On The Cover:
R. Mark Richardson, MD, PhD, (right), director of the University of Pittsburgh’s Epilepsy and Movement Disorders Surgery Program, prepares a patient for participation in a research task during a deep brain stimulation (DBS) procedure. In addition to conducting studies funded by the Brain Initiative, the University of Pittsburgh Department of Neurological Surgery is the only department in Pennsylvania offering asleep, interventional-MRI based DBS, in addition to microelectrode-guided DBS, to treat patients with movement disorders.
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Introduction

Advancing innovative neurosurgical care

This year, we lost one of the true giants in neurosurgery, the founding chairman of our department, Peter J. Jannetta, MD. I wish to dedicate this annual report to his memory, and use this message to underscore the magnitude of the impact of his work, both to this department and to the field of neurosurgery. As I reflect on Dr. Jannetta’s impact in neurosurgery, the first word that comes to mind is innovation. His innovative spirit remains woven into the fabric of our department.

There are a number of key innovative accomplishments for this academic year that I would like to highlight. Our investigative culture was broadly recognized with a number of prestigious national awards. In total, our residents and faculty received 21 awards. I am extremely proud of this accomplishment. Most notable, L. Dade Lunsford, MD, was recognized by the American Academy of Neurological Surgeons with the 2016 Cushing Award for Technical Excellence and Innovation in Neurosurgery. The award is bestowed on an AANS member for technical prowess and skill and/or innovation in the development of new procedures that have become part of the arsenal neurosurgeons use to treat disease or trauma.

Also, Nduka Amankulor, MD, was awarded the 2015 Leo H. Crip, MD, Excellence in Patient Care Award from the University of Pittsburgh Cancer Institute; Adam S. Kanter, MD, received the Early Achievement Award from the University of Vermont School of Medicine; Ian Pollack, MD, received the Children’s Brain Tumor Foundation’s Award for Scientific Excellence; Joseph Maroon, MD, was awarded the Lifetime Leadership Award for Concussion Research by the UPMC Sports Medicine Concussion Program; and department faculty and residents received numerous awards at national conferences. This is a clear signal of the strong tradition of innovative patient care in our department started by Dr. Jannetta.

Excellence in clinical care remains the hallmark of our department. A dedication to outstanding patient care, while continuing to play a leading role in the development of novel treatment approaches, remains our unabated goal. Regional, national and international patients continue to visit our department for management of complex neurosurgical conditions. Embracing evidence-based, minimally invasive approaches for the management of complex brain and spine pathology, remain at the forefront of our departmental efforts. Our faculty continue to teach neurosurgeons and other physicians from all over the globe, here in Pittsburgh, and at our national and international meetings as well.

The spirit of scientific discovery remains vibrant in our department. Our department research funding portfolio remains robust and, despite national trends, has more than doubled over the past six years. We continue to expand the breadth and depth of our research effort with the recruitment of three new faculty members. Sameer Agnihotri, PhD, and Gary Kohanbash, PhD, will complement our brain tumor program with Dr. Agnihotri advancing our understanding of the basic biology of brain tumors and Dr. Kohanbash developing novel immunotherapy approaches for brain tumors. Fang-Cheng (Frank) Yeh, MD, PhD, will enhance our MRI imaging technology, developing new approaches to implement and analyze High Definition Fiber Tractography. On the clinical side, I am delighted to welcome Bradley Gross, MD, who will focus on interventional neurovascular surgery.

Training the next generation of academic, innovative leaders in neurosurgery remains a key personal and departmental focus. We are fortunate to attract the brightest minds to our residency and fellowship programs. I remain extremely impressed by the ingenuity of our trainees and their outstanding accomplishments.
On March 30, our faculty, residents and staff were fortunate to attend Dr. Jannetta’s last public lecture—a talk on Walter Dandy, another neurosurgery legend—presented with Dr. Dandy’s daughter, Mary Ellen Dandy-Marmaduke. I was saddened with his passing just a few days later, but we were all extremely blessed to witness Dr. Jannetta’s charm, insight, warmth and wit one final time. This was Dr. Jannetta’s final gift to our department.

I am extremely proud of the progress in neurosurgical care advanced by our faculty and residents over the past year, and I’m eagerly awaiting the years ahead, building on the legacy of Dr. Jannetta, further advancing innovative neurosurgical care to help improve the lives of patients everywhere.

