelan Neurosurgery Society, 2012
Research Assistant of the Year, Universidad Central de Venezuela, 2011
Teacher Assistant of the Year, Department of Anatomy and Neuroanatomy, Universidad Central de Venezuela, 2010

Publications: 2020-21
• Refereed Articles:

• Published Abstracts:

Daryl P. Fields II, MD, PhD
PGY-3 Resident

Daryl Pinion Fields II, MD, PhD, joined the University of Pittsburgh Department of Neurological Surgery in July of 2018. He completed his undergraduate degree at Saint John’s University (Collegeville, Minn.), and his medical degree, as well as research doctorate, at the University of Wisconsin, Madison. Prior to medical school, Dr. Fields held several leadership positions as a firefighter captain and medic. In addition, he spent several years as a neural rehab personal trainer managing clients with debilitating neuromuscular disorders; including stroke, brain trauma, multiple sclerosis and spinal cord injuries. This work led him to discover his leadership abilities, manual adeptness, and human interaction skills, thus spurring interest in using these aptitudes to serve society through a career in medicine. Further medical training and development of scientific skill set through a PhD has refined his passion towards caring for patients afflicted with debilitating neural motor deficits. He has personally designed and lead projects involving the full spectrum of medical science research including disease modeling to development of novel drug therapies. This has resulted in several national research awards, numerous publications and a drug therapy patent for treating breathing disorders. These personal experiences, along with a track record of scientific innovation, have made him uniquely positioned for his current career of personally treating and actively investigating novel treatment strategies for incurable neural disorders. In his free time Dr. Fields enjoys working out, cooking, and catching up with friends.
Zachary C. Gersey, MD

Zachary C. Gersey, MD, MS, joined the University of Pittsburgh Department of Neurological Surgery residency program in July of 2017. Having graduated cum laude from University of Florida with a degree in biology, he completed his medical education at the University of Miami Miller School of Medicine. During medical school, Dr. Gersey became immersed in neurosurgery, both in and out of clinic. He was recognized as a student leader and researcher at both the University of Miami Brain Tumor Initiative and the Cerebrovascular Institute. His research experience propelled him to earn his master’s degree in translational investigation from the University of Miami through his work in glioblastoma multiforme. Dr. Gersey’s research is focused on the molecular targeting of glioblastoma stem cells—a subset of cells theorized to be the cause of tumor recurrence and treatment resistance. His research has led to several awards and distinctions and he plans to continue his work while in Pittsburgh. Dr. Gersey is also involved in community outreach and service, having spent time volunteering in health clinics all over south Florida and also abroad in Central America. His dedication to academics, community, and education led to his election into the Alpha Omega Alpha Medical Honor Society. Dr. Gersey was born in Rochester, N.Y., but moved to Merritt Island, Fla., while in high school. Outside of medicine, Zach enjoys spending time with family and friends, playing soccer and baseball, playing the guitar, and weight lifting.
Zachary C. Gersey, MD

Specialized Areas of Interest
Neurosurgical oncology; skull base neurosurgery; education in neurosurgery.

Education & Training
BA, Biology, University of Florida, 2011
MA, University of Miami, 2016
MD, University of Miami, 2017

Honors and Awards
Neil Peart Neurosurgery Research Award, Glioblastoma Foundation, 2020
Best Poster Award, Florida Center for Brain Tumor Research, Brain Tumor Summit, 2016
Alpha Omega Alpha, University of Miami, 2016
Clinical and Translational Investigation Scholarship, University of Miami, 2016.

Jeffery Head, MD
PGY-1 Resident

Jeffery Head, MD, joined the University of Pittsburgh Department of Neurological Surgery residency program in July of 2020. He graduated from Colgate University in 2012 with honors in cellular neuroscience and earned his medical degree from Sidney Kimmel Medical College at Thomas Jefferson University in 2020, where he graduated cum laude and was elected into the Alpha Omega Alpha Honor Society. Prior to medical school, Dr. Head spent two years as a post-baccalaureate research fellow at the National Institutes of Health studying developmental neurobiology in zebrafish. His work focused on understanding the molecular signaling pathways that regulate collective cell migration in the peripheral nervous system during embryogenesis and creating digital reconstructions of the relationships between these cells during their migration. During his medical school career, Dr. Head was involved in research on spinal cord stimulation waveforms in treating chronic low-back pain, surgical approaches to the spine in treating ossification of the posterior longitudinal ligament, mechanical thrombectomy in distal circulation strokes, and the risk-factors for infection in external ventricular drains. Dr. Head was born and raised in Fairfield, Conn.

Outside of neurosurgery Dr. Head is an avid skier and enjoys cooking, hiking, running, softball, soccer, and spending time with his friends and family.

Specialized Areas of Interest
Cerebrovascular neurosurgery; spine surgery; skull base neurosurgery; general neurosurgery.

Professional Organization Membership
Alpha Omega Alpha Honor Society
American Association of Neurological Surgeons
Congress of Neurological Surgeons

Education & Training
BA, Cellular Neuroscience, Colgate University, 2012
MD, Sidney Kimmel Medical College at Thomas Jefferson University, 2020

Honors and Awards
Cum Laude, SKMC 2020
Alpha Omega Alpha Honor Society, SKMC 2019
Top Performer, AANS Top Gun Neurosurgical Skills Competition, AANS Meeting 2019
Dr. George McClellan Surgical Honor Society, SKMC 2018
Hobart Amory Hare Medical Honor Society, SKMC 2018
Joseph Scott Hudson, MD
PGY-2 Resident

Joseph Scott Hudson, MD, joined the University of Pittsburgh Department of Neurological Surgery residency program in July 2019 after graduating with research distinction from the University of Iowa Carver College of Medicine. He also received his undergraduate degree from the University of Iowa with honors in biology, a minor in chemistry, and high distinction. During his undergraduate education, he became heavily involved in the Department of Neurosurgery at the University of Iowa Hospitals and Clinics. His work under the mentorship of David Hasan, MD, in cerebrovascular neurosurgery included basic science investigations into the pathogenesis of intracranial aneurysms, device development, and neurovascular imaging development. During medical school, Dr. Hudson received research support from the Neurosurgery Research and Education Foundation (NREF) as a medical student fellow, subsequently receiving the 2016 NREF best medical student abstract award. His research has led to numerous peer reviewed publications, abstracts, and oral presentations at national neurosurgical conferences. Dr. Hudson is an elected member of the Alpha Omega Alpha medical honor society. Dr. Hudson was born in Waterloo, Iowa. He was raised in Cedar Falls, Iowa and Plankstadt, Germany. His hobbies outside of neurosurgery include spending time with family and friends, golf, professional and collegiate sports, snow skiing, travel, and water sports.

Specialized Areas of Interest
Cerebrovascular neurosurgery; spine surgery; general neurosurgery.

Professional Organization Membership
Alpha Omega Alpha
American Association of Neurological Surgeons
American Heart Association/American Stroke Association
Congress of Neurological Surgeons

Education & Training
BA, Biology, Minor in Chemistry, University of Iowa, 2015
MD, University of Iowa Carver College of Medicine, 2019

Honors and Awards
Richard Kessel Scholarship in Medicine, University of Iowa Carver College of Medicine, 2018
Melvin Marcus Scholarship for Excellence, University of Iowa Carver College of Medicine, 2018
Trainee Scholar Travel Award, University of Iowa Carver College of Medicine, 2018
Award for Excellence in Clinical Neuroscience Research, University of Iowa Carver College of Medicine, 2017
Best Abstract Award, AANS/NREF Medical Student Summer Research Fellowship, 2016
Honors Graduate, Biology, University of Iowa, 2015
High Distinction Graduate, University of Iowa, 2015
Dean’s List, University of Iowa, 2011-2015
President’s List, University of Iowa, 2011-2015
Resident Biographies

Joseph Scott Hudson, MD

Publications: 2020-21
• Refereed Articles:


Rachel C. Jacobs, MD
PGY-1 Resident

Rachel C. Jacobs, MD, joined the University of Pittsburgh Department of Neurological Surgery residency program in July of 2020 after receiving her medical degree from the University of Pittsburgh School of Medicine. She obtained her undergraduate degree in neuroscience and behavioral biology from Emory University as a Liberal Arts Scholarship recipient. During her undergraduate education, she spent four years at Yerkes National Primate Research Center studying selective MRI-guided neurotoxic lesions and neuroanatomical procedures in rhesus macaques to assess brain reorganization following neonatal brain lesions. During medical school, she became heavily involved in the Department of Neurosurgery Center for Image-Guided Neurosurgery under the mentorship of L. Dade Lunsford, MD. Specifically, she worked on clinical studies regarding stereotactic radiosurgery outcomes for benign and malignant brain tumors, arteriovenous malformations and cavernous malformations. Her peer-reviewed work has been presented at regional and national neurosurgical conferences in oral and abstract form. Dr. Jacobs enjoys boxing, spinning, and international travel in her free time. She is a native of Atlanta, Ga.

Specialized Areas of Interest
Cerebrovascular neurosurgery; endoscopic endonasal and skull base neurosurgery; complex spine.

Professional Organization Membership
American Association of Neurological Surgeons
American Medical Association
Congress of Neurological Surgeons

Education & Training
BS, Neuroscience/Behavioral Biology, Emory University, 2016
MD, University of Pittsburgh School of Medicine, 2020

Honors and Awards
Morris H. and Gertrude M. Harris Foundation Scholar for Jewish Medical Students, 2016-20
MD, University of Pittsburgh School of Medicine, 2020
Justiss A. Kallos, MD  
*PGY-4 Resident*

Justiss Kallos, MD, joined the University of Pittsburgh Department of Neurological Surgery residency program in June of 2017 after graduating from the Vanderbilt University School of Medicine. Prior to matriculating for residency, she spent a year as project coordinator for a neuroplasticity lab working to improve stroke rehabilitation outcomes and expand access to rehabilitation services for rural veterans within the U.S. Department of Veterans Affairs in Atlanta, Ga. She also spent a postgraduate year studying at the University of St. Andrews as a Robert T. Jones, Jr. Memorial Scholar after graduating summa cum laude from Emory University with a degree in neuroscience and behavioral biology. She has a wide array of interests, having been involved in projects assessing perioperative factors that predict outcomes following vascular and skull base operations using traditional and machine learning models, Gamma Knife Radiosurgery, stroke rehabilitation and telemedicine, and social determinants affecting health outcomes. Outside of residency, she enjoys international travel, playing board games, hiking, and spending quality time with family.

**Professional Organization Membership**

American Association of Neurological Surgeons  
Congress of Neurological Surgeons

**Education & Training**

BS, Neuroscience/Behavioral Biology, Emory University, 2011  
MD, Vanderbilt University School of Medicine, 2017

**Honors and Awards**

Cornelius Vanderbilt Scholar, Vanderbilt University School of Medicine, 2013-17  
Gold Humanism Honor Society, Vanderbilt University School of Medicine, 2016  
Robert T. Jones, Jr. Scholar, Emory University, 2011-12  
Summa Cum Laude, Emory University, 2011

**Publications: 2020-21**

- **Refereed Articles:**
  

Andrew Legarreta, MD  
*PGY-2 Resident*

Andrew D. Legarreta, MD, joined the University of Pittsburgh Department of Neurological Surgery residency program in July of 2019 after receiving his medical degree from Vanderbilt University School of Medicine. He received his undergraduate degree from Duke University, completing a BA in history. During medical school, Dr. Legarreta studied the effects of sport-related concussion in the high school athlete population. Specifically, he examined predic-
Andrew Legarreta, MD

tors of post-concussion syndrome and, separately, structural and functional neuroimaging findings in football players. His peer-reviewed work has been presented at regional and national neurosurgical conferences in oral and abstract form. Dr. Legarreta enjoys playing guitar, international travel, and golf in his free time. He is a native of Buffalo, N.Y.

**Specialized Areas of Interest**
Cerebrovascular neurosurgery; endoscopic endonasal and skull base neurosurgery; scoliosis and complex spinal deformity; sport-related concussion.

**Professional Organization Membership**
American Association of Neurological Surgeons
American Medical Association
Congress of Neurological Surgeons

**Education & Training**
BA, History, Duke University, 2014
MD, Vanderbilt University School of Medicine, 2019

**Honors and Awards**
Cornelius Vanderbilt Scholarship, Vanderbilt University School of Medicine, 2015-19

Arka N. Mallela, MD

Arka N. Mallela, MD, joined the University of Pittsburgh Department of Neurological Surgery residency program in July 2018 after graduating from the University of Pennsylvania School of Medicine, earning his MD and MS in translational research. He received his undergraduate degrees from the Vagelos Scholars Program at the University of Pennsylvania, completing a BA in biophysics, biochemistry, and philosophy and an MS in biological chemistry. Dr. Mallela has a strong interest in the intersection of neurophysiology, neuroimaging, network theory and deep learning. He is currently interested in utilizing these tools to study a variety of neurological diseases, including fetal brain folding, epilepsy, and brain tumors. For his work, Dr. Mallela has received the 2017 American Brain Tumor Association Young Investigator Award. He was recently selected for the Burroughs Wellcome Foundation Physician Scientist Incubator Program at the University of Pittsburgh to further his research in these areas. In his free time, Dr. Mallela enjoys hiking, movie making, and spending time with his family, wife, and friends.

**Specialized Areas of Interest**
Epilepsy surgery; neuro-oncology; pediatric neurosurgery.

**Professional Organization Membership**
American Association of Neurological Surgeons
Association for Clinical and Translational Sciences
Congress of Neurological Surgeons

**Education & Training**
BS, Biophysics, Biochemistry, Philosophy, University of Pennsylvania, 2013
MS, Biological Chemistry, University of Pennsylvania, 2013
MS, Translational Research, University of Pennsylvania, 2018
MD, University of Pennsylvania Perelman School of Medicine, 2018
Resident Biographies

Arka N. Mallela, MD

Editorial Service

• Ad Hoc Reviewer:
  Journal of Neuro- oncology
  Journal of Neurotrauma
  Neurosurgery
  Scientific Reports

Honors and Awards

Physician Scientist Incubator Program, Burroughs Wellcome Foundation, 2021
Walter L. Copeland Grant, Copeland Foundation, 2020
American Brain Tumor Association Young Investigator Award, 2017

Publications: 2020-21

• Refereed Articles:


• Virtual Presentations:

David J. McCarthy, MD

PGY-1 Resident

David McCarthy, MD, MS, joined the University of Pittsburgh Department of Neurological Surgery residency program in July of 2020 after graduating from the University of Miami Miller School of Medicine. Prior to matriculation, Dr. McCarthy received additional education in clinical and biomedical research to earn a master's of clinical and translational research with a focus in statistics. Dr. McCarthy studied biochemistry at the University of Florida. During medical school, Dr. McCarthy cultivated an interest in ischemic and hemorrhagic stroke treatment modalities and outcomes. In the laboratory he investigated endothelial dysfunction in aneurysms and pharmaceutical stroke recovery enhancement. For aneurysms, he researched molecular inhibition of pathologic endothelial cell expression and enhanced endothelization following endovascular treatment modalities. In ischemic stroke he utilized a murine photochemical cortical stroke model to assess the efficacy of various neuroprotective pharmaceutical agents. In clinical research, Dr. McCarthy authored and
co-authored manuscripts that focused on optimizing neuroendovascular access, and post stroke thrombectomy critical care. Dr. McCarthy’s research interests include neurosurgical epidemiology and treatment trends, neuroendovascular devices, and the molecular physiology of cerebral aneurysms. He hopes to apply artificial intelligence and machine learning for computation flow dynamic assessment of cerebral aneurysms, comparing physiologic cell stress to genomic expression. Additionally, he hopes to contribute to neurosurgical literature with the improvement of current statistical methods. Dr. McCarthy was raised in Tampa, Fla. In his free time, he enjoys creating art (resin, graphite), winter mountaineering, skiing, hiking, running, and weightlifting.

**Specialized Areas of Interest**
Cerebrovascular neurosurgery, neuro-oncology, pediatric neurosurgery, functional neurosurgery, and neurotrauma.

**Professional Organization Membership**
American Association of Neurological Surgeons  
American Heart Association: Stroke Council  
Congress of Neurological Surgeons

**Education & Training**
BS, Biochemistry, University of Florida, 2014  
MS, University of Miami, 2018  
MD, University of Miami Miller School of Medicine, 2020

**Honors and Awards**
Judson Scholarship Recipient, University of Miami Miller School of Medicine, 2014-2020  
ISC Junior Investigator Travel Award/Grant, American Heart Association, 2019  
Second Place Clinical Poster Award, Eastern Atlantic Student Research Forum (ESRF), 2018  
Cerebrovascular Disease and Stroke Fellowship Recipient, American Heart Association, 2017  
Best Clinical Poster Presentation Winner, Eugene J. Sayfie Research Day, 2017  
Medical Student Research Fellow, Neurosurgery Research and Education Foundation (NREF), 2017  
Clinical and Translational Investigation Scholarship, University of Miami, 2017  
Gold Humanism Honor Society Inductee, University of Miami Miller School of Medicine, 2017

**Publications: 2020-21**
- Refereed Articles:
Resident Biographies


**Invited Lectures: 2020-21**

• Virtual:
  McCarthy DJ, Luther E, Gross B, Starke R. “Unruptured arteriovenous malformation intervention rate is inversely correlated with ruptured AVM discharge incidence.” Society of Neurorinterventional Surgery Annual Meeting, August 4-7, 2020.