Robert M. Friedlander, MD
Chairman, Professor of Neurological Surgery
Walter E. Dandy Professor of Neurological Surgery
Statistics
Statistics

**Sites of Service**
- **UPMC Hospitals:**
  - Children's Hospital of Pittsburgh of UPMC
  - Magee-Womens Hospital of UPMC
  - UPMC East
  - UPMC Hamot (Erie)
  - UPMC McKeosport
  - UPMC Mercy*
  - UPMC Passavant
  - UPMC Presbyterian*
  - UPMC St. Margaret
  - UPMC Shadyside
  * Level 1 trauma facility

- **Non-UPMC Hospitals:**
  - Excela Health System (Latrobe Area & Westmoreland Regional Hospitals)
  - Indiana Hospital
  - Monongahela Valley Hospital
  - VA Pittsburgh Healthcare System

- **Outpatient Offices:**
  - Seven (fully staffed sites; 20 time share sites covering western Pennsylvania)

**Residency**
- Three to four chief residents matriculate annually.

**Major Service Lines**
- Community based general neurosurgery (East, Mercy, Passavant, Westmoreland)
- Complex instrumented spine including scoliosis
- Endoneurovascular interventional radiology
- Image-guided neurosurgery (frame based, frameless, intraoperative CT scan)
- Neurophysiology intraoperative monitoring
- Pain management
- Pediatric neurosurgery
- Skull base lesions; endoscopic endonasal approach
- Surgical neuro-oncology
- Stereotactic radiosurgery (Gamma Knife, Cyber Knife)
- Epilepsy & movement disorders
- Human neural prosthetics program

**PSD Clinical Productivity (fy 2016)**
- Procedures: 10,272
- Work RVUs: 367,614

**UPP Research Productivity (fy 2016)**
- Directs: $7,669,832
- Indirects: $2,391,064
- Grant Projects: 129

**UPP Financial Productivity (fy 2016)**
- Gross charges: $103,353,743
- Net patient revenue: $22,127,462
- Collection percentage: 21.41%
- Net days in AR: 37
- AR > 90 days (%): 18.16%
Surgical Services by Hospital
2015-16 Procedures (n=10,272)

Presbyterian 53.6%
Shadyside 9.9%
Mercy 12.4%
Magee 0.3%
Children’s 5.7%
VA 3.0%
Passavant 2.3%
St. Margaret 2.1%
McKeensport 0.3%
Latrobe 5.2%
Hamot 4.9%
Altoona 1.7%
Mon Valley 0.6%
UPMC East < 0.1%

Surgical Services by Procedure Type
2015-16 Procedures (n=10,272)

Peripheral Nerve 1.6%
Other 18.2%
Crani, Epilepsy 0.7%
Crani, Tumor 6.2%
Crani, Trauma 5.1%
Crani, Vascular 1.0%
Crani, Pain 2.7%
Endonasal 1.8%
Endovascular 11.8%
Radiosurgery 9.3%
CSF Diversion 5.1%
Functional 7.8%
Extracranial, Vascular 0.8%
Spine 27.8%
Faculty, Residents and Visitors
Faculty, Residents and Visitors

Faculty

Full-Time Faculty

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

• Professors:
  C. Edward Dixon, PhD
  (Vice Chairman, Research)
  Peter C. Gerszten, MD, MPH
  (Vice Chairman, Quality Improvement)
  L. Dade Lunsford, MD
  John J. Moossy, MD
  Ajay Niranjan
  David O. Okonkwo, MD, PhD
  (Vice Chairman, Clinic Operations)
  Ian F. Pollack, MD
  (Vice Chairman, Academic Affairs)
  Mingui Sun, PhD

• Associate Professors:
  Jeffrey Balzer, PhD
  Donald J. Crammond, PhD
  Johnathan Engh, MD
  Juan C. Fernandez-Miranda, MD
  Paul A. Gardner, MD
  (Vice Chairman, Surgical Services)
  D. Kojo Hamilton, MD
  Adam S. Kanter, MD
  Raymond Sekula Jr, MD, MBA
  Parthasarathy D. Thirumala, MD
  Elizabeth Tyler-Kabara, MD, PhD

• Assistant Professors:
  Nduka Amankulor, MD
  David J. Bissonette, PA-C, MBA
  (Retired effective June 2016)
  Diane L. Carlisle, PhD
  Andrew F. Ducruet, MD
  (Left department effective June 2016)
  Avniel Ghuman, PhD
  Paola Grandi, PhD
  Stephanie Greene, MD
  Miguel Habeych, MD, MPH, FACNS
  (Left department effective March 2016)
  Luke Henry, PhD
  Brian Jankowitz, MD
  Edward A. Monaco III, MD, PhD
  Jamie Pardini, PhD
  (Left department effective September 2015)
  Ava Puccio, PhD, RN
  R. Mark Richardson, MD, PhD
  Mandeep Tamber, MD, PhD