**Michael McDowell, MD**

*Chief Resident*

Michael McDowell, MD, joined the University of Pittsburgh Department of Neurological Surgery residency program in July of 2014 after graduating from Columbia University’s College of Physicians and Surgeons medical school. He received undergraduate degrees in biochemistry and Latin dance from Arizona State University in 2005, graduating as valedictorian. During medical school, Dr. McDowell was elected into Alpha Omega Alpha and received funding to pursue a Doris Duke Clinical Research Fellowship investigating the mechanisms by which genetic and environmental factors alter aneurysm morphology. He subsequently received funding from the Brain Aneurysm Foundation to continue his work during residency. Dr. McDowell was heavily involved in teaching and community outreach during medical school and was voted clinician of the year for his contributions to the Columbia Student Medical Outreach clinic in Washington Heights. He is the founder and director of the University of Pittsburgh School of Medicine’s mini-elective for second year medical students titled “Brain and Blade: The World of Neurosurgery.” His current research interests include the identification of novel biomarkers associated with aneurysms, clinical applications of near infrared spectroscopy, and the study of the outcomes of pediatric skull base surgery. His interests outside of neurosurgery include medical education, dance, and theater. Dr. McDowell is the son of Douglas and Marti McDowell of Iron Mountain, Michigan. After completing the University of Pittsburgh neurological surgery residency program in June of 2021, Dr. McDowell accepted a position with UPMC Children’s Hospital of Pittsburgh as the pediatric neurosurgery fellow and an appointment as assistant professor of neurological surgery with University of Pittsburgh. His wife, Dr. Samantha McDowell, practices dentistry in the Pittsburgh area.
Michael McDonell, MD

Resident Biographies

**Specialized Areas of Interest**
Healthcare improvement; Chiari malformation; pediatric neurosurgery; cerebrovascular disease; medical education.

**Professional Organization Membership**
Allegheny County Medical Society  
Alpha Omega Alpha  
American Association of Neurological Surgery  
AANS Section on the History of Neurological Surgery  
AANS Young Neurosurgeons Committee  
AANS/CNS Joint Section on Pediatric Neurosurgery  
Congress of Neurological Surgeons  
Pennsylvania Medical Society House of Delegates  
Radiosurgical Society

**Education & Training**
BS, Biochemistry, Arizona State University, 2009
MD, Columbia University College of Physicians and Surgeons, 2014

**Editorial Service**
- Ad Hoc Reviewer:
  - American Journal of Neuroradiology  
  - Current Neurovascular Research  
  - Journal of Clinical Medicine  
  - Journal of Clinical Neuroscience  
  - Journal of Neurosurgery  
  - Neuroimaging in Neurology and Psychiatry  
  - Operative Neurosurgery  
  - SAGE Open Medical Case Reports  
  - Stroke  
  - World Neurosurgery

**Interdepartmental and Medical Center Activities**
- **University of Pittsburgh:**
  - Advisor, Neurosurgery Interest Group  
  - GMEC Residency Accreditation, Reviews, and Quality Subcommittee  
  - GMEC Professional Development Subcommittee

**Professional Activities**
Young Neurosurgery Committee Representative, AANS History Section and AANS/CNS Pediatric Section  
Regional Coordinator, Northeast AANS Medical Student Chapters  
Committee for Transformation for the Allegheny Medical Center

**Honors and Awards**
University of Pittsburgh School of Medicine Faculty Teaching Award, 2021  
Pennsylvania Neurological Society Oral Presentation Award, 2019  
Copeland Grant Winner, Pittsburgh Foundation, 2015, 2019  
Gold Medal, Top Gun Surgical Completion, Lumbar Pedicle Screw Placement, American Association of Neurological Surgeons, 2017  
Charlie Kuntz Scholar, AANS/CNS Spine Summit, 2016  
Christopher Getch Chair of Research, Brain Aneurysm Foundation, 2013
Michael McDowell, MD

Resident Biographies

Publications: 2020-21

• Refereed Articles:


• Presentations:


Resident Biographies

Michael McDowell, MD

Invited Lectures: 2020-21

• Virtual:
  McDowell M. “Redesigning Medical Student Exposure to Neurosurgery,” Fridays with Friedlander webcast, Department of Neurological Surgery, University of Pittsburgh, Pittsburgh, Pa., February 12, 2021.


Gautam M. Nayar, MD
PGY-3 Resident

Gautam M. Nayar, MD, joined the University of Pittsburgh Department of Neurological Surgery residency program in July of 2018. After graduating from the University of Florida with a degree in computer science, Dr. Nayar completed his medical education at Duke University School of Medicine. As the Ruth K. Broad Foundation Neurosciences Fellow, he studied neuronal response and processing towards integration of sensory brain-computer interfaces in the laboratory of Miguel Nicolelis, MD, PhD. Dr. Nayar also cultivated an interest in spinal outcomes research focusing on minimally invasive approaches, radiation reduction protocol, and identification of pre-operative risk factors. Dr. Nayar’s work on the clinical efficacy of ultra-low radiation imaging protocols was awarded the 2017 AANS Donald Quest Clinical Science Award. Although raised in Pittsburgh, Dr. Nayar moved to Gainesville, Fla. for high school and college. In his free time, he enjoys hiking, weightlifting, and spending time with his family.

Professional Organization Membership
American Association of Neurological Surgeons
Congress of Neurological Surgeons
North American Spine Society
Society of Lateral Spine Access Surgery

Education & Training
American Association of Neurological Surgeons
Congress of Neurological Surgeons
North American Spine Society
Society of Lateral Spine Access Surgery

Honors and Awards
Donald Quest Clinical Science Award, AANS, 2017

Publications: 2020-21

• Refereed Articles:

Kamil W. Nowicki, MD, PhD
PGY-5 Resident

Kamil W. Nowicki, MD, PhD, began his residency with the University of Pittsburgh Department of Neurosurgery in June of 2016. He graduated from University of Florida in 2008 with a degree in chemistry with the highest honors and earned his combined medical degree and a PhD in molecular cell biology from the University of Florida College of Medicine in 2016. During his medical school career, he conducted research in the department of neurosurgery under mentorship of Brian L. Hoh, MD, and Edward W. Scott, PhD. In his dissertation research he showed that blockade of shear stress-induced CXCL1 chemokines prevents cerebral aneurysm formation. He was awarded two research grants from the Brain Aneurysm Foundation. He was also the recipient of the Equal Access Clinic award for his work as director of a mobile clinic site while providing care for the underserved population of Gainesville, Fla. in 2012 and 2013. His current research efforts are focused on studying the platelet inflammatory axis in cerebral aneurysm formation and creation of a blood test to detect aneurysm formation. Dr. Nowicki was born in Poland and moved to Gainesville in 2001. His hobbies include soccer, digital photography, and cross-fit.

Specialized Areas of Interest
Chemokines; hemodynamics; intracranial aneurysms; cerebrovascular surgery; biomedical engineering; inflammation; and shear stress.

Professional Organization Membership
American Association of Neurological Surgeons
American Heart Association: Council on Atherisclerosis, Thrombosis, and Vascular Biology
American Medical Association
American Physician Scientist Association
Congress of Neurological Surgeons

Education & Training
BS, Chemistry, University of Florida, Summa cum laude, 2008
PhD, Molecular Cell Biology, University of Florida College of Medicine, 2014
MD, University of Florida College of Medicine, 2016

Editorial Service
• Ad Hoc Reviewer:
  Journal of Neurointerventional Surgery

Professional Activities
Pitt Ventures First Gear Program, 2021 first cohort, team lead, University of Pittsburgh

Patent Applications

Honors and Awards
University of Pittsburgh Pitt Ventures First Gear Program, 2021
Best Basic Science Abstract, Cerebrovascular Section, CNS, 2019
Best Presentation Award, Stuart Rowe Society Lectureship Day, 2018, 2019
Walter. L Copeland Grant, Pittsburgh Foundation, 2019
Neurosurgical Topgun Competition 1st Place Tie, Myriad Minimally Invasive Tumor, 2018
Timothy P. Susco Chair of Research Grant Award, Brain Aneurysm Foundation, 2016
Resident Biographies

Dawn Brejcha Chair of Research Grant Award, Brain Aneurysm Foundation, 2016
Outstanding Academic And Research Accomplishment Award, University of Florida, 2016
College of Medicine Travel Award, University of Florida, 2015
Medical Guild Competition Bronze Award, University of Florida, 2014
Equal Access Clinic Award, University of Florida, 2012-13
Shirley Dudek Demmer Chair of Research Grant Award, Brain Aneurysm Foundation, 2013
Brain Aneurysm Center Chair of Research Grant Award, North Shore University Hospital, 2012
Summa Cum Laude, Bachelor of Science in Chemistry, University of Florida, 2008
Sanibel Symposium Superior Poster Award, University of Florida, 2007
Anderson Scholar of High Distinction, University of Florida, 2006
Florida Bright Futures Scholarship, University of Florida, 2005

Publications: 2020-21
• Refereed Papers:

Enyinna Nwachuku, MD
PGY-6 Resident

Enyinna L. Nwachuku, MD, began his residency with the University of Pittsburgh Department of Neurological Surgery in July of 2015. He graduated from the University of Pittsburgh in 2010 with a degree in neuroscience, and subsequently earned his medical degree from the University of Pittsburgh in 2015. Along with three other colleagues from medical school, Dr. Nwachuku is a co-founder of a national and locally funded, non-profit, after-school organization called The Healthy Minds Academy which is a program geared toward professional development with at-risk youth in the public-school systems of Pittsburgh. In September of 2019, Dr. Nwachuku became the first resident to serve in what is considered to be the first sports medicine fellowship of its kind in the nation. The fellowship included rotations with the Pittsburgh Steelers, Pittsburgh Penguins and other Pittsburgh-area sports organizations. Dr. Nwachuku was born in Nigeria. Interests outside of neurosurgery include cinema, traveling, and global/public health disparities.

Specialized Areas of Interest
Cranial and spine trauma; complex and minimally invasive spine, and neurosurgical sports medicine; and clinical trials research in traumatic brain and spinal cord injury.

Professional Organization Membership
American Association of Neurological Surgeons
Congress of Neurological Neurosurgeons
Pennsylvania Medical Society

Education & Training
BS, University of Pittsburgh, Neuroscience, 2010
MD, University of Pittsburgh, 2015
Publications: 2020-21

- Refereed Articles:
  


Alp Ozpinar, MD

PGY-7 Resident

Alp Ozpinar, MD, a native of Istanbul, Turkey, joined the University of Pittsburgh neurosurgery residency program in July of 2015 after receiving his medical degree from Oregon Health and Science University. While in medical school, Dr. Ozpinar was elected to Alpha Omega Alpha as a junior, and was awarded the School of Medicine Research Award and Outstanding Medical Student Scholarship upon graduation. Dr. Ozpinar’s research activities focus on degenerative spine and spinal deformity. He has over 55 peer-reviewed journal publications, over 70 poster and oral presentations in regional and national meetings and nine book chapters. His research has been published in several high impact journals including *JAMA* and *Molecular Aspects of Medicine*. Dr. Ozpinar is pursing an enfolded fellowship in minimally invasive and complex spine surgery at the University of Pittsburgh. Outside of neurological surgery, Dr. Ozpinar is an avid tennis player and occasionally competes in men’s open tennis tournaments. His other hobbies include triathlons, skiing and travel.

Specialized Areas of Interest
Degenerative spine; complex spinal deformity; minimally invasive spine surgery; radiosurgery; spinal biomechanics.

Professional Organization Membership
- Alpha Omega Alpha
- American Association of Neurological Surgeons
- American Medical Association
- Congress of Neurological Surgeons
- Turkish American Doctors Association of Midwest

Education & Training
- BS, Biomedical Engineering, University of California, Davis, 2009
- MD, Oregon Health and Science University, 2015

Honors and Awards
- Resident Presentation Award, AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves, 2018
- Charlie Kuntz Scholar Award, AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves, 2016
- Outstanding Medical Student Scholarship, Oregon Health and Science University, 2015
- School of Medicine Research Award, Oregon Health and Science University, 2015
Resident Biographies

Matthew Pease, MD
PGY-6 Resident

Matthew Pease, MD, joined the University of Pittsburgh Department of Neurological Surgery residency program in July of 2015 after graduating from the University of Southern California’s Keck School of Medicine. He received his undergraduate degree in economics from Duke University in 2010. Prior to matriculating to medical school, Dr. Pease explored a variety of research topics including animal models of addiction through a Howard Hughes research fellowship, learning modules through fellowship at the National Institutes of Health, and game theory models of group conflict. During medical school, Dr. Pease earned an American Association Medical Student Research fellowship to investigate the epigenetics of pituitary adenomas. He continues his interests in economics and brain tumor research during residency. Outside of neurosurgery, Dr. Pease enjoys hiking, college basketball and football, and theater.

Specialized Areas of Interest
Brain tumors.

Professional Organization Membership
American Association of Neurological Surgeons
Congress of Neurological Surgeons

Education & Training
BA, Economics, Duke University, 2010
MD, University of Southern California, 2015

Honors and Awards
Natus Trauma Best Resident Clinical Abstract, American Association of Neurological Surgeons, 2021
Data Science Fellowship, Congress of Neurological Surgeons, 2020
Runner-Up Presentation Award, Stuart Rowe Society Lectureship Day, 2017

Alpha Omega Alpha, 2014
National Dean’s List, 2009

Publications: 2020-21
• Refereed Articles:


Data Science Fellowship, Congress of Neurological Surgeons, 2020
Runner-Up Presentation Award, Stuart Rowe Society Lectureship Day, 2017

Matthew Pease, MD

PGY-6 Resident

Matthew Pease, MD, joined the University of Pittsburgh Department of Neurological Surgery residency program in July of 2015 after graduating from the University of Southern California’s Keck School of Medicine. He received his undergraduate degree in economics from Duke University in 2010. Prior to matriculating to medical school, Dr. Pease explored a variety of research topics including animal models of addiction through a Howard Hughes research fellowship, learning modules through fellowship at the National Institutes of Health, and game theory models of group conflict. During medical school, Dr. Pease earned an American Association Medical Student Research fellowship to investigate the epigenetics of pituitary adenomas. He continues his interests in economics and brain tumor research during residency. Outside of neurosurgery, Dr. Pease enjoys hiking, college basketball and football, and theater.

Specialized Areas of Interest
Brain tumors.

Professional Organization Membership
American Association of Neurological Surgeons
Congress of Neurological Surgeons

Education & Training
BA, Economics, Duke University, 2010
MD, University of Southern California, 2015

Honors and Awards
Natus Trauma Best Resident Clinical Abstract, American Association of Neurological Surgeons, 2021
Data Science Fellowship, Congress of Neurological Surgeons, 2020
Runner-Up Presentation Award, Stuart Rowe Society Lectureship Day, 2017
**Resident Biographies**

**Roberta K. Sefcik, MD**  
*PGY-4 Resident*

Roberta K. Sefcik, MD, began her residency with the University of Pittsburgh Department of Neurosurgery in June of 2017. She graduated from Carnegie Mellon University in 2011 where she pursued an interdisciplinary degree in psychology and music performance, focusing on bagpipe performance. She was admitted to the Humanities and Medicine Program and the Patient-Oriented Research Training and Leadership Program at the Icahn School of Medicine at Mount Sinai in New York where she received her medical degree and a master of science in clinical research in 2017. Dr. Sefcik was born and raised in Dunedin, Fla.

**Specialized Areas of Interest**  
Cerebrovascular surgery

**Education & Training**

BA, Psychology/Music Performance, Carnegie Mellon University, 2011  
MS, Clinical research, Icahn School of Medicine at Mount Sinai, 2017  
MD, Icahn School of Medicine at Mount Sinai, 2017

**Honors and Awards**

Distinction in Research, Icahn School of Medicine at Mount Sinai, 2017  
Phi Beta Kappa, 2011.

**Jeremy Stone, MD**  
*Chief Resident*

Jeremy Stone, MD, joined the University of Pittsburgh Department of Neurological Surgery residency program in July of 2014. He completed his undergraduate work at Case Western Reserve University, attaining magna cum laude honors with dual degrees in biology and psychology. A native of Hawaii, Dr. Stone returned home to the University of Hawaii John A. Burns School of Medicine to pursue his medical degree. He was recognized as a leader in his class, taking on the role of president of the American Medical Association Chapter and serving as delegate to the Hawaii Medical Association. He also led many community service outreach projects. Dr. Stone’s academic achievement was acknowledged with election into the Alpha Omega Alpha Honor Medical Society. Dr. Stone’s research interests include vascular neurosurgery, traumatic brain injury systems-based improvement, evaluation of surgical outcomes in spinal deformity, and molecular mechanisms underlying neurodegenerative disease. He began enfolded endovascular fellowship training in July of 2018. Outside of the hospital and research lab, Dr. Stone enjoys spending time with his wife, three kids and first grandchild, hiking and playing sports. In June of 2021, Dr. Stone completed his seven-year neurological surgery residency at the University of Pittsburgh and is headed to UPMC Hamot in Erie, Pa. where he will practice endovascular surgery.

**Specialized Areas of Interest**  
Vascular/endovascular; tumor; spine.

**Professional Organization Membership**

Alpha Omega Alpha  
American Association of Neurological Surgeons  
Congress of Neurological Surgeons  
Phi Beta Kappa
Jeremy Stone, MD

Resident Biographies

Education & Training
BS, Biology/Psychology, Case Western Reserve University, 2009
MD, University of Hawaii, 2014

Editorial Service
• Ad Hoc Reviewer:
Neurosurgery

Honors and Awards
UPMC Medical Education LEAP Award for Patient Safety and Quality Improvement, 2017, 2020
Oral Presentation Award, Second Annual Graduate Medical Education Quality and Safety Symposium, University of Pittsburgh, 2019
Best Resident Research Presentation Runner Up, Stuart Rowe Society Lectureship, University of Pittsburgh, 2019
Frank and Mary McDowell Award for Excellence in Surgery, 2014
Windsor and Mary Cutting Excellence in the Basic Sciences Award, University of Hawaii John A. Burns School of Medicine, 2014
Bernard Yim Award for Top Performance in Internal Medicine Clerkship, American College of Physicians, University of Hawaii John A. Burns School of Medicine, 2013
Po’okela and Noi’i Award for Outstanding Research, 2014
American College of Physicians Bernard Him Award for Top Performance in Internal Medicine, 2013.