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

• Clinical Professor Emeritus:
  Peter Sheptak, MD

Faculty and residents at 2016 resident graduation dinner held at Pittsburgh Golf Club on June 18, 2016.
Faculty, Residents and Visitors

Faculty

• Clinical Associate Professors:
  Michael J. Rutigliano, MD, MBA
  David S. Zorub, MD

• Clinical Assistant Professors:
  J. Brad Bellotte, MD
  Daniel M. Bursick, MD
  David L. Kaufmann, MD
  Vincent J. Miele, MD
  Monte B. Weinberger, MD

• Research Associate Professor:
  Hideyuki Kano, MD, PhD

• Research Assistant Professors:
  Yue-Fang Chang, PhD
  Wendy Fellows-Mayle, PhD
  Esther Jane, PhD
  Wenyuan Jia, PhD
  Daniel Premkumar, PhD
  Hong Qu Yan, MD, PhD

• Clinical Instructors:
  Jeff Bost, PA-C
  Erin Paschel, PA-C

Joint Appointments in Neurological Surgery

Michael Bell, MD
  (Critical Care Medicine)
Karin E. Byers, MD, MS
  (Medicine)
Michael Collins, MD
  (Orthopedic Surgery)
David Crippen, MD
  (Critical Care Medicine)
William Fielding Donaldson, MD
  (Orthopedic Surgery)
John C. Flickinger, MD
  (Radiation Oncology)
Ferenc E. Gyulai, MD
  (Anesthesiology)
Barry E. Hirsh, MD
  (Otolaryngology)
Tudor G. Jovin, MD
  (Neurology)
James D. Kang, MD
  (Orthopaedic Surgery)
Steven L. Kanter, MD
  (Senior Associate Dean, Medicine)
Ruchira Menka Jha, MD, MS
  (Neurology)

Bradley Molyneaux, MD, PhD
  (Critical Care Medicine)
Frank S. Lieberman, MD
  (Neurology)
Rosa Lynn B. Pinkus, PhD
  (Medicine)
Kees Hugo Polderman, MD
  (Critical Care Medicine)
Margaret Reidy, MD
  (Physical Medicine and Rehabilitation)
William F. Rothfus, MD
  (Radiology)
Walter Schneider, PhD
  (Psychology)
Lori Anne Shutter, MD
  (Critical Care Medicine)
Carl H. Snyderman, MD
  (Otolaryngology)
S. Tanya Stefko, MD
  (Ophthalmology)
Peter L. Strick, PhD
  (Neurobiology)
Lawrence R. Wechsler, MD
  (Neurology)
Steven L. Whitehurst, MD
  (Anesthesiology)

Adjunct Faculty

James Burke, MD
Dallas Hack, MD
Paul David Nussbaum, PhD
Hideho Okada, MD, PhD

UPMC Hamot

Efkan Colpan, MD
Elio Demeira, MD
William Diefenbach, MD
Isam Khoja, MD
Faculty, Residents and Visitors

Residents

Chief Residents
Ali Kooshkabadi, MD
Medical School: Johns Hopkins
Undergraduate School: Wake Forest
Hometown: Atlanta, Ga.

Robert Miller, MD
Medical School: Sanford, South Dakota
Undergraduate School: Colorado State
Hometown: Denver, Colo.

PGY-5
Gurpreet S. Gandhoke, MD
Med School: NDMVP Samaj’s Medical College
Undergraduate: University of Pune
Hometown: Pune, India

Phillip Lee, MD, PhD
Medical School: Pittsburgh
Undergraduate School: George Washington
Hometown: Kingsport, Tenn.

David Panczykowski, MD
Medical School: Miami
Undergraduate School: Clemson
Hometown: Colorado Springs, Colo.

Gregory Weiner, MD
Medical School: Tulane
Undergraduate School: California, Berkeley
Hometown: Los Angeles, Calif.

Georgios Zenonos, MD
Medical School: Athens
Undergraduate School: N/A
Hometown: Pafos, Cyprus

PGY-6
Christopher Deibert, MD
Medical School: Pittsburgh
Undergraduate School: Goucher College
Hometown: Pottsville, Pa.