Publications: 2020-21
• Refereed Articles:
Daniel Tonetti, MD  
Chief Resident

Daniel A. Tonetti, MD, joined the Department of Neurological Surgery residency program in July of 2014. He graduated with honors from Drexel University with BS and MS degrees in chemical engineering. Prior to matriculation into medical school, he was employed within the pharmaceutical industry in both drug discovery and vaccine manufacturing. Dr. Tonetti earned his medical degree from the University of Pittsburgh in 2014, where he was elected by his peers president of his class and was elected to Alpha Omega Alpha as a junior. Outside of neurological surgery, Dr. Tonetti is interested in medical education, running, soccer & backpacking. He is a native of Keedysville, Md. Dr. Tonetti completed his seven-year residency program in neurological surgery at the University of Pittsburgh in June of 2021 and is headed to the University of California, San Francisco where he will serve a cerebrovascular fellowship.

Specialized Areas of Interest
Cerebrovascular neurosurgery; endovascular neurosurgery; stereotactic radiosurgery; complex spine; neurotrauma.

Professional Organization Membership
Alpha Omega Alpha Medical Honor Society
American Association of Neurological Surgeons
Congress of Neurological Surgeons
Pennsylvania Neurosurgical Society

Education & Training
BA, MS, Chemical Engineering, Drexel University, 2010
MD, University of Pittsburgh, 2014

Honors and Awards
Theodore Kurze Senior Prize for Excellence in Neurological Surgery and Clinical Neurosciences, University of Pittsburgh, 2014

Publications: 2020-21
• Refereed Articles:
Resident Biographies

Daniel Tonetti, MD


Xiaoran Zhang, MD  
PGY-5 Resident

Xiaoran (Zel) Zhang, MD, MS, joined the University of Pittsburgh Neurological Surgery residency program in June of 2016 after graduating from the University of Pittsburgh School of Medicine. Dr. Zhang obtained a combined BS/MS degree from the Department of Microbiology, Immunology, and Molecular Genetics at University of California, Los Angeles. His master’s thesis was titled “Role of Vitamin D in the Toll-induced Antimicrobial Responses.” During medical school, Dr. Zhang was selected to participate in the Clinical Scientist Training Program and was awarded a master’s level certificate in clinical research. Additionally, he studied the mechanisms of immune escape in isocitrate dehydrogenase mutant gliomas. He was awarded The Theodore Kurze Senior Prize for excellence in Neurological Surgery and Clinical Neurosciences. Dr. Zhang is a native of Henan, China.

Specialized Areas of Interest  
Neuro-oncology; cerebrovascular; and neurotrauma.

Professional Organization Membership  
American Association of Neurological Surgeons  
Congress of Neurological Surgeons

Education & Training  
BS/MS, Microbiology, Immunology, and Molecular Genetics, UCLA, 2012  
MD, University of Pittsburgh, 2016

Honors and Awards  
The Theodore Kurze Senior Prize for Excellence in Neurological Surgery and Clinical Neurosciences, 2016

Publications: 2020-21  
• Refereed Articles:  
Chief Resident Outdoor Graduation Dinner

Department chairman Robert Friedlander with wife Eugenia.

Samantha Sarnicke and mother check out peregrine falcon.

Dr. & Mrs. L. Dade Lunsford get a close look at a prehensile tale skink lizard.

Guests gather at outdoor reception.

Dr. Friedlander with reception guests.

Attending docs and residents get together for masked group shot.
Graduating chief residents (back row) with three of four new 2021-22 residents, Sharath Anand, Andrew Faramand and Sakibul Huq.

Graduating chief resident Nitin Agarwal with wife Preetha (second from right) and family.

Graduating chief resident Daniel Tonetti with family.

Graduating chief resident Michael McDowell and wife with parents.

Graduating chief resident Jeremy Stone and wife Stacy (right) with parents.

Resident wives Lucy Andrews, Preetha Kamath, Stacy Stone, Molly Tonetti and Samantha Sarnicke.
Chief Resident Outdoor Graduation Dinner

Arka Mallela accepts award certificate for highest ABNS score from Dr. Friedlander.

Michael McDowell presents Roberta Sefcik with 'Duh Rules to Being a Good Resident.'

Drs. Friedlander and Joseph Maroon present inaugural Aequanimitas Award to Hanna Algattas.


Dr. Friedlander presents faculty teaching award to Vincent Miele.

Nitin Agarwal receives resident teaching award from Dr. Friedlander.

Michael McDowell presents Roberta Sefcik with 'Duh Rules to Being a Good Resident.'
Drs. Friedlander and Sekula present graduation certificate to Nitin Agarwal.

Dr. Friedlander shows off personalized bobble-head doll given to him by staff for his recent recognition award as a distinguished professor.

Michael McDowell accepts graduation certificate from Drs. Friedlander and Sekula.

Jeremy Stone receives graduation certificate from Drs. Friedlander and Sekula.

Drs. Friedlander and Sekula present graduation certificate to Dan Tonetti.

Graduating chief residents Michael McDowell, Nitin Agarwal, Dan Tonetti, and Jeremy Stone.
Research

Overview

The goal of the Department of Neurological Surgery at the University of Pittsburgh is to improve the care and treatment of patients with neurological disease. This goal is being achieved partly through the implementation and administration of state-of-the-art basic and translational research. Our department—with more than 40 faculty members and investigators—endeavors to be at the forefront of medical research. Numerous advances have already been achieved—research translated into practice.

Annually, the department has been highly ranked in total research funding, a direct result of the success and quality of our research and development. In the 2021 fiscal year, our faculty and residents were involved in more than 160 research projects having a total annual budget award of more than $10 million.

Ongoing research includes the disciplines of molecular biology, neurophysiology, neurochemistry, neuroanatomy, neuroradiology and other neuroscience arenas. Specific questions addressed include research into the acute and chronic care following neurotrauma, neural recovery and plasticity, the neurobiologic and therapeutic response in neuro-oncology, the underlying mechanisms and treatment of epilepsy and movement disorders, cell death and radiation injury, and cerebrovascular physiology and modeling. The department provides an outstanding research environment for fellows, residents, and students seeking training in neurosurgical research.

Intramural research support for junior faculty and residents is available through the Walter L. Copeland Fund. The Walter L. Copeland Fund was established at The Pittsburgh Foundation in 1961, with instructions that the entire annual proceeds support cranial research in the Department of Neurosurgery at the University of Pittsburgh. The Copeland Fund has provided seed funding that has resulted in substantial federal grants to the Department of Neurological Surgery. For example, over the last five years, the department was awarded a total of $750,000 ($150,000 per year). During the same interval, Copeland Fund awardees used the data from these seed funds to apply and receive over $21 million in total external funding to the Department of Neurological Surgery. (See related story on page 247.)

The Walter L. Copeland Laboratory

The Walter L. Copeland Laboratory serves as a central facility for research and development within the Department of Neurological Surgery. Located on the ninth floor of Scaife Hall, the laboratory was dedicated on November 29, 2001 by L. Dade Lunsford, MD. The laboratory houses several research disciplines which provide resources for wide range of neurosurgery faculty, residents, visiting fellows, and students. Neurotrauma, brain imaging, and neuroanatomical research are the primary initiatives being conducted in the laboratory. A significant amount of this work is funded by The Walter L. Copeland Fund, a fund that has provided resources for research at the University of Pittsburgh since 1961.

The Laboratory for Clinical Neurotrauma Research is located in the Copeland Laboratory. Under the direction of David O. Okonkwo, MD, PhD, and co-director, Ava M. Puccio, RN, PhD, the team conducts innovative clinical research with a focus on biomarkers as well as the evaluation of neurotherapeutics for traumatic brain injury.

The Surgical Neuroanatomy Laboratory—under the direction of Paul Gardner, MD—and the Fiber Tractography Laboratory—under the direction of Fang-Cheng (Frank) Yeh, MD, PhD—are also located in the Copeland Laboratory. Residents and visiting fellows train in neuroanatomy and the development of minimally invasive endoNeurosurgical approaches to the brain. New routes to various brain locations are developed using in vitro models.
Research

Overview

The Fiber Tractography Lab is focused on the application of HDFT for presurgical planning and intraoperative navigation to facilitate brain function preservation and improve resection rates in patients with complex brain lesions. The laboratory's work is also centered on studying the structure and connectivity of the fiber tracts forming the "normal" human brain, and their structural alteration in patients with brain tumors, vascular lesions, stroke, and neurodegenerative diseases.

Wendy Fellows-Mayle, PhD, is coordinator of the Copeland Laboratory.

Neurotrauma Research

The Brain Trauma Research Center (BTRC) at the University of Pittsburgh is a multidisciplinary research program aimed at improving outcome following severe traumatic brain injury. Research conducted both at our center and at other brain injury research programs clearly demonstrates the potential for improving outcomes using therapies designed to treat biochemical derangements that occur following impact to the brain. In order to identify the most critical of these sequelae of brain injury and to find newer therapies that are effective in treating them, the BTRC has established several basic science head injury laboratories and clinical research projects.

C. Edward Dixon, PhD, leads the Department of Neurological Surgery’s efforts in preclinical traumatic brain injury research. The research focuses on basic and translational efforts to study mechanisms of cognitive deficits after TBI and to evaluate novel interventions. Shaun Carlson, PhD, leads efforts on synaptic dysfunction mechanisms of TBI. The Department of Neurological Surgery has pioneered efforts in the study of presynaptic mechanisms of cognitive deficits after TBI. Preclinical TBI research is supported by the National Institutes of Health, Veterans Administration, and the Department of Defense.

David O. Okonkwo, MD, PhD, leads the department’s clinical research efforts as director of the Neurotrauma Clinical Trials Center (NCTC). The NCTC performs wide-ranging studies, including clinical trials funded by federal agencies and industry to study new therapies, novel brain monitoring devices, advanced neuroimaging, and biomarkers. The center also houses the National TBI Biospecimens Repository. This repository, under the direction of Ava Puccio, RN, PhD, is the largest centralized collection of biological samples from traumatic brain injury patients in the United States. The Department of Neurological Surgery has pioneered efforts using hypothermia and cerebral blood flow monitoring in the treatment of severe head injury and has conducted landmark investigations into the mechanisms of induction and recovery of head trauma and secondary injury.

The Safar Center for Resuscitation Research is directed by Patrick Kochanek, MD, of the Department of Critical Care, and has a strong collaborative and productive relationship with several members of the Brain Trauma Research Center. Dr. Dixon and Shaun Carlson, PhD, serve as associate directors of the Safar Center. The mission of the Safar Center is to improve understanding of the mechanisms of secondary injury after traumatic brain injury, cardiopulmonary arrest, severe hemorrhage from whatever cause, and to contribute to the development and implementation of novel and increasingly more effective therapies.

Brain Tumor Research

• Basic Science Advances

Our brain tumor basic science research program is a world-class effort focused on delivering novel brain tumor therapies from the laboratory to the bedside. Areas of active investigation include immunotherapy, signal transduction pathways that contribute to the growth of tumor cells, oncolytic viruses, rare tumor exome sequencing, and the development of preclinical animal and brain organoid models for the treatment of brain tumors.
At the core of our program is a commitment to personalized medicine and the development of patient-specific therapies. This commitment begins in the operating room where—with patient consent—tumor samples are retrieved for laboratory investigation under controlled research tumor banking protocols. These specimens are critical to the development of translational targets for brain tumor therapy and brain organoid formation for the investigation of novel biological therapies. This initiative has led to the banking and study of thousands of unique tumor samples, facilitating personalization of brain tumor care for our patients.

Brain tumors are inherently immunosuppressive. Each tumor develops unique mechanisms to escape natural anti-tumor immune responses. We have recently discovered a unique immune escape mechanism that involves silencing of immune recognition genes. Importantly, we have discovered that a new class of tumor drugs, called ‘hypomethylating agents’, can awaken the expression of these genes and allow effective immune responses in IDH mutant gliomas. A Phase I clinical trial is currently being designed based on these findings and is currently being refined by the Alliance for Clinical Trials in Oncology consortium in preparation for a multicenter clinical trial.

Additionally, our program has a strong focus on developing personalized brain tumor therapy by studying humanoid brain organoid tumor models, a biologically more accurate model that simulates a patient’s condition in miniature in the laboratory by replicating the patient’s brain from induced pluripotent stem cells. These organoids are subsequently used to evaluate the biological and genetic evolution of individual brain tumors and, subsequently, to generate and test personalized therapies based on these findings. The desire to develop truly personalized medicine strategies is at the heart of these efforts.

Another exciting area of research in our department involves the development of genetically engineered oncolytic herpes-simplex viruses (oHSV) that can selectively kill proliferating glioma cells but not normal brain cells. Promising preclinical studies in mouse models indicate that this strategy is highly effective for the treatment of glioblastoma. Several patents have been generated and licensed based on this work, and studies are ongoing to evaluate safety testing in preclinical models in anticipation of oHSV clinical trials in the near future.

Previous work in our brain tumor program identified new vaccine strategies for the treatment of gliomas. Researchers in our group developed glioma-associated antigen peptide vaccines to boost tumor-specific immune responses. Phase I clinical trials of these vaccines demonstrate robust induction of antigen-specific immune responses and some clinical activity in both adult and pediatric patients with glioma. These trials are ongoing at the University of Pittsburgh Cancer Institute and Children’s Hospital of Pittsburgh. Recent studies have identified patterns of gene expression in peripheral blood mononuclear cells that are associated with response and resistance to peptide-based vaccination in pediatric low-grade gliomas. Future studies will evaluate whether these features are also seen in other subgroups of childhood brain tumors incorporated on our vaccine trials.

Another strategy in brain tumor research is to inhibit the pathways that promote tumor growth or to stimulate those that promote tumor cell killing. The poor response of malignant gliomas to conventional therapies, such as cytotoxic chemotherapy or radiotherapy, reflects resistance of these tumors to undergoing apoptosis in response to DNA damage or mitogen depletion. Through a large-scale screening study, we have identified several exploitable targets, which when inhibited induce tumor cytotoxicity. We have been examining pharmacological agents to inhibit these targets, alone and in combination with agents that induce apoptotic signaling in these tumors. The clinical research branch of our Brain Tumor Program currently runs “personalized” clinical studies based on patients’ gene mark-
ers, such as human leukocyte antigen (HLA)-A2 (for immunotherapy studies), epidermal growth factor receptor (EGFR) variant III and chromosome 1p/19q co-deletion. In addition, the program offers a host of molecularly targeted treatment approaches for children whose brain tumors have genomic alterations that make them ideally suited for specific novel-agent trials. These include studies of MEK inhibitors (e.g. Selumetinib) for children with BRAF-altered low-grade gliomas, which are being conducted by the PBTC and more recently, the Children’s Oncology Group.

Similarly, members of our group are studying rare skull base tumors such as chordoma by performing whole exome sequencing to search for novel genetic alterations in these tumors that could lead to a better understanding of their oncogenesis as well as targets for treatment. These targets are then evaluated to see if current therapies can be applied to these rare tumors. The impact of methylation in skull base tumors is also being studied to understand if these genetic changes, which occur throughout life, play a role in tumor prognosis. In addition, our surgeons and pathologists have identified a molecular panel that can help predict chordoma clinical behavior and prognosis. This panel is now applied on a regular basis to our patients to provide a personalized approach for current and future treatment.

- Clinical Care Advances

Currently, clinical care of patients with skull base tumors, primary brain tumors and metastatic brain tumors related to systemic cancer represent a major focus for our department’s activities. During the last 38 years, the Center for Image Guided Neurosurgery has provided care to more than 20,000 patients with such tumors as an adjuvant or alternative minimally invasive treatment strategy. One of the most important adjuvant strategies to control brain tumor progression is optimization of radiation delivery techniques. Using technologies such as Gamma Knife® radiosurgery at UPMC Presbyterian (over 17,000 patients and more than 1,000 published articles, books or chapters) and linear accelerator radiation technologies at UPMC Shadyside, methods to enhance the efficacy and safety of radiation delivery have been pioneered. The International Radiosurgery Research Foundation and corporate entities have funded UPMC to perform radiosurgery for recurrent malignant gliomas coupled with bevacizumab as part of a phase 2 clinical trial. Long term outcome assessments have been completed for patients with metastatic brain cancer, a condition where radiosurgery often has replaced conventional surgery and radiation therapy as the initial management.

Working in concert with these advanced radiosurgery and radiation technologies, the UPMC Center for Cranial Base Surgery is the oldest skull base center in North America. They have been a source of innovation for decades, helping develop new and less invasive approaches, such as the endoscopic endonasal and transorbital approaches, to limit the impact of surgery for these challenging tumors.

Since 1975 the department has been noted as a source of innovation in brain tumor diagnosis and management. In 1981 the first dedicated CT scanner was installed in a unique operating room at UPMC Presbyterian to facilitate minimally invasive surgical techniques. Updated in 2009, this facility also serves as a site to explore less invasive strategies for tumor removals such as the endoscopic endonasal approach, endoresection using guiding technologies coupled with endoscopic removal, and transorbital approaches. Working hand in hand with our skull base program innovative combined strategies for tumor biopsy or removal followed by adjuvant radiosurgery, chemotherapy, or immunotherapy has offered new advances in patient care resulting in ever longer high-quality outcomes. Our pediatric program has also been enhanced by the opening of an intraoperative MRI suite, which facilitates the goal of achieving safer and more extensive resections in challenging childhood brain tumors.
Innovative imaging techniques are being developed and applied to better understand brain tumors and their structural relationship with surrounding white matter tracts. High-Definition Fiber Tractography (HDFT) provides a superior presurgical evaluation of the fiber tracts for patients with complex brain lesions, allowing us to reconstruct fiber tracts and design a less invasive trajectory into the target lesion. We are currently investigating its potential for not only presurgical planning and intraoperative navigation but also for neurostructural damage assessment, estimation of postsurgical neural pathway damage and recovery, and tracking of postsurgical changes, neuroplasticity, and responses to rehabilitation therapy. The ultimate goal is to facilitate brain function preservation and recovery in patients undergoing complex brain tumor surgery.

**Magnetoencephalography (MEG) Research**

The aim of MEG research, directed by Avniel Singh Ghuman, PhD, is to facilitate, develop, and advance clinical and basic neuroscience research using magnetoencephalography. To this end, Dr. Ghuman is helping to develop new research applications for MEG in collaboration with researchers throughout the community.

MEG is the most powerful functional neuroimaging technique for noninvasively recording magnetic fields generated by electrophysiological brain activity, providing millisecond temporal resolution and adequate spatial resolution of neural events.

MEG is currently being used to study the healthy brain—both in adults and during development—in order to understand the neural basis of cognitive processes, including reading, vision, audition, motor control, semantic memory, executive functioning, emotional processing, and working memory. Furthermore, groups in the community are also using MEG to understand how neural processing is disturbed in a host of pathologies, including TBI, schizophrenia, spinal cord injury, HIV-AIDS, epilepsy, autism spectrum disorders, Alzheimer's disease, and Parkinson's disease. The MEG currently supports both presurgical clinical services and seven major (R01 or equivalent) NIH grants.

**Laboratory of Cognitive Neurodynamics**

The Laboratory of Cognitive Neurodynamics, under the direction of Avniel Ghuman, PhD, studies how our brain turns what falls upon our eyes into the rich meaningful experience that we perceive in the world around us. Specifically, the goal of these studies is to examine the spatiotemporal dynamics of how neural activity reflects the stages of information processing and how information flows through brain networks responsible for visual perception. The lab is particularly interested in the dynamic neural representation of faces, bodies, objects, words, and social and affective visual images. This work by the Laboratory of Cognitive Neurodynamics is supported by a Biobehavioral Research Award for Innovative New Scientists from the National Institute of Mental Health, an R21 grant from the National Eye Institute, and a brain initiative grant from the National Science Foundation.

**Neuroapoptosis Research**

The focus of the Neuroapoptosis Laboratory at the University of Pittsburgh Department of Neurological Surgery, under the direction of Robert Friedlander, MD, is the study of the basic mechanisms of apoptosis, as mediated by the caspase apoptotic family in neurologic diseases. In addition, discovering novel approaches to ameliorate the impact of cell death in a variety of neurological diseases is a central theme of the Neuroapoptosis Laboratory. The role of synaptic mitochondrial vulnerability, specifically as it relates to synaptic degeneration, has been a recent focus.
The lab is evaluating the impact of apoptotic cell death, and in particular, that mediated by the caspase cell death family on the pathogenesis of neurodegenerative diseases. Neurodegenerative diseases presently being investigated are Huntington’s Disease (HD), Alzheimer’s Disease (AD) and Amyotrophic Lateral Sclerosis (ALS). Given that ageing plays a role in all of these diseases, the impact of normal and pathological ageing is also being evaluated. Activation of the caspase cell death cascade appears to play an important role in a variety of neurodegenerative diseases. Researchers have demonstrated that inhibition of the Caspase-1 (also known as ICE) apoptotic gene slows the progression and delays mortality in transgenic mouse models of ALS and Huntington’s disease. Furthermore, delivering caspase inhibitors directly into the brain of these transgenic mice prolongs their survival. This was the first time that any intervention had been demonstrated efficacious in a HD model. Adding relevancy to these findings, researchers have also demonstrated that caspase-1 is activated in the brain and spinal cord of humans with HD and ALS respectively. They also have demonstrated that Minocycline demonstrates neuroprotection in a mouse model of HD.

Apoptotic cell death plays a significant role in stroke as well as traumatic brain and spinal cord injury. Researchers are evaluating the impact Caspase family activation has on apoptotic cell death in these conditions. The relation of the caspase family and free radical production is also being investigated as well as targeted caspase-mediated pharmacoprotection.

Using in vitro models, researchers are evaluating both the mechanisms involved in the activation of Caspases, as well as the post-Caspase activation pathways involved in cell death. The role of inflammatory pathways in neurodegeneration continues to be a focus of research. Researchers are also evaluating the basic mechanisms of cell death, and especially as they relate to neurologic diseases.

An additional recent focus of the Neuroapoptosis laboratory has been the demonstration that neuronal melatonin is synthesized exclusively in mitochondria. This has significantly altered the understanding of the biology of this important signaling molecule. Given that the laboratory first demonstrated that melatonin receptors are located on the mitochondrial outer membrane, this suggest melatonin is made in the mitochondrial where it is secreted and then binds to its high affinity receptor. This “automitocrine” pathways modulates mitochondrial stability and neuroprotection. We have also created a new mouse model where the rate limiting step of melatonin synthesis has been knocked out. This model has features of accelerated ageing and is an important tool in our ongoing studies.

Neurodegeneration Research

Robert Friedlander, MD, is investigating the neuropathology and mechanisms of neurodegeneration in adult-onset neurological diseases. Pre-clinical drug trials in mouse models of neurological disease act as a conduit of therapeutic agents for direct translation to human clinical trials in Huntington’s disease and amyotrophic lateral sclerosis patients.

A major goal of current clinical research is to identify parallels in peripheral and central biomarker detection of disease and manifestations of neuronal dysfunction with transition to potential disease-modifying therapies that are being developed and evaluated in the clinical setting, especially in early stage disease. The goal is to create a data set of multiple markers that can be used with multivariate techniques to develop a unique biochemical signature relating to neurological diseases and to evaluate correlative biomarkers and biomarkers in response to therapy.
Fiber Tractography Laboratory

Fiber tracking is an advanced MRI-based non-invasive imaging technique used to study the intrinsic structure and connectivity of the living human brain, both in normal subjects and neurosurgery/neurology patients.

The Fiber Tractography Lab—under the direction of Fang-Cheng (Frank) Yeh, MD, PhD—is focused on the application of fiber tracking for presurgical planning and intraoperative navigation to facilitate brain function preservation and improve resection rates in patients with complex brain lesions. Dr. Yeh developed DSI Studio and applied it to study the structure and connectivity of the fiber tracts forming the human brain, and their structural alteration in patients with brain tumors, vascular lesions, stroke, and neurodegenerative diseases.

These are the main areas of research:

• Presurgical Assessment of Fiber Tracts and Surgical Planning
  Fiber tracking provides a superior presurgical evaluation of the fiber tracts for patients with complex brain lesions, including low grade and high-grade gliomas. Presurgical studies are built upon precise and accurate neuroanatomical knowledge, which allows doctors to reconstruct perilesional or intralesional fiber tracts, design the less invasive trajectory into the target lesion, and apply more effectively intraoperative electrical mapping techniques for maximal and safe tumor resection in eloquent cortical and subcortical regions.

  Our clinical experience applying fiber tracking has been reported in Neurosurgery, Journal of Neurosurgery, and Neuro-oncology among others. The lab is actively investigating its potential for not only presurgical planning and intraoperative navigation, but also for neurostructural damage assessment, estimation of postsurgical neural pathways damage and recovery, and tracking of postsurgical changes and responses to rehabilitation therapy.

• Fiber Tract Integrity and Damage Progression in Neurological Disorders
  Researchers are currently studying patients with amyotrophic lateral sclerosis (ALS) and Huntington’s disease, aiming to obtain quantifiable measures of white matter tract integrity that can be correlated with the speed of disease progression and with clinical measures. The ultimate goal is to find an accurate biomarker of the disease that can be monitored and serve as a reference for treatment response.

• Mapping Normative Brain Connections Using Fiber Tracking
  Studies in the Fiber Tractography Lab have contributed to elucidate the structure, connectivity, and potential functional role of the major fiber pathways and how they give rise to brain functions. Innovative studies using data from the Human Connectome Project are being completed to construct population-based tractography atlases.

Surgical Neuroanatomy Laboratory

The Surgical Neuroanatomy Lab (SNL) has a dual educational and research role aiming to improve surgical techniques and outcomes by mastering knowledge of relevant surgical neuroanatomy. Under the joint direction of Paul Gardner, MD, and George Zenonos, MD, in the Department of Neurological Surgery, and Carl Snyderman, MD, MBA, and Eric Wang, MD, in the Department of Otolaryngology, the lab follows our clinical philosophies of teamwork and innovation.

Many national and international students, residents, and fellows have conducted training and research at the SNL during the last years. The working philosophy at the SNL is that of Albert L. Rhoton, Jr., MD, handed down from Juan Fernandez-Miranda, MD: meticulous and
exquisite anatomical microdissections to better understand the intricacies of the complex anatomy of the human brain and skull base.

The lab has four main research/educational areas: endoscopic skull base anatomy, microsurgical neuroanatomy, new approach development, and white matter anatomy/brain connectivity/surgical planning.

• Endoscopic Skull Base Anatomy
The Endoscopic Endonasal Approach (EEA) has revolutionized skull base neurosurgery. The EEA has anatomical and technical advantages over open skull base approaches for the treatment of selected lesions. EEA is not minimally invasive but designed to be maximally effective for the treatment of a wide variety of ventral skull base lesions. The Surgical Neuroanatomy Laboratory at the University of Pittsburgh has pioneered anatomical work on the area of skull base endoscopy, and its goal is to continue providing landmark contributions to the skull base community. Meticulous knowledge of the ventral skull base anatomy as seen from the endoscopic perspective is critical to apply endonasal endoscopic surgery in an effective and safe manner.

• Microsurgical Neuroanatomy
Conventional skull base approaches are being compared with novel endoscopic endonasal approaches to aid in understanding indications and limitations of different but complementary skull base approaches. Contemporary skull base surgeons should combine expertise in open and endoscopic skull base approaches to select the most appropriate approach and technique for each particular case. Emphasis is made on the circumferential conceptualization of the skull base and the selection of "anatomically-favorable" surgical routes.

• New Approach Development
Following our philosophy of constant evaluation and innovation between the anatomy lab and the operating room, the SNL is used to develop and examine new approaches or expand known approaches to help define modern skull base surgery. Examples include the expansion of the lateral orbitotomy to the cavernous sinus and middle fossa and the development of the contralateral transmaxillary (CTM) approach.

• White Matter Anatomy
Dissection of the white matter fiber tracts provides a unique insight into the complex intrinsic architecture of the brain and builds up an essential knowledge for operating on intra-axial tumors. A unique feature of our white matter studies is the combination with advanced imaging techniques, such as High-Definition Fiber Tractography (HDFT), to facilitate greater understanding of brain connectivity “in-vivo” and in neurosurgery patients. These techniques are also being studied to try to improve the imaging of cranial nerves.

Brain Tumor Evolution & Therapy Lab
The Laboratory of Brain Tumor Evolution & Therapy, under the direction of Baoli Hu, PhD, is interested in the genetic and epigenetic events contributing to the evolution of brain tumors. The long-term goal of the lab is to achieve a better understanding of brain tumor biology and to develop more effective diagnoses and therapeutic strategies for the treatment of brain cancer.

Cancer is increasingly being viewed as an ecosystem where the cancer cells dynamically evolve and spatiotemporally communicate with surrounding cells and environmental factors. Deciphering this evolutionary complexity allows us to better understand brain tumor initiation, progression, recurrence, and drug resistance. The Brain Tumor Evolution
& Therapy Lab is focusing on glioma and medulloblastoma, the most common malignant brain tumors in adults and children, respectively. Specific projects are as follows:

- **Modeling the evolution and diversity of brain tumors using human-in-mouse system**
  Intratumor genetic heterogeneity and phenotypic diversity are the hallmarks of glioma and medulloblastoma, which predict the risk of tumor development, progression and response to treatment. To delineate crosstalk mechanisms of these factors, we have been developing human-in-mouse model systems based on malignant transformation of human neural/ cerebellar stem cells driven by subtype-specific genetic/epigenetic alterations. These models can faithfully recapitulate the molecular diversity, cellular heterogeneity, and histology seen in patient tumors. In addition, these models enable precise system-level comparisons of premalignant and malignant states of these stem cells, which deepens our understanding of tumor evolutionary dynamics in the molecular and cellular level. The key regulators in this process are validated as diagnostic biomarkers and therapeutic targets for clinical application.

- **Interrogating consequences of stem cells plasticity within brain tumor microenvironment**
  Emerging evidence suggests that glioma/medulloblastoma stem cells may contribute to tumor evolution and anti-therapy. We previously found that glioblastoma stem cells (GSCs) differentiate into endothelial-like cells (GdECs), which recruit host endothelial cells (ECs) to form an invasive niche, resulting in tumor invasiveness and recurrence. We are continuing our efforts to gain a better understanding of the molecular mechanisms of these cancer stem cells, and how they communicate with their surrounding cells (e.g. endothelial cells, microglia/macrophages, astrocytes, etc.), which allows us to develop novel and more effective therapies by targeting critical components of the tumor microenvironment.

- **Illuminating mechanisms governing cancer cells invasion and dissemination in brain**
  The major challenge in the clinical management of glioblastoma is that cancer cells extensively infiltrate into the surrounding tissue, leading to nearly universal recurrence. Group 3 medulloblastoma is characterized by frequent metastasis at diagnosis and the worst prognosis among all the subgroups. We aim to elucidate molecular mechanisms of de novo invasion and treatment-induced invasion (e.g. TMZ, bevacizumab, etc.), which enables us to identify “drivers” mediating cancer cells invasion and to dissemination and to aid in the development of new therapies.

**Brain Tumor Biology and Therapy Laboratory**

The Brain Tumor Biology and Therapy Laboratory, under the direction of Sameer Agnihotri, PhD, studies pediatric and adult high-grade gliomas (HGG) and diffuse intrinsic pontine gliomas (DIPG). The lab has a focus on several topics:

- It is now appreciated that HGG glioma comprises of several molecular subgroups and that the genetics of pediatric and adult HGG are distinct. Therefore a "one size that fits all" approach to therapy will not be successful. The Agnihotri Laboratory interests include using next-generation sequencing technology to identify and validate driver alterations of various HGG with a focus on DIPG and non-histone mutated “RTK” Glioblastoma (GBM).

- A defining hallmark of glioblastoma and DIPG is altered tumor metabolism. The metabolic shift towards aerobic glycolysis with reprogramming of mitochondrial oxidative phosphorylation, regardless of oxygen availability, is a phenomenon known as the Warburg effect. In addition to the Warburg effect, glioblastoma tumor cells also utilize the tricarboxylic acid cycle/oxidative phosphorylation in a different capacity than normal tissue. The Agnihotri Laboratory investigates the metabolic dependencies of brain tumors and if they can provide therapeutic vulnerabilities.
• The lab uses the genomic and metabolic information to build better representative brain tumor pre-clinical models for testing of novel therapies. Working closely with a clinical team, use of these accurate models are essential to start early phase clinical trials.

**Pediatric Neurosurgery ImmunoOncology Laboratory**

The Pediatric Neurosurgery ImmunoOncology Laboratory (PNIO) at the University of Pittsburgh, under the direction of Gary Kohanbash, PhD, seeks to develop novel immuno-oncology approaches to treat deadly pediatric central nervous system tumors. With over a decade of experience in translational brain tumor immunology and involvement in numerous clinical trials, the laboratory has a specific focus on high-grade and low-grade gliomas, and ependymomas.

It is now known that immune cells can traffic into the central nervous system (CNS) and mediate anti-tumor responses. However, owing to its immune-privileged status and delicate brain structures, safety and efficacy must be considered in a different manner than tumors occurring outside of the CNS. With significant developments in next-generation sequencing, novel targets targeting pediatric CNS tumors are being identified.

The PNIO seeks to bridge the gaps between bioinformatics, preclinical studies, and patient care. Specific emphasis in the PNIO involve improving peptide vaccine immunotherapy through the following projects:

• Identification of novel targetable tumor antigens and neoantigens.
• Employing combination therapies using checkpoint inhibitors such as anti-PD1 and anti-TIGIT with peptide vaccine immunotherapy.
• Understanding how tumor genetics create a hostile environment for T-cell responses at the tumor site.
• Enhancing expression of molecules that make the tumor visible to the immune system.
• Non-invasive immunoPET of activated T-cells and Tumor-Associate Myeloid Cells (TAMCs) during IO therapy.
• Identification of biomarkers for CNS IO clinical trials.
• Single-cell RNA-sequencing to identify immune-cell and tumor cross-talk.

**National TBI Biospecimens Repository**

A national repository of biological samples from patients who have sustained traumatic brain injuries (TBIs) has been established in the Department of Neurological Surgery at the University of Pittsburgh. This biorepository supports the Transforming Research and Clinical Knowledge in Traumatic Brain Injury (TRACK-TBI) study, a multi-center initiative funded by the National Institutes of Health (NIH) that is intended to revolutionize clinical care for brain-injured patients. A central goal of the TRACK-TBI biorepository is to identify blood-based biomarkers that can assist hospital-based clinicians in diagnosing TBIs and allow industry partners in the laboratory to identify new, effective treatments. Three thousand participants who have sustained a TBI have been recruited into the TRACK-TBI study, and a large, high-quality database of clinical, imaging, biomarker, and outcome data is being generated.

In collaboration with the TRACK-TBI coordinating center at the University of California San Francisco (led by Geoff Manley, MD) and our 17 U.S. partner sites, David Okonkwo, MD, PhD, and Ava Puccio, RN, PhD, at the University of Pittsburgh received a large supplemental award from the U.S. Department of Defense to establish the TRACK-TBI biorepository. Following laboratory renovations and certification in February 2016, the Department of Neurological Surgery at the University of Pittsburgh became the official new home of the TRACK-TBI biospecimens repository.
The TRACK-TBI biorepository is the largest centralized collection of biological samples from TBI patients in the US. For a complex disorder like TBI, which has global incidence but lacks definitive clinical classification for diagnosis and therapy, multicenter collaboration is key for progress in research. Only with large numbers of patients and samples will researchers be able to address the many variations of TBIs. Similar to other disease processes, such as cardiovascular disease and cancer, diagnoses must be matched with a biomarker of injury and genetic markers for treatment directives.

Additional NIH-funded studies have recognized the expertise of the biorepository and are utilizing the biorepository efforts.

**“Front-Runner” Biomarkers for Diagnoses/Ongoing Abbott Laboratories Pivotal Trial**

The partnership with the TRACK-TBI effort has already borne fruit, with an early indication from the pilot work on a biomarker of interest, glial fibrillary acidic protein (GFAP), a brain-specific protein released into serum as a pathophysiological response to TBI. Based on the initial TRACK-TBI sample set (215 patients), the measurement of GFAP in blood has been shown to be effective in identifying patients with a high likelihood of having abnormal pathology seen on a CT scan, and was validated in a larger sample set. GFAP and UCH-L1 were recently approved by the FDA for clinical use in identifying patients unlikely to have lesions on head CT when measured in serum in the acute phase after injury.

Through the support of the NIH and the Department of Defense, and in partnership with the national TRACK-TBI study, investigators at the University of Pittsburgh Department of Neurological Surgery are generating an international resource statistically powered to validate new, clinically relevant TBI biomarkers.

**Cerebral Aneurysm Research Lab**

Cerebral aneurysms are common vascular lesions seen in up to five percent of the population, that, when ruptured, can lead to catastrophic consequences with up to 50 percent mortality and morbidity. The cerebral aneurysm research lab aims to further the understanding of molecular pathways underlying cerebral aneurysm formation in order to induce repair and prevent rupture. Current research efforts are directed by resident Kamil W. Nowicki, MD, PhD, under the joint mentorship of Robert M. Friedlander, MD, and Bradley Gross, MD. Techniques and models used in the lab depend heavily on molecular cell biology, animal surgeries and biomedical engineering to study immune cell behavior in response to chemokines and their interactions with hemodynamic shear stress. Current projects include:

- **Role of Platelets in Cerebral Aneurysm Formation and Healing**
  This project is actively exploring the role of platelets and inflammatory cytokines released by platelets in cerebral aneurysm formation. Current efforts are directed on using small molecule inhibitors in preventing aneurysm formation. This work resulted in a patent application, Pitt ID #05390 “Methods of treating aneurysms.” (U.S. Provisional Application No.: 63/067,604). Recently, the research team was selected to participate in the “Pitt Ventures: First Gear 2021” program to explore the road towards commercialization.

- **Role of Hemodynamic Shear Stress in Cerebral Aneurysm Formation**
  This study utilizes a novel in vitro model that simulates flow conditions within human aneurysms to induce inflammation and secretory chemokine response. In previous work, the authors showed that hemodynamic shear stress induces aneurysm formation via interleukin-8 and CXCL-1 mediated neutrophil inflammatory response. That work resulted in a patent application UFTINV-200015 T17844 “Drug therapy to prevent formation or
enlargement or rupture of aneurysms. In a follow-up paper, they were able to show that this inflammatory response results in M1/M2 macrophage imbalance, driving aneurysm formation.

- **Biomarker Discovery and Platform Development**
  Ongoing study that focuses on biomarker discovery to arrive at a blood test for cerebral aneurysm formation. Currently in animal model and human retrospective study stage with future efforts directed at a prospective IRB-approved study.

- **Novel Endovascular Medical Devices**
  New ongoing collaboration with Seungil Kim, PhD, and William Wagner, PhD, from the University of Pittsburgh Department of Biomedical Engineering that is moving from in vitro to in vivo phase. This project is exploring novel pH-responsive embolic agents and designer alloys for endovascular treatment of cerebral aneurysms.

**Spinal Cord Stimulation Laboratory**

The Spinal Cord Stimulation Laboratory, under the direction of Marco Capogrosso, PhD, and part of the University of Pittsburgh Rehab and Neural Engineering Labs, broadly studies the interactions between electrical stimulation and the dynamics of spinal circuits. Specifically, laboratory activities are focused on three areas of interest.

- **Area 1: Computational models of spinal cord stimulation.** We use computational neuroscience tools, Finite Element Methods and modern AI strategies to decipher the computational principles underlying the interaction of artificial electrical stimulation and the neural dynamics of spinal circuits. Specifically, we aim to understand how artificial inputs are transformed into coordinated movements by the spinal cord.

- **Area 2: Electrophysiology of spinal circuits and mechanisms of neuromodulation.** We perform electrophysiology in animal models such as rats, and monkeys to understand how the spinal cord and the brain reacts to electrical stimulation. We aim to combine results from computer models to experimental data to optimize neurostimulation technologies and design new effective therapies to motor paralysis.

- **Area 3: Clinical applications of spinal cord stimulation in motor disorders.** We apply the results of computational and animal studies in translational clinical trials in patients that suffer from motor disorders such as stroke, spinal cord injury and motoneuron diseases. Specifically, we aim to test new implantable technologies to improve motor and sensory functions in people with arm and hand paralysis.

**Cortical Systems Laboratory**

The Cortical Systems Lab, under the direction of Jorge A. González-Martínez, MD, PhD, is a neuroscience translational laboratory studying brain electrophysiology, cognition and language in patients undergoing epilepsy and movement disorder surgery. The main goal of our work is to better understand the neurobiology of cortical systems in humans. We aim to develop new methods for brain mapping and therapeutic options for patients with medically refractory epilepsy and movement disorders, including neuromodulatory and resective procedures. The laboratory is highly integrated with the University of Pittsburgh Epilepsy Center and the Carnegie Mellon University Department of Biomedical Engineering.

- **Epilepsy Monitoring Unit (EMU)**
  The laboratory clinical arm is the epilepsy monitoring unit, part of the University of Pittsburgh Epilepsy Center. The epilepsy center at the University of Pittsburgh is one of the leading epilepsy surgery programs in the world, with more than 5,000 adult patient-visit annu-
Overview

ally. The program offers the opportunity for comprehensive evaluation in a self-contained, eight-bed, adult epilepsy monitoring unit (EMU). The EMU features the latest technology including state-of-the-art, all digital video EEG equipment in private rooms. Operating around the clock, seven days a week, the unit is staffed by a dedicated team of nurses and EEG technologists specializing in epilepsy and overseen by staff epileptologists. The unit is part of the Comprehensive Epilepsy Center, a multi-disciplinary group of neurosurgeons, neurologists neuroradiologist, neuropsychologist, nurses, residents and fellows who coordinate the care and research related topics for patients with medically refractory epilepsy. Patient Management Conference Meetings (PMCs) are performed weekly, on Mondays, where all aspects of patient care are discussed in an academic and teaching environment. Approximately 50 to 60 invasive monitoring procedures (SEEG) are performed per year in our center.

Molecular Tumor Biology and Personalized Precision Therapy Lab

The Molecular Tumor Biology and Personalized Precision Therapy Lab, under the direction of Pascal Zinn, MD, PhD, focuses on patient-centered care for brain and spinal tumors. Every patient is unique and so is every tumor; therefore, a personalized precision approach is fundamental to the treatment of tumors. Utilizing humanoid brain disease avatars or so-called brain organoid models, Dr. Zinn replicates the patient’s condition in the laboratory and thus studies how tumors form and how tumors can be treated using tumor genetics precision approaches. Furthermore, Dr. Zinn is developing personalized biologically-adaptable and patient-tailored, virus-based therapies for brain cancer.
Investigator Research Summaries

**Hussam Abou-Al-Shaar, MD**  
*PGY-3 Resident*

Dr. Abou-Al-Shaar is looking at the outcomes of patients who underwent endoscopic endonasal surgery for pituitary adenomas, chordomas, among other pathologies. Additionally, he is investigating the role of combined transcranial and endoscopic endonasal approaches for various skull base lesions to determine their efficacy and limitation. Dr. Abou-Al-Shaar is investigating the role of a novel imaging tool in determining visual recovery and outcomes following endoscopic endonasal surgery for pituitary adenoma. He is also interested in elucidating the role of gamma knife radiosurgery in the management of various skull base and cerebrovascular pathologies.

**Ali Alattar, MD, MAS**  
*PGY-2 Resident*

- **Augmented reality image-guidance platforms in neurosurgery.** This project aims to improve the trajectory of ventriculoperitoneal shunt catheter placement and pedicle screw placement using augmented reality from the Microsoft Hololens 2 device running Novarad’s OpAR software. Pedicle screw and ventriculostomy placement trajectories will be graded and compared between traditional non-guided arms and augmented reality guidance in phantom and cadaveric specimens as well as living patients.

- **Blood-based biomarker for diagnosis of intracranial aneurysms.** This project aims to develop a diagnostic test to determine the presence of intracranial aneurysms based on cytokine concentrations in samples of peripheral blood. Researchers are using aneurysm-induced mouse models to define a panel of cytokines expressed at high levels in the presence of intracranial aneurysms. Dr. Alattar leads the statistical effort to create predictive models to efficiently diagnose intracranial aneurysms and distinguish them with high specificity from aneurysms found extracranially. Researchers are also in the process of creating a web application to host statistical models and predict the presence of intracranial aneurysms based on user-uploaded cytokine array data. Two patent applications are pending, and the project was recently selected for participation in the University of Pittsburgh’s “Pitt Ventures First Gear 2021” program to explore the road towards commercialization.

**Marco Capogrosso, PhD**  
*Assistant Professor  
Director, Spinal Cord Stimulation Laboratory*

In the last year, Dr. Capogrosso’s lab—like all the other labs in the world—had to face the challenge of working during the COVID-19 pandemic. Remote working; difficulties in performing clinical research due to risks for subjects; in-person working restrictions; and family and relative international travel restrictions took their toll on lab members. For this, Dr. Capogrosso would like to acknowledge the efforts of all team members that have, nonetheless, made incredible advances despite these tremendous challenges. Indeed, despite these difficulties, the lab managed to accomplish outstanding achievements. They initiated a pioneering clinical trial testing the efficacy of spinal cord stimulation to restore arm and hand function in people with stroke (NCT04512690). The first subject completed the trial with results that exceeded expectations. Following up on this success—in collaboration with Doug Weber, PhD, at Carnegie Mellon University and Peter Gerszten, MD, from the Department of Neurological Surgery—the lab received substantial financial support from the UPMC Enter-
prise investment fund to transform this trial into a novel therapy for people with post-stroke hemiparesis. In parallel, the lab received approval from the Institutional Animal Care and Use Committee (IACUC) to perform an experimental investigation in non-human primates to understand the mechanisms underlying motor recovery with spinal cord stimulation. Dr. Capogrosso’s lab published four publications, including results from our research in the prestigious *Nature Communications* and *Cell Systems*.

**Diane L. Carlisle, PhD**  
*Associate Professor*

In the past year, Dr. Carlisle has used patient-specific induced pluripotent stem cells (iPSCs) to investigate mitochondrial function of neural progenitors and neurons from sporadic and familial ALS patients as well as from Huntington’s Disease patients. She has differentiated iPSCs into neural progenitors and mature neurons and isolated mitochondria for analysis. She has found proteomic and functional differences between neurons and controls from neurodegenerative disease patients.

**C. Edward Dixon, PhD**  
*Neurotrauma Chair Professor*  
*Vice Chair, Research*  
*Director, Brain Trauma Research Center*

With funding from the NIH and VA, Dr. Dixon is conducting MRI tractography studies on neurotransmitter pathways after experimental TBI. He is also examining retinoic acid modulation of markers of synaptic plasticity after TBI. Dr. Dixon has also been collaborating on a project to examine the effect of enriched environment on behavior in Alzheimer's Disease transgenic mouse models. Lastly, in work funded by the state of Pennsylvania, he is examining potential fluid biomarkers of synaptic damage after experimental TBI.

**David T. Fernandes Cabral, MD**  
*PGY-4 Resident*

Dr. Fernandes is currently collaborating in the development of advanced fiber tractography for the spinal cord. This will allow further study of spinal cord anatomy as well as increasing the understanding of different diseases affecting this region of the central nervous system. In addition to this, Dr. Fernandes is currently working on functional anatomy, trying to understand the functionality of the different white matter tracts in the brain. On top of the research activities, Dr. Fernandes is currently working on developing an anatomy series for junior residents.

**Paul A. Gardner, MD**  
*Peter J. Jannetta Professor*  
*Executive Vice Chair, Surgical Services*  
*Neurosurgical Director, Center for Cranial Base Surgery*  
*Director, Surgical Neuroanatomy Lab*

Dr. Gardner’s recent projects include collaboration on an update of the molecular prognostication panel for clival chordoma developed by Georgios Zenonos, MD. The research won the best paper award at the NASBS (North American Skull Base Society) meeting this past year and helped define the role of radical resection and adjuvant radiation for low and moderate grade chordomas (determined by FISH analysis). This panel is also being investigated for use by the Chordoma Foundation to identify patients with aggressive, poor prognosis
tumors who would be candidates for early chemotherapy trials and multi-institutional validation.

Dr. Gardner continues evaluation of clinical cohorts of patients with skull base tumors to show impact and outcomes of treatment, largely endoscopic endonasal surgery. In addition, background work evaluating the impact of hormonal therapies on meningioma has begun in preparation for a larger scale case series.

Dr. Gardner also has a continued role as investigator for Peripheral Nerve Matrix (PNM), an extracellular matrix-derived product for nerve repair. The company (Renerva) formed about this product is continuing work through animal studies in preparation for clinical trial.

Dr. Gardner also has continued with a multi-institutional study with the University of Minnesota to studying the genetic and epigenetic makeup of chordomas and chondrosarcomas. This research is delineating genetic subgroups of chordoma and chondrosarcoma to help predict prognosis as well as target novel drug therapies. These efforts will dramatically further the pathway toward personalized treatment of these and other rare tumors.

Peter C. Gerszten, MD, MPH
Peter E. Sheptak Professor
Vice Chair, Quality Improvement
Director, Percutaneous Spine Service

This year, Dr. Gerszten has begun to explore the role of spinal cord electrical stimulation for an expanding variety of indications. Dr. Gerszten has a long interest in spinal neuro-modulation. His previous work documented the potential use of radiosurgery for spinal neuromodulation. Based upon successful animal research, Dr. Gerszten collaborated with members of the University of Pittsburgh Rehabilitation Neural Engineering Laboratories and the Neurosciences Institute of Carnegie Mellon University to perform the first ever implantation of a cervical spinal cord stimulator in a patient with a stroke in order to overcome arm paralysis. Epidural electrical stimulation is currently used to treat pain caused by damage or injury to the cervical spinal nerves. The implantation of electrodes over the cervical dorsal root ganglia should allow for the selective engagement of hand and arm muscles by providing the surviving neural circuits with appropriate electrical signals. By adjusting the location of the cervical leads as well as modifying the electrical stimulation of the spinal cord stimulator, patients should have the ability to regain use of paralyzed limbs.

Dr. Gerszten's clinical research focuses on the adoption of minimally invasive surgical treatments for disorders of the spine. Such minimally invasive techniques allow for decreased morbidity while improving outcomes in neurosurgical patients. Such techniques include the use of expanded radio frequency ablative techniques for patients with spinal tumors. Dr. Gerszten continues to expand and systematically analyze the clinical outcomes and safety profiles associated with the use of new spinal implant devices. He has a particular interest in documenting the safety and efficacy of minimally invasive sacroiliac joint fusions using titanium screw implants for sacroiliac joint dysfunction.

Avniel Singh Ghuman, PhD
Associate Professor,
Director, Cognitive Neurodynamics Lab

Over the past year, Dr. Ghuman’s Cognitive Neurodynamics Lab made a number of new and ongoing discoveries. Using intracranial recordings in epilepsy patients, the lab has found a
novel, dynamic model for how information is represented in the brain, including illustrating an extended brain circuit used to read words and understanding how brain states influence what we see.

The map of category-selectivity in human ventral temporal cortex (VTC) provides organizational constraints to models of object recognition. One important principle is lateral-medial response biases to stimuli that are typically viewed in the center or periphery of the visual field. However, little is known about the relative temporal dynamics and location of regions that respond preferentially to stimulus classes that are centrally viewed, like the face- and word-processing networks. Here, word- and face-selective regions within VTC were mapped using intracranial recordings from 36 patients. Partially overlapping, but also anatomically dissociable patches of face- and word-selectivity were found in VTC. In addition to canonical word-selective regions along the left posterior occipitotemporal sulcus, selectivity was also located medial and anterior to face-selective regions on the fusiform gyrus at the group level and within individual male and female subjects. These regions were replicated using 7 Tesla fMRI in healthy subjects. Left hemisphere word-selective regions preceded right hemisphere responses by 125 ms, potentially reflecting the left hemisphere bias for language; with no hemispheric difference in face-selective response latency. Word-selective regions along the posterior fusiform responded first, then spread medially and laterally, then anteriorly. Face-selective responses were first seen in posterior fusiform regions bilaterally, then proceeded anteriorly from there. For both words and faces, the relative delay between regions was longer than would be predicted by purely feedforward models of visual processing. The distinct time-courses of responses across these regions, and between hemispheres, suggest a complex and dynamic functional circuit supports face and word perception. These results and findings were published in the *Journal of Neuroscience*.

Perception reflects not only sensory inputs, but also the endogenous state when these inputs enter the brain. Prior studies show that endogenous neural states influence stimulus processing through non-specific, global mechanisms, such as spontaneous fluctuations of arousal. It is unclear if endogenous activity influences circuit and stimulus-specific processing and behavior as well. Here we use intracranial recordings from 30 pre-surgical epilepsy patients to show that patterns of endogenous activity are related to the strength of trial-by-trial neural tuning in different visual category-selective neural circuits. The same aspects of the endogenous activity that relate to tuning in a particular neural circuit also correlate to behavioral reaction times only for stimuli from the category that circuit is selective for. These results suggest that endogenous activity can modulate neural tuning and influence behavior in a circuit- and stimulus-specific manner, reflecting a potential mechanism by which endogenous neural states facilitate and bias perception. These results and findings were published in *Nature Communications*.

**Jorge A. González-Martínez, MD, PhD**
Professor
UPMC Endowed Chair in Epilepsy Surgery
Adjunct Professor, Biomedical Engineering, Carnegie Mellon University
Director, Epilepsy & Movement Disorders Program
Co-Director, University of Pittsburgh Epilepsy Center
Director, Cortical Systems Laboratory

**• Dynamic Pathways for Word Retrieval**
Fluent word retrieval involves a dynamic neural network that includes at least five regions of primary interest (fusiform gyrus, temporal pole, middle temporal gyrus, angular gyrus, and inferior frontal gyrus), interconnected by major white matter fascicles (inferior longitudinal
fascicle, the occipital frontal fascicle, and the uncinate fascicle). In addition, there is increas-
ing but debated evidence that hippocampus is critically involved in language processes, including word retrieval. This extended network is described in theories at the cross-roads of cognitive neuroscience and psychology, and it is central in a variety of clinical contexts such pre-surgical assessment in temporal lobe epilepsy. Some theories highlight the anato-
mo-functional links for each of the regions involved or the temporal organization of their recruitment. Others have focused on the network of white matter connections between re-

gions. Dr. González-Martínez’s fundamental goal is to combine these two approaches to fos-
ter understanding of word retrieval and its disruptions, by considering both the sub-second functional dynamics and the precise anatomical pathways between brain areas. This goal is achieved by expanding our previous research in patients with medically intractable epilepsy requiring SEEG (depth electrodes) implantation. The project is based on a unique and novel combination of extensive intra-cerebral stereotactic recordings of neurophysiological activity with high definition fiber tracking methods.

• Human Decision Making in Complex Environments
The overall goal of the proposal is to understand the neural circuit involved in (1) representing relevant decision variables, (2) integrating these variables to form subjective values, and (3) selecting one of the options in multi-attribute decisions.

• A Biomimetic Approach Towards a Dexterous Neuroprosthesis
The loss of arm and hand function experienced by people with chronic cervical spinal cord injury limits independence and employment opportunities, increasing the extent, duration, and overall cost of care. A sensorimotor brain-computer interface can bypass the injured spinal cord to restore lost movement and sensation. Dr. González-Martínez will investigate the potential of biomimetic intracortical microstimulation for sensory restoration and motor decoding schemes that enable control over grasp kinematics and kinetics to restore dexterity for people with tetraplegia.

• Hamot Health Foundation: The Role of Basal Ganglia in Language and Motor Control
The goal of this proposal is to explore the role of subcortical nodes in the basal ganglia-thalamocortical network and the cortex in coding various aspects of motor control, through electrophysiological study of networks targeted during deep brain stimulation surgery.

• DIXI Neurolab: Thermocoagulation and Epilepsy (Thermocoagulation device for diagnosis and treatment of medically refractory epilepsy)
The overall reach for this proposal is to develop and evaluate a portable and user-friendly radio-frequency generator device, compatible with the current DIXI depth electrodes. Dr. González-Martínez will develop and evaluate the efficacy and safety of the device through a series of rigorous bench testing and clinical studies with the ultimate goal of enabling its clinical use to map seizures and to allow bedside, thermocoagulation-based, treatment.

Baoli Hu, PhD
Assistant Professor
Director, Brain Tumor Evolution & Therapy Lab

Over the past year, the research efforts in the Brain Tumor Evolution Therapy Lab have mainly focused on the completion of two projects which include 1) understanding molecule mechanisms of the immune-suppressive microenvironment, and 2) studying metastatic dissemination of medulloblastoma. The results in these projects have been generated for research grants application and paper publications. Specifically, one research proposal was funded by the Walter L. Copeland Foundation, one research article was accepted for publica-
Investigator Research Summaries

Over the past year, Dr. Hudson has leveraged UPMC’s robust clinical volume to analyze endovascular thrombectomy outcomes as well as the effectiveness of a newly colt aspiration catheter. Additionally, he published articles regarding advancements in endovascular technique for treating difficult intracranial aneurysms. Dr. Hudson remains interested in the molecular pathogenesis of intracranial aneurysms. He currently has articles in press exploring the departments experience with mechanical thrombectomy in distal vessels.

Rachel C. Jacobs, MD
PGY-1 Resident

The optimal treatment paradigm for large AVMs is controversial. The Center for Image-Guided Neurosurgery has previously reported on the efficacy of volume-staged radiosurgery for large AVMs. This past year we focused on risk of symptomatic adverse radiation effect for VS-SRS for large AVMs. The manuscript is accepted and in production by the Journal of Neurosurgery.

Separately, under the guidance of Raymond Sekula Jr., MD, findings from the Neurosurgery Mini-Elective at Pitt Med were published in the Journal of Medical Education and Curricular Development regarding the impact of a hands-on pre-clinical neurosurgery elective course on second-year medical student interest and attitudes.

Robert Kellogg, MD
Assistant Professor

Dr. Kellogg is in the process of reviewing UPMC Children’s Hospital of Pittsburgh’s experience regarding management of spasticity and dystonia with intrathecal and intraventricular baclofen pumps including complications. Additionally, he is analyzing and will report CHP’s extensive selective dorsal rhizotomy experience.

Dr. Kellogg is also co-investigator on a multi-center clinical trial to assess the feasibility of aminolevulinic acid (ALA) in pediatric brain tumor patients. The goal is to have this trial up and running in early 2022.

Daniela Leronni, PhD
Research Instructor

In the past year, Dr. Leronni continued to investigate the functional meaning of the mitochondria localization of the Melatonin receptor 1 (MT1) and the receptor-mediated neuroprotective effect of melatonin. This project arises from Dr. Friedlander group’s groundbreaking discovery that MT1 is dually localized on the plasma membrane and the outer
mitochondria membrane (OMM). The hypothesis of the project is that the dually localized MT1 receptors have two distinct functions and that the hormone melatonin acts as neuroprotector through its mitochondrially localized MT1 receptor. In the past year, Dr. Leronni generated molecular biology tools that allowed her to identify the post-translational modification required for the correct plasma membrane localization of the receptor, but not for its mitochondrial localization. In addition, she continues to collaborate with other researchers to study the mitochondrial signaling cascade triggered by melatonin and its receptors in brain of mice models.

Witold Lipski, PhD
Research Instructor

• **Speech encoding in the human subthalamic nucleus.**
  Using single-unit neuronal recordings in the subthalamic nucleus (STN) of patients undergoing deep brain stimulation electrode implantation for Parkinson's disease, Dr. Lipski has developed a model of STN neuron firing during speech production based on phonetic and sequence elements of produced speech. This work demonstrated the phonetic and sequence encoding in individual STN neurons, with implications for understanding the role of the basal ganglia in speech production, as well as possible novel applications in responsive neuromodulation therapies for movement disorders.

• **Investigation and therapeutic neuromodulation of thalamo-cortical networks in focal epilepsy**
  Medically refractory epilepsy (MRE) is highly debilitating and lethal. Standard of care for focal MRE is surgical resection of the epileptogenic cortical area. However, in patients with seizures involving high eloquent areas such as the temporal, parietal and occipital (posterior quadrant) cortices, safe surgery cannot be performed due to the high risks for devastating neurological consequences such as speech and vision deficits. In this unserved patient population, thalamic deep brain stimulation (DBS) could represent a feasible and alternative option, but outcomes of pilot clinical studies evidenced suboptimal clinical efficacy, mainly in posterior quadrant epilepsies. One of the major impediments to improve thalamic DBS treatment for MRE in posterior-quadrant epilepsies is the lack of understanding on seizures organization and neural dynamics, e.g., how seizures are initiated, spread and terminate, and their relation to thalamic nuclei. In addition, despite considerable evidence for subcortical involvement in epilepsy collected over the past century, studies focus mainly on examining seizures in cortical brain regions, leaving largely unexplored the vast thalamocortical networks that are known to contribute in many aspects of cortical synchronization. Together with Dr. Gonzalez-Martinez and his team, Dr. Lipski is proposing a study to characterize the dynamic relation between thalamic nuclei and seizure neural dynamics in the human posterior quadrant cortex, with the long-term goal of identifying potentially effective targets/parameters of stimulation of thalamic DBS therapy for MRE. In preliminary investigations, Dr. Lipski has benefited from applying intracranial monitoring of brain activity via stereo-electroencephalography (SEEG) depth electrodes to study electrophysiological signatures of seizures in subcortical structures. Based on this preliminary evidence, he hypothesizes that thalamo-cortical networks critically participate in seizure initiation and termination via their reciprocal connections, in special, between the posterior thalamus (Pulvinar) and the posterior quadrant cortex. To verify this hypothesis, he proposes an investigation in human subjects with MRE that undergo SEEG monitoring to record neural dynamics in the thalamic nuclei and cortex simultaneously. Specifically, Dr. Lipski will analyze patterns of functional connectivity and in situ local field potential recordings obtained at rest and during stimulation of the thalamic nuclei.
Investigator Research Summaries

**Arka N. Mallela, MD**
*PGY-3 Resident*

- **Networks and Mapping in Language and Epilepsy**
  Dr. Mallela is exploring the role of the supplementary motor area in language dysfunction and recovery through multimodal advanced neuroimaging, MEG, awake mapping during craniotomy, and stereo EEG.

- **Understanding Fetal Brain Folding**
  Dr. Mallela is investigating the fetal development of the insula and Sylvian fissure to propose a novel mechanism of insular formation and telencephalic folding through advanced fetal neuroimaging and data analysis.

- **Augmented and Virtual Reality in Neurosurgery**
  Dr. Mallela and Edward Andrews, MD, are developing intraoperative augmented reality solutions for cranial and spinal navigation, to integrate multiple monitoring modalities, and to streamline operative workflow.

- **Deep Learning in Clinical Neurosurgery**
  Dr. Mallela is interested in utilizing deep learning techniques to probe clinical datasets in epilepsy and neuro-oncology to develop predictive tools and to analyze intraoperative data and events.

**Kamil W. Nowicki, MD, PhD**
*PGY-5 Resident*

Kamil W. Nowicki, MD, PhD, has been actively involved in the laboratory exploring the role of platelets and inflammatory cytokines in cerebral aneurysm formation resulting in two patent applications. In the spring of 2021, his research team was selected to participate in the University of Pittsburgh’s "Pitt Ventures First Gear 2021" program to explore the road towards commercialization. His future endeavors will concentrate on a blood test for cerebral aneurysms and development of next generation endovascular devices.

**David O. Okonkwo, MD, PhD**
*Professor*
*Director, Neurotrauma Clinical Trials Center*
*Director, Scoliosis and Spinal Deformity Program*
*Special Advisor, UPMC Enterprises*

- **Transforming Research and Clinical Knowledge in Traumatic Brain Injury**
  TRACK-TBI is an 18-site consortium that is rapidly changing the landscape for TBI care and research through more precise TBI diagnosis, prognosis, and treatment. Dr. Okonkwo is a principal investigator of this effort.

- **Comprehensive Biomarker Panel for Trauma-Related Dementia: Mechanistic Links Among Axonal Injury, Neuroinflammation, and Neurodegeneration**
  This study is a Department of Defense-funded study with a goal to establish a comprehensive neuroimaging and biomarker panel of trauma-related dementia, so that the pathophysiologic mechanisms underlying persistent trauma-induced cognitive impairments may be better understood and targeted for therapy.
Brain Oxygen Optimization in Severe Traumatic Brain Injury-Phase 3

BOOST-3 is a major randomized prospective clinical trial for severe TBI patients. The first randomized controlled trial of brain tissue oxygen monitoring in severe TBI (BOOST-2) demonstrated improvement in brain physiology through multimodal neuromonitoring. BOOST-3 will determine if there is evidence of clinical efficacy of a treatment protocol based on PbtO2 monitoring compared to treatment based on ICP monitoring alone.

Matthew Pease, MD
PGY-6 Resident

This past year, Dr. Pease was the Congress of Neurological Surgeons Data Science Fellow. He completed two large research projects using machine learning in imaging analysis. First, he developed a model to predict long-term outcomes in severe TBI patients using a multi-institutional cohort from TRACK-TBI. This model performed well, with an area under the receiver operating curve of 0.85. For this project, Dr. Pease won the Natus Award for best resident abstract from the American Association of Neurological Surgeons and will be giving a plenary talk at the AANS 2021 annual meeting in Orlando. Dr. Pease is also creating an MRI-based model to predict tumor pathology to distinguish between GBM, CNS lymphoma, and brain metastatic disease. This model was very successful and could lead to the prevention of invasive biopsies.

Ian F. Pollack, MD
A. Leland Albright Distinguished Professor
Vice Chair, Academic Affairs
Chief, Pediatric Neurosurgery
Co-Director, Neurosurgical Oncology
Professor of Clinical and Translational Science

Dr. Pollack’s group has continued to build on their recent studies designed to define the mechanisms underlying resistance in childhood and adult malignant gliomas. For these efforts, they have developed a series of “drug-resistance” tumor model systems, paired with treatment naïve counterparts. They have leveraged this unique resource to build a strong collaboration with the Drug Discovery Institute and the Systems Biology Program, through which they have characterized the NAD metabolic pathway as a key intermediate through which multiple cell lines achieve treatment resistance. Using RNA sequencing studies and pathway analysis they have identified several common molecular drivers of this process as well as downstream signaling pathways that are hijacked to promote a resistance phenotype. These observations have provided a basis for additional studies that examine pharmacological and RNA interference-based strategies for reversing resistance as well as metabolic manipulations that may provide novel approaches for promoting tumor cell killing. Planned studies will also examine whether the resistance phenotype reflects clonal selection or an epitranscriptomic phenomenon, which will have implications for how best to counteract this common process to achieve durable responses.

Dr. Pollack’s group has also continued their NIH-funded activities that focus on immunotherapy for pediatric brain tumors. They have applied RNA sequencing of peripheral blood mononuclear cells in their low-grade glioma cohort to characterize gene expression patterns associated with favorable response to vaccine therapy, and those associated with resistance to therapy. They are working to counteract the latter in preclinical therapeutic studies. Accrual continues on their ongoing clinical trials for recurrent low-grade gliomas and ependymomas.
Daniel R. Premkumar, PhD
Research Assistant Professor

Malignant gliomas are the most common, highly infiltrative, rapidly growing tumors of the central nervous system (CNS) in both children and adults with no cure and few treatment options. Recent studies have demonstrated the existence of multiple tumor subgroups within the broad category of high-grade gliomas, which differ in terms of their molecular characteristics and demographic features. Increased activation of receptor tyrosine kinases (RTKs), among others have been well-characterized in GBM. Although many novel small molecules that target the “survival nodes” of gliomas are now in clinical trials, it appears that even those tumors that respond initially exhibit a tendency to acquire resistance and recur. Using established cell lines, Dr. Premkumar is evaluating combination therapy of clinically validated drug compounds, that were recently shown to be efficacious. His research group is also focused on the identification and characterization of resistance to the combination therapy with the goal of leveraging the mechanistic insights gained to optimize therapeutic strategies involving this promising combination for glioma and extend knowledge on the regulation of different factors that contribute GBM malignancy.

Ava Puccio, RN, PhD
Assistant Professor
Co-Director, Neurotrauma Clinical Trials Center

The ultimate goal of Dr. Puccio’s career trajectory is to research innovative treatment paradigms for individualized care of TBI patients, with an emphasis on the secondary injury mechanisms following TBI. Mechanisms include temperature management, brain oxygenation optimization and genetic influences including variations and genomic (for example hypoxic signaling).

Recent clinical trials of pharmacotherapy in TBI patients have not shown efficacy, including a Phase 3 study of a neuroprotective agent, progesterone, SynAPSE trial in patients with severe TBI (GCS 3-8). TBI heterogeneity has been indicated as a cause for failure of these trials; however, we are exploring other means to design more effective clinical trials. A recent collaborative multi-center clinical trial that recently began enrollment is “Brain Oxygen Optimization in Severe Traumatic Brain Injury—Phase 3 (BOOST-3),” and a Department of Defense ancillary study, “Bio-BOOST” examining biospecimens in a cohort of sites.

Additional clinical studies include the prospective collection of demographics, blood and cerebrospinal fluid and neurological outcomes for the Neurotrauma Clinical Trials Center in Pittsburgh, saliva-based biomarkers and genetic repositories. Collaborative external research is ongoing with the University of California, San Francisco, examining and refining a standard for data collection in TBI studies suitable for use across the broad spectrum of TBI and exploring novel approaches for classification of the initial injury severity and outcome after TBI, making use of emerging technology, Transforming Research and Clinical Care Knowledge in TBI (TRACK-TBI). In addition, Dr. Puccio is examining aging differences in recovery in the elderly TBI cohort in an adjunct study, TRACK-Geriatric Collaborative. Translational research is ongoing with industry to validate a commercial handheld hematoma detector for detection of an intracranial blood clot in the acute setting; a non-invasive intracranial pressure monitoring device and an upcoming blood-based biomarker study examining a point-of-care device with Abbott Laboratories with biorepository efforts at the University of Pittsburgh.
Mingui Sun, PhD
Professor

- **A Leadless EEG Sensor**
  Non-convulsive seizures (NCS) and non-convulsive status epilepticus (NCSE) are critical neurophysiological conditions which do not have overt clinical signs. These conduction can be diagnosed only with EEG monitoring. Unfortunately, approximately 2% of the patients in the ICU undergo continuous EEG monitoring. Primary reasons for the underuse of this technology is due to the complexity in setting up EEG equipment in busy, human resource constrained ICU. Dr. Sun is developing a self-contained EEG sensor in the size of a U.S. quarter with no electrode leads. By simply pressing the EEG sensor against the unprepared scalp and twisting slightly, the device can grasp the skin firmly and start acquiring and transmitting EEG wirelessly to a bedside monitor, a smartphone, a tablet, or a Bluetooth enabled device within an ambulance. With these unique features, the aforementioned problem can be solved.

- **A Human-Mimetic AI System for Automatic, Passive and Objective Dietary Assessment**
  Unhealthy diet is strongly linked to risks of chronic diseases, such as cardiovascular diseases, diabetes and certain types of cancer. Unhealthy foods with large portion sizes are widely consumed. Currently, 68.5% of U.S. adults are overweight, among the highest in developed countries. Understanding how the diet-related risk factors affect people’s health and finding effective ways to empower them in improving lifestyle habits are among the most important tasks in public health. Dr. Sun has been working on a biomedical engineering project to address the dietary assessment problem, taking advantage of advanced mathematical modeling, wearable electronics and artificial intelligence.

Parthasarathy D. Thirumala, MD
Professor
Director, Center of Clinical Neurophysiology

- **Realtime evaluation of adverse events (READE.ai)**
  Perioperative stroke can result in death secondary to a clot in a large cerebral blood vessel. Dr. Thirumala's research has shown that a patient with perioperative stroke is 6 to 8 times more likely to die than a patient with an intraoperative myocardial infarction. The annual incidence of 55,000 perioperative strokes per year is a significant underestimate, because a recent study showed that incidence of perioperative stroke increased depending on the method of evaluation (surgeon (7%), neurologist (17%), imaging (54%)). Despite the availability of approved, lifesaving, mechanical clot removal therapy it is not routinely administered due to delay in stroke detection. This has prompted the American Heart Association in a scientific statement to recommend neuromonitoring to detect strokes. Currently, in high-risk cardiovascular and neurological surgery, a trained neurologist visually monitors the EEG signals continuously and applies empirical criteria to detect cerebral ischemia and stroke. However, human visual monitoring is mentally demanding, expensive, and limits scalability by the neurologist to monitor many surgeries. This explains why, despite availability of EEG devices, it is not universally available at all medical institutions. Thus, there is a clear need for solutions, which can support the neurologist to improve stroke detection so timely lifesaving therapies can be administered.

Dr. Thirumala's solution is READE (real time evaluation of adverse events), a software system that can display intraoperative EEG signals, use machine learning to detect stroke and alert the monitoring neurologist in real-time. With seed funding ($500K) from the UPMC's Enterprises Division, Dr. Thirumala has developed initial models to detect ischemia, a pre-
Dr. Thirumala plans to develop more comprehensive models from the full data set during the CEA project.

Dr. Thirumala expects the READE.ai algorithm to detect stroke during surgery and reduce the time to effective clinical intervention for patients who undergo cardiovascular surgeries. Annually, one million cardiovascular surgeries are conducted in the U.S. alone. He expects this will translate to neuromonitoring all surgical procedures where there is a risk of stroke. Twenty million surgeries are conducted every year in the U.S., of which 4 million are at risk of stroke. Finally, Dr. Thirumala believes that READE.ai neuromonitoring can also be extended to detect spinal cord and peripheral nerve injury. This will provide significant upsell opportunities for algorithms which can detect spinal cord and peripheral nerve injury.

Fang-Cheng Yeh, MD, PhD
Assistant Professor
Director, High-Definition Fiber Tractography Lab

- Population-Based Tractography Connectome of Human Brain and Its Hierarchical Topology
A conventional connectome records region-to-region connectivity but does not inform how regions are connected through brain pathways. Here Dr. Yeh leveraged high-throughput automated tractography to map 52 pathways in 1065 subjects and explored the population probability of a pathway connecting to each cortical region. The results can be accumulated into a novel tractography connectome that records the tract-to-region connection probability of the young adult population. Using the connective pattern as the feature vector, Dr. Yeh further applied unsupervised hierarchical clustering to reveal the hierarchical relation of cortical regions. The clustering results showed that cortical regions are grouped into three distinctly separated structural networks, including the dorsal, ventral, and limbic network, matching the dual stream models in the language or visual processing, and each of the networks further has its downward hierarchical structures. The tractography connectome and its hierarchical topology provides a data-driven perspective toward cortical segmentation to elucidates the structure-function relation.
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<td>Menopausal Vasomotor Symptoms as a Marker of Brain Aging</td>
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<td>Omega-3, Isoflavones &amp; Amyloid Deposition in Cognitively Normal Elderly Japanese (WPIC Sub w/Akira Sekikawa)</td>
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<td>Novel Diffusion MRI in Early Psychosis</td>
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<td>Novel Role And Mechanisms Of Histone Deacetylases in Traumatic Injury</td>
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<td>Simulations of Spinal Cord Recruitment to Optimize Bioelectronic Interventions for Lower Urinary Tract Control</td>
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<td>Marco Capogrosso</td>
<td>Spinal Root Stimulation for Restoration of Function in Lower-Limb Amputees</td>
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<td>Structural and Functional Dysconnectivity in Dopamine/Acetylcholine Circuity in Repetitive Mild TBI</td>
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<td>SV2A as a Therapeutic Target for Improved Neurotransmission after Traumatic Brain Injury</td>
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<td>Targeting Extracellular Signaling-regulated Kinase 5 (ERK5) in Brain Tumors and their Microenvironment</td>
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<td>Targeting Extracellular Signaling-Regulated Kinase 5 (ERK5) in Brain Tumors and their Microenvironment</td>
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<td>The Study of Women's Health Across the Nation (SWAN): The Impact of Midlife and the Menopause Transition on Health and Functioning in Early Old Age</td>
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<td>Traumatic Brain Injury and Aging: Targeting the Cholinergic System for Deficits in Sustained Attention and Executive Function</td>
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<td>Avniel Ghuman</td>
<td>Understanding the Synaptic, Cellular and Circuit Events of MEG &amp; EEG Using a Vertically Translational Cross-Species</td>
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<td>National Science Foundation</td>
<td>Jorge González-Martínez</td>
<td>NCS-FO: Collaborative Research - Human Decision-Making in Complex Environments</td>
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<td>National Science Foundation</td>
<td>Partha Thirumala</td>
<td>NSF I-Corps: Realtime Evaluation of Adverse Events (READE.ai)</td>
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<td>NeuBase Therapeutics, Inc</td>
<td>Robert Friedlander</td>
<td>Evaluate HD-GPNAs as potential therapeutics in multiple models of Huntington’s Disease: murine neuronal cell lines, human neural progenitors, and R6/2 mouse HD model</td>
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<td>Chuck Noll Foundation</td>
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<td>Biomarker Panel for Inflammation and Tau in Concussed Athletes</td>
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<td>Levetiracetam as a Therapy for Synaptic Dysfunction after Repetitive Mild Traumatic Brain Injury</td>
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<td>NuVasive, Inc.</td>
<td>D. Kojo Hamilton</td>
<td>Prediction of Postoperative Global Sagittal Alignment Using Musculoskeletal Modeling-Validation Study</td>
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<td>NuVasive, Inc.</td>
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<td>Prospective Multicenter Study Evaluating the Clinical and Radiographic Outcomes of Thoracolumbar Spine Surgery When Comprehensive Sagittal Alignment Surgical Planning is Used</td>
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<td>Paul Gardner</td>
<td>Menigioma Study</td>
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<td>Orgeon Health &amp; Science Univ</td>
<td>David Okonkwo</td>
<td>Randomized Trial of Early Hemodynamic Management of Patients following Acute Spinal Cord Injury - TEMPLE</td>
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<td>University of Pennsylvania</td>
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<td>Biomarkers in the Brain Oxygen Optimization in Severe TBI Trial (Bio-BOOST)</td>
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<td>University of Pennsylvania</td>
<td>David Okonkwo</td>
<td>Collaborative Neuropathology Network Characterizing Outcomes of Traumatic Brain Injury (CONNECT-TBI)</td>
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<td>University of Pennsylvania</td>
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<td>PACT: PA Consortium of TBI</td>
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<td>Ava Puccio</td>
<td>TRACK BIO Enroll - Serum Neurofilament Light Chain as a Biomarker of Traumatic Axonal Injury</td>
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<td>Ava Puccio</td>
<td>TRACK-TBI Epileptogenesis Project</td>
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<td>David Okonkwo</td>
<td>PA CURES TBI - Biomarkers and Drug Discovery Pipeline of TBI-Related Neurodegeneration</td>
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<td>Pittsburgh Foundation</td>
<td>Gary Kohanbash</td>
<td>Advancing Peptide Vaccine Immunotherapy for Children with Brain Tumors</td>
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<td>Peter Gerszten</td>
<td>Development and Evaluation of an Augmented Reality (AR)A-Based Surgical Guidance System</td>
<td>$8,975</td>
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<td>Sameer Agnihotri</td>
<td>Elucidating theMechanisms of Malignant Brain Tumor Formation and Using Novel Therapeutic Strategies in Animal Models</td>
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<td>Pittsburgh Foundation</td>
<td>Tanusree Sen</td>
<td>ER Stress in Neuroinflammation after TBI; a View from PERK Phosphorylation</td>
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<td>Fine Tuning of Melatonin Synthesis Enzyme AANAT by Phosphorylation</td>
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<td>Yalikun Sufo</td>
<td>Function of the Melatonin Synthesized in Neuron after Ischemic/Reperfusion Injury</td>
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<td>Tanisha Singh</td>
<td>Investigating Mitochondrial Protein Import in Amyotrophic Lateral Sclerosis (ALS)</td>
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<td>Neurogranin and Traumatic Brain Injury: Characterization of Neurogranin A Dependent Signaling Changes</td>
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<td>Regulation of mutant huntingtin toxicity by phosphomimetic mutations within its N-terminal region</td>
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<td>Baoli Hu</td>
<td>Role of Chitinase A-3A-like-1 (CHI3L1) in Immune Microenvironment of Glioblastoma</td>
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<td>Synaptic Dysfunction after Pediatric Cardiac Arrest</td>
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<td>The Role of Cell Cycle in Neuroinflammation after TBI</td>
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<td>Theranostic Antibody for Improving Immunotherapy and Immune Monitoring in Glioma</td>
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<td>Prosidyann, Inc.</td>
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<td>Post Market, Prospective, Multi-Center, NonRandomized Study to Assess Posterolateral Lumbar Fusions Using Fibergraft® BG Matrix</td>
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<td>Targeted Delivery of CRISPR/Cas9 protein to CD4+ T cells for in vivo genome editing</td>
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<td>UPMC</td>
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<td>A New Model of Neuronal Melatonin Defect to Identify Novel Anti-Aging and Neuroprotective Therapies</td>
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<td>A Precision Medicine Approach Based on Discrete Time Windows for Predicting Outcomes of Polytrauma Patients</td>
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<td>A Precision Medicine Approach Based on Discrete Time Windows for Predicting Outcomes of Polytrauma Patients</td>
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<td>Endoscopic Versus Shunt Treatment of Hydrocephalus in Infants (ESTHI)</td>
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<td>IPA Erik Holets: Connectome Analysis of the Nigrostriatal Neuronal Tract after Blast TBI</td>
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<td>Non-Invasive Intracranial Pressure Assessment Using a Compact, Portable Monitor (IPASS)</td>
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<td>Non-Invasive Intracranial Pressure Assessment Using a Compact, Portable Monitor (IPASS)</td>
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Walter L. Copeland Fund Celebrating 60 Years of Cranial Research Philanthropy at Pitt

2021 marks the 60th year since the Walter L. Copeland Fund was established to fund cranial research at the University of Pittsburgh Department of Neurological Surgery, and the 20th year since the Walter L. Copeland Laboratory was dedicated within the university’s Scaife Hall to provide a central core facility for that research. Below is an updated reprint of an earlier Neurosurgery News article explaining the origins of that incredible and lasting philanthropic gift from an extraordinary man.

Walter L. Copeland has been a name synonymous with state-of-the-art neurosurgical research accomplishments at the University of Pittsburgh Department of Neurological Surgery for decades.

These accomplishments have largely been made possible through a $1 million estate gift Walter L. Copeland earmarked to the department at the time of his passing in 1959. This gift—a huge amount for the time and roughly equivalent to more than $9 million in 2021 dollars—has planted the seeds for years of fruitful research.

In the decades since it’s inception in 1961, the Copeland Fund has provided the impetus for hundreds of research projects that, ultimately, have improved the lives of countless patients. The generosity and thoughtfulness of one individual has provided a powerful, lasting and positive impact on a department and the people it serves.

As a child, Copeland watched as his father owned and managed a small grocery store in the New Kensington area, just northeast of Pittsburgh. The elderly Copeland always encouraged his children to strive for greater opportunities. Walter heeded his father’s advice and worked diligently to become a successful attorney, eventually becoming a director at the former Jones & Laughlin Steel Corporation.

Family was just as important to Walter. He lived his entire adult life with his brother, the Rev. Clyde E. M. Copeland, pastor of the Jefferson United Presbyterian Church in the South Hills area of Pittsburgh. It was at this juncture that Walter may have made the philanthropic decision that ultimately impacted neurosurgery research at the University of Pittsburgh for generations.

Not much is known with any certainty about the circumstances surrounding Walter’s choice to give such a huge amount to support research in brain surgery—his will gave no reason for the bequest—but the reasons may be rooted in the medical case of a little girl, Shirley Mae Hough, whom he never met.

Soon after Walter’s death at age 78 on March 5, 1959, his brother shed some light on the possible reasoning behind Walter’s generosity.

(continued on next page)
“About 12 years ago, a little 10-year-old girl [Hough] in my congregation developed a brain tumor,” Clyde recalled at the time. “She was a very bright and precocious girl and I was at the hospital when she was operated upon.” Considering this surgery was performed in the 1940s, there was still much to be learned about neurosurgery. Unfortunately, the girl developed complications and passed away, July 21, 1945, after five months in the hospital.

While Clyde was offering pastoral support to Hough’s family during the difficult months that preceded her death, he was also discussing the girl, her family, and the treatment she was receiving during nightly dinner conversations with his brother. Clyde later learned from the girl’s family that, although Walter had never met the child, he visited her family at the funeral home to offer his sympathies.

“My brother was a very tender-hearted man and very reticent where his feelings were involved,” Clyde said. “He never discussed this with me, but I can only assume that this is the reason why he set up the trust fund.”

Through this bequest, the Walter L. Copeland Fund was established at The Pittsburgh Foundation in 1961, with instructions that the entire annual proceeds support research in the Department of Neurosurgery at the University of Pittsburgh. In the last five years alone, The Copeland Fund has provided seed funding totaling $750,000 for various research projects, that in turn, have resulted in substantial federal grants to the department. In this period, Copeland Fund awardees used the data from these seed funds to apply and receive over $21 million in total external funding.

The Walter L. Copeland Laboratory itself houses several research disciplines which provide resources for a neurosurgery faculty, residents, visiting fellows, and students. Neurotrauma, brain imaging, and neuroanatomical research are the primary initiatives being conducted in the laboratory.

The Laboratory for Clinical Neurotrauma Research, The Surgical Neuroanatomy Lab and the Fiber Tractography Lab are three of the labs performing cutting edge research to help the department stay at the forefront of neurosurgery research.

Walter’s philanthropy helped make the University of Pittsburgh Department of Neurological Surgery a prestigious institution where patients have come to rely on lifesaving medical care, advanced training and forward-looking research.

Each year the Copeland Fund provides funding for cranial research performed by both faculty and residents in training. Over 60 years of such funding has contributed to major advances in brain research that has benefitted countless patients. This is a wonderful example of how gifting can change the future of medical care.
Alumni: Past Residents
Past Residents

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Ste 900
Houston, TX 77030

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Martina Stippler, MD
Beth Israel Deaconess Medical Center
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Maywood, IL 60153

Costas G. Hadjipanayis, MD, PhD
Mount Sinai Beth Israel
Phillips Ambulatory Care Center
10 Union Square, Suite 5E
New York, NY 10003

Matthew M. Wetzel, MD
Excela Health Neurosurgery
Medical Commons Two
540 South Street, Suite 304
Greensburg, PA 15601

Class of 2005
Anthony Harris, MD, PhD
MultiCare Neuroscience Center
915 6th Avenue
Tacoma, WA 98405-4682

John Y.K. Lee, MD
Penn Medicine
Pennsylvania Hospital
801 Spruce Street
Philadelphia, PA 19107

Class of 2004
Elad I. Levy, MD
University at Buffalo Neurosurgery
3980 A Sheridan Drive, Suite 200
Amherst, NY 14226

Richard M. Spiro, MD
ECMC Health
462 Grider Street
Buffalo, NY 14215

Elizabeth C. Tyler-Kabara, MD, PhD
University of Texas, Austin
Dell Children’s Medical Center
4900 Mueller Boulevard
Austin, TX 78723

Class of 2003
James P. Burke, MD, PhD
Allegheny Brain & Spine Neurosurgeons
501 Howard Avenue
Altoona, PA 16601

Melvin Field, MD
Orlando Neurosurgery
1605 W. Fairbanks Avenue
Winter Park, FL 32789

Alan M. Scarrow, MD, JD
Mercy Clinic Neurosurgery
1229 E. Seminole Street, Suite 220
Springfield, MO 65804

Class of 2002
Katrina S. Firlik, MD
HealthPrize Technologies
20 Marshall Street
South Norwalk, CT 06854

Atul K. Patel, MD
NorthBay Healthcare
1860 Pennsylvania Ave
Fairfield, CA 94533
Past Residents

Kevin L. Stevenson, MD
Piedmont Spine & Orthopedic Center
4660 Riverside Park Blvd
Macon, GA 31210

Class of 2001
Todd P. Thompson, MD
University of Colorado Health
Boulder Medical Building, Suite 101
1725 E. Boulder Street
Colorado Springs, CO 80909

John B. Wahlig, Jr., MD
Northern Light Health
195 Fore River Parkway, Suite 440
Portland, ME 04102

Timothy F. Witham, MD
The Johns Hopkins Hospital
Department of Neurosurgery
600 N. Wolfe Street
Baltimore, MD 21287

Class of 2000
Andrew Firlik, MD
JAZZ Venture Partners
123 South Park Street
San Francisco, CA 94107

David Lowry, MD
The Brain + Spine Center
3299 North Wellness Drive
Building C, Suite 240
Holland, MI, 49424

Brian Subach, MD
Subach Spinal Solutions
1635 N. George Mason Drive
Suite 150
Arlington, VA 22205

Class of 1999
Brent Clyde, MD
Evanston Regional Hospital
190 Arrowhead Dr, Evanston, WY 82930

Peter Gerszten, MD
University of Pittsburgh
Department of Neurological Surgery
200 Lothrop Street, Suite B-400
Pittsburgh, PA 15213

Mark McLaughlin, MD
Suite 200
731 Alexander Road
Princeton, NJ 08540

Class of 1998
Eugene A. Bonaroti, MD
Surgical Spine Associates
107 Gamma Drive, Suite 110
Pittsburgh, PA 15238

Jeffrey Campbell, MD
Jefferson University Hospitals
3855 West Chester Pike
Suite 280
Newtown Square, PA 19073

Daniel Resnick, MD
University of Wisconsin, Madison
Department of Neurosurgery
600 Highland Avenue
Madison, WI, 53792

Class of 1997
Christopher Comey, MD
Advanced Neurosurgery Associates
631 Professional Drive
Suite 360
Lawrenceville, GA 30046

Kamal Kalia, MD
Baystate Health
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Springfield, MA 01107

Class of 1996
Bruce Pollock, MD
Mayo Clinic
200 First Street SW
Rochester, MN 55905

Michael Rutigliano, MD
Westmoreland County Community Neurosurgery
425 Frye Farm Road
Greensburg, PA 15601

Class of 1995
Paul Grabb, MD
Children’s Mercy Hospital
2401 Gillham Road
Kansas City, MO 64108
Past Residents

Peter Miller, MD, PhD
Iredell Health System
774 Hartness Road
Statesville, NC 28677

Daniel O’Rourke, MD
St. Luke’s University Health Network
701 Ostrum Street, Suite 302
Bethlehem, PA 18015

Class of 1994
Michael Horowitz, MD
First Coast Neurosurgery
1887 Kingsley Avenue
Orange Park, FL 32073

Walter Langheinrich, MD
Beacon Health System
100 Navarre Place, Suite 6600
South Bend, IN 46601

Gregory J. Przybylski, MD
New Jersey Neuroscience Institute
65 James Street
Edison, NJ 08820

Class of 1993
Mark Linskey, MD
University of California, Irvine
101 The City Drive South
Orange, CA 92868

B. Gregory Thompson, Jr., MD
University of Michigan/Taubman HCC
1500 E. Medical Center
Ann Arbor, MI 48109

Class of 1992
David Oliver-Smith, MD
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420 East North Avenue, Suite 302
Pittsburgh, PA 15212

Erick Stephanian, MD
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1530 North 7th Street
Terre Haute, IN 47807

Class of 1991
Eric Altschuler, MD
Allegheny Health Network
575 Coal Valley Road, Suite 260
Jefferson Hills, PA 15205

Ian Pollack, MD
Children’s Hospital of Pittsburgh
One Children’s Hospital Drive
4401 Penn Avenue
Pittsburgh, PA 15224

Class of 1990
David Engle, MD
Maui Memorial Medical Center
221 Mahalani Street
Wailuku, HI 96793

Walter Hall, MD, MBA
Upstate University Hospital
750 E. Adams Street
Syracuse, NY 13210

Class of 1989
Mark Dias, MD
Penn State Medical School
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Robert Freidman, MD
Piedmont Healthcare
South Atlanta Neurosurgery
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Stockbridge, GA 30281

Hae-Dong Jho, MD, PhD
Allegheny General Hospital
420 East North Avenue, Suite 302
Pittsburgh, PA 15212

Donald Marion, MD
35 High Rock Road
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Class of 1988
Michael Goodman, MD
Saint Luke’s Neurological & Spine Surgery
4320 Wornall Road, Suite 710
Kansas City, MO 64111

Frank Vertosick Jr., MD
380 W. Chestnut Street
Washington, PA 15301

Class of 1987
Bruce Cook, MD
New England Neurological Associates
220 Sutton Street
North Andover, MA, 01845
Past Residents

Class of 1986
Kenneth Casey, MD
Beaumont Health System
18025 Fort Street
Riverview, MI 48193

Rob Parrish, MD
Houston Methodist
6565 Fannin Street
Houston, TX 77030

Class of 1985
John Bookwalter, III, MD
Pittsburgh Neurosurgery Center
5820 Centre Avenue
Pittsburgh, PA 15206

James Wilberger, MD

Andrew Goler, MD

Class of 1984
Mark Lester, MD
Texas Health Resources
612 E. Lamar Boulevard
Arlington, TX 76011

Class of 1983
Daniel Bursick, MD

Laligam Sekhar, MD
University of Washington
Department of Neurological Surgery
325 9th Avenue
Seattle, WA 98104

Class of 1982
Parviz Baghai, MD
Allegheny General Hospital
420 East North Avenue
Pittsburgh, PA 15212

Stephen Haines, MD
University of Minnesota
420 Delaware Street, SE
Minneapolis, MN 55455

Class of 1981
Phillip Bechtel, MD
Fort Worth Brain & Spine Institute
1325 Pennsylvania Avenue
Fort Worth, TX 76104

L. Dade Lunsford, MD
University of Pittsburgh
Department of Neurological Surgery
200 Lothrop Street, Suite B-400
Pittsburgh, PA 15213

Class of 1979
Paul Nelson, MD
Penn State Hershey Medical Neuroscience Institute-(SC)
1850 East Park Avenue, Suite 112
State College, PA 16803

Howard Gendell, MD

Class of 1978
A. Leland Albright, MD
Pastor for Caring Ministries
Grace Lutheran Church
200 North Catherine Avenue
LaGrange, IL 60525

Tadashi Kudo, MD

Class of 1977
Jack McCallum, MD
1 Stevens Drive
Fort Worth, TX 76126

John Phillips, MD
224 Malibu
Barefoot Beach, FL 34134

Class of 1976
Munir Abbasy, MD

Bruce Wilder, MD
436 Seventh Avenue, Suite 1050
Pittsburgh, PA 15219

Class of 1975
Albert Camma
751 Forest Avenue, Suite 202
Zanesville, OH 43701

Eric Holm, MD
Berks Neurosurgery Associates
606 Museum Road
Reading, PA 19611
Past Residents

**Class of 1974**
Victor Bazzone, MD  
Spinal & Neurological Surgery  
15190 Community Road, Suite 300  
Gulfport, MS 39503

Joseph Izzo, MD  
136 N. San Mateo Drive  
San Mateo, CA 94401

**Class of 1973**
Charles Kalko, MD

**Class of 1972**
Paul Zannetti, MD  
5226 St. Andrew  
Corpus Christi, TX 78413

Robert E. Kaplan, MD

William DeWeese, MD  
Neurological Surgery  
13801 N. Bruce B. Downs Boulevard  
Tampa, FL 33613

**Class of 1971**
Constantino Amores, MD  
Neurosurgical Associates Inc.  
415 Morris Street, Suite 400  
Charleston, WV 25301-1840

Gary Sapiro, MD

Stamatios Stavropoulos, MD

Ronald Vincent, MD

**Class of 1970**
Augusto Delerme, MD

Harry Stephens, MD

**Class of 1969**
Eugene Russo, MD

**Class of 1968**
Peter Sheptak, MD  
Val Humphreys, MD  
Hooshang Kasravi, MD

**Class of 1967**
Alvin Szojchet, MD  
Bertrand Marlier, MD

**Class of 1966**
Daniel Soriano, MD

**Class of 1965**
Jerry Brown, MD  
Sydney Walker, MD

**Class of 1964**
Mario Ludmer, MD  
John D.H. Johnston, MD

**Class of 1963**
Rafael Dovarganes, MD  
Taghy Tirgary, MD

**Class of 1962**
Joseph Arditti, MD  
Anthony Gallo, MD  
Robert Kyle, MD

**Class of 1961**
Paul Renton, MD  
Leslie DeLima, MD

**Class of 1959**
Ernest Reigh, MD

**Class of 1958**
Robert Brocker, MD  
James Davis, MD

**Class of 1957**
Morris Sanders, MD

**Class of 1956**
Norman Uddstrom, MD
Past Residents

**Class of 1955**
Robert L. Baker, Sr., MD

**Class of 1952**
Robert Wright, MD

To update information listed in this section, please send email to neuroinfo@upmc.edu.
Past Residents
Donations
(July 1, 2020 through June 30, 2021)

Alba Tull Center for Neuro Imaging and Therapeutics
• $1,000,000+: The Tull Family Foundation

Albright Chair in Childrens Neurosurgery
• $500 - $999: United Way of Southwestern Pennsylvania
• $100 - $499: Dr. Eugene A. Bonaroti
• Up to $99: United Way of Southwestern Pennsylvania

Brain Cancer Research
• $10,000 - $24,999: Brain Cancer Awareness 5K, Limited
• $100 - $499: Cheryl L. Deblasi
• Up to $99: Natalie Baur, Martin E. Goldhaber, Sally Winston Goldhaber

Chordoma Research
• $250,000 - $499,999: Anna Yoder

Gamma Knife
• Up to $99: Zorana Bahovic, Gina M. Preston

Peter J. Jannetta Chair
• $100 - $499: Dr. Eugene A. Bonaroti

L. Dade Lunsford Fund
• $10,000 - $24,999: Dr. Daniel M. Bursick, Dr. & Mrs. Mark C. Lester, Dr. Phillip V. Parry
• $1,000 - $4,999: Ted Godfrey, Dr. & Mrs. Richard W. Hertzberg
• $500 - $999: Dr. Peter K. Dempsey, Rita Weber
• $100 - $499: Christine E. Flock, Denver R. Roopchand, Martin Weber Family, Theresa C. Williams-Harris, Esquire

• Up to $99: Eileen M. Godfrey, Doreen LaGray, Natalie J. Mai-Dixon, Patricia Renzi, Hannelore E. Sachse, Albert A. Schnabl, Jeanne L. Strobridge

Maroon Income Fund - Heindl Fund
• $5,000 - $9,999: Carl L. Campbell

Microvascular and Cranial Nerve Research
• $10,000 - $24,999: Mark H. Erwin
• $5,000 - $9,999: Mr. & Mrs. Stephen Edelman, Dr. Trisha Ormond
• $1,000 - $4,999: Ron Zwanziger
• $500 - $999: Danielle Fade, Julie C. Middendorf, Beverly E. Steinberg

• $100 - $499: John A. Allendorfer, Mr. & Mrs. Michael John Zamba, William D. Tettelbach
• Up to $99: Sharon Beville

Moossey Award for Excellence Neurosurgery
• $100,000 - $149,999: Dr. Matthew J. Tormenti
Donations
(July 1, 2020 through June 30, 2021)

• $10,000 - $24,999:
  Dr. Mark & Julie McLaughlin
  Patricia M. Cotton-Hoden
  Glendean J. Davis
  Meghan Demorest
  Gary Eiben
  Walter G. Freidhoff
  Mr. & Mrs. Craig J. Gahr
  Neala Gollomp

NeuroExplorers Educational Fund
• $100,000 - $149,999:
  The Hunter Family Foundation

Neurosurgery Faculty Training & Research
• $100,000 - $149,999:
  The Giorgio Foundation

• $1,000 - $4,999:
  The Leigh Tison Charitable Trust

Neurosurgery Fellow Fund
• $100,000 - $149,999:
  Neurosurgery Research & Education Foundation

• $5,000 - $9,999:
  Glioblastoma Foundation

Neurosurgery General Fund
• $5,000 - $9,999:
  Mr. & Mrs. Joel C. Ross

• $1,000 - $4,999:
  Jeffrey R. Balzer, PhD
  William L. Benson
  Dr. Kenneth Bollens III
  Dr. Richard P. Brenner
  Asmi Butala
  John F. Krumwiede
  Anne K. Ringham
  David B. Dalzell Jr.
  Tracey A. Geffin Dikes
  Richard G. Evelyn
  Diana R. Jannetta
  Mary Jones
  Dr. Paul B. Nelson

• $500 - $999:
  Gwendelyn S. Hughes
  Brenda E. Joseph
  Cindy A. Kelly
  Donna J. Kirby
  John R. Kopnicky
  Audrey Kretow
  Lucille R. Kronk
  Angela F. Kushner
  Rebecca M. Lear
  Pamela A. Legare
  Marc Manus
  Robert A. Marsh
  Carol A. McMurray
  Gordon M. Moss
  Chris A. Muhr
  Imogene Nunn
  Rosemary O'Sullivan
  Cynthia L. Okeson
  Robert F. Patton
  John E. Paulik
  Virginia L. Peet
  Donna H. Reicher
  Denise G. Roman
  Bernard N. Rothman
  Ralph P. Rusnic
  Marilyn T. Santell
  Carlos S. Shibata
  James E. Shields
  William J. Shortencarrier
  G. Thomas Sorbera
  Marie Staton
  Elizabeth C. Stumpf
  Christina A. Turco
  Khanh M. Vu
  Sharon M. Zinn
Donations
(July 1, 2020 through June 30, 2021)

• Up to $99:
  Barbara L. Antonini
  Karen L. Archibald
  Dharini A. Balajee
  Helen L. Bauman
  Donna M. Benjamin
  Leon M. Bernstein
  Martin Binder
  Patricia A. Blasko
  Elmer G. Bowman Jr.
  Carol Ann Bradley
  Dr. Paul U. Bulgarelli
  Melvin E. Caldwell Jr.
  Patricia A. Demas
  Therese B. DeMatteis
  Nancy L. Depalo
  Lois W. Doran
  Alice L. Dorigo
  Donald A. Dukelow
  Sheldon E. Ehret
  Joey Eicher
  Lela R. Elliott
  Darhl W. Empfield Sr.
  Robert R. Fredrick
  Flora Genevro
  Carolyn A. Gregor
  Barbara J. Gregory
  Dorothy L. Gudukas
  Robert M. Hagan
  Edith M. Harshbarger
  Deanna K. Johncour
  Ellen Mae Kaye
  Lynn A. Kazmirski
  Diane Kelly
  Jackie Kerr
  Joseph E. Kochman
  John J. Kocis
  Yuri I. Kotov
  Elizabeth M. Marker Kunkler
  Ralph J. Ledonne
  Cecile H. Levenson
  Tracy Lewis
  Linda Rae Lopez
  Patricia B. Luisi
  David S. Marino
  Patricia Mascari
  Robert N. Matoka
  Stephen J. McGeady
  Jane B. Mercatoris
  Brenda Morris
  Kathleen M. Noel
  Janet L. Paris
  Susan M. Peters
  Linda L. Pollino
  Ruth T. Pollock
  Paula J. Richner
  Renee Rosenthal
  Cheryl L. Scheck
  Colleen M. Scruy
  James Sgroi
  Eileen C. Singel
  Kimberly Slonecker
  Richard L. Spickard
  John C. Stasko
  Juanita D. Summers
  Cynthia A. Supak
  Anthony J. Targoss
  Alani Taylor
  Ellen T. Tracy
  Mary E. Ulmer
  K. Mensah Wali
  Patricia Lomando White
  Carol A. Wigton
  Warren R. Wolf
  Casper C. Zimmer
  Janet W. Zimmerman

Neurosurgical Endowment Fund
• $10,000 - $24,999:
  Dr. Joseph C. Maroon

• Up to $99:
  United Way of Southwestern Pennsylvania

Sheptak Chair in Neurological Surgery
• $10,000 - $24,999:
  Dr. & Mrs. Peter Sheptak

Skull Base Surgery Fund
• $1,000 - $4,999:
  Molly & Tom Crooks

Spine Research Fund
• $100 - $499:
  Sarah Seitz
Sites of Service
• UPMC Hospitals:
  UPMC Altoona
  UPMC Children’s Hospital of Pittsburgh
  UPMC East
  UPMC Hamot
  UPMC Horizon
  UPMC Magee-Womens Hospital
  UPMC McKeensport
  UPMC Mercy*
  UPMC Northwest
  UPMC Passavant
  UPMC Pinnacle
  UPMC Presbyterian*
  UPMC St. Margaret
  UPMC Shadyside
  UPMC Susquehanna
  UPMC Western Maryland
* Level 1 trauma facility

• Non-UPMC Hospitals:
  Armstrong
  Excela Health System (Latrobe Area &
   Westmoreland Regional Hospitals)
  Indiana Hospital
  Monongahela Valley Hospital
  Trinity
  VA Pittsburgh Healthcare System

• Outpatient Offices:
  Seven (fully staffed sites; 20 time share sites
   covering western Pennsylvania)

Residency
Four chief residents matriculate annually

Major Service Lines
Community based general neurosurgery
Complex instrumented spine including
  scoliosis
Endoneurovascular interventional
  radiology
Epilepsy & movement disorders
Human neural prosthetics program
Image-guided neurosurgery (frame based,
  frameless, intraoperative CT scan)
Neurophysiology intraoperative
  monitoring
Pain management
Pediatric neurosurgery
Skull base lesions; EEA
Surgical neuro-oncology
Stereotactic radiosurgery

PSD Clinical Productivity (fy 2021)
Total Charge Volume: 125,490
Work RVUs: 392,737

Pitt Research Productivity (fy 2021)
Directs: $7,998,429
Indirects: $2,370,002
Grant Projects: 165

UPP Financial Productivity (fy 2021)
Gross charges: $104,078,328
Net patient revenue: $21,616,951
Collection percentage: 20.77%
Robert M. Friedlander, MD, MA
Chairman and Walter E. Dandy Distinguished Professor of Neurological Surgery
University of Pittsburgh School of Medicine