Zachary Tempel, MD
Medical School: Indiana
Undergraduate School: Miami
Hometown: Indianapolis, Ind.

Nathan Zwagerman, MD
Medical School: Wayne State
Undergraduate School: Calvin College

2016 graduating chief residents Robert Miller and Ali Kooshkabadi.
Faculty, Residents and Visitors

Residents

PGY-4
William Ares, MD
Medical School: Vermont
Undergraduate School: Johns Hopkins
Hometown: Malverne, N.Y.

Stephen A. Johnson, MD
Medical School: Penn
Undergraduate School: Penn
Hometown: Spring Lake, N.J.

W. Christopher Newman, MD
Medical School: Florida
Undergraduate School: Harvard
Hometown: Longwood, Fla.

Christian B. Ricks, MD
Medical School: Baylor
Undergraduate School: Brigham Young
Hometown: Scarsdale, N.Y.

PGY-3
Amir H. Faraji, MD, PhD
Medical School: Pittsburgh
Undergraduate School: Florida
Hometown: Clearwater, Fla.

Ezequiel Goldschmidt, MD
Medical School: Buenos Aires University
Undergraduate School: Buenos Aires University
Hometown: Buenos Aires, Argentina

David J. Salvetti, MD
Medical School: Virginia
Undergraduate School: Vanderbilt

Benjamin M. Zussman, MD
Medical School: Jefferson Medical College
Undergraduate School: Haverford
Hometown: Pittsburgh, Pa.

PGY-2
Nitin Agarwal, MD
Medical School: Rutgers
Undergraduate School: College of New Jersey
Hometown: Flemington, N.J.

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

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.

PGY1
Nima Alan, MD
Medical School: Case Western
Undergraduate School: British Columbia
Hometown: Vancouver, B.C.

Enyinna Nwachuku, MD
Med School: Pittsburgh
Undergraduate School: Pittsburgh

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

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

New Residents for 2016-17
Hanna Algattas, MD
Medical School: Rochester
Undergraduate School: Colgate
Hometown: Syracuse, N.Y.

Edward Andrews, MD
Med School: Thomas Jefferson
Undergraduate School: Pennsylvania

Kamil Nowicki, MD, PhD
Medical School: Florida
Undergraduate School: Florida
Hometown: Gainesville, Fla.

Xiaoran Zhang, MD
Medical School: Pittsburgh
Undergraduate School: UCLA
Hometown: Luoyang, China
Each year the department hosts the Stuart Rowe Society Lectureship and Research Day, a special day intended to showcase research activities in the field of neurological surgery.

The day is held in honor of Stuart Niles Rowe, widely considered the founding figure of neurosurgery training in Pittsburgh. In 1936, Rowe established the base of what would later become the University of Pittsburgh Department of Neurological Surgery.

During this special day, a series of talks are presented by department residents, each spotlighting a topical research issue relevant in the field of neurosurgery. These talks are followed by discussion, moderated by a prominent visiting professor. The 2015 honored guest was Robert E. Harbaugh, MD, of the Milton S. Hershey Medical Center.

(See photos of the 2015 Stuart Rowe Research and Lectureship Day on page 56.)

2015 Stuart Rowe Lecturer

Robert E. Harbaugh, MD
Distinguished Professor, Chair
Penn State Milton S. Hershey Medical Center

Past Stuart Rowe Lecturers

<table>
<thead>
<tr>
<th>Year</th>
<th>Lecturer</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>Robert L. Martuza, MD</td>
<td>Harvard Medical School</td>
</tr>
<tr>
<td>2013</td>
<td>Chris Shaffrey, MD</td>
<td>University of Virginia</td>
</tr>
<tr>
<td>2012</td>
<td>James Rutka, MD</td>
<td>University of Toronto</td>
</tr>
<tr>
<td>2011</td>
<td>Henry Brem, MD</td>
<td>Johns Hopkins University</td>
</tr>
<tr>
<td>2010</td>
<td>Ralph G. Dacey, Jr., MD</td>
<td>Washington University</td>
</tr>
<tr>
<td>2009</td>
<td>Edward H. Oldfield, MD</td>
<td>University of Virginia</td>
</tr>
<tr>
<td>2008</td>
<td>Patrick J. Kelly, MD</td>
<td>New York University</td>
</tr>
<tr>
<td>2007</td>
<td>John A. Jane, Sr, MD, PhD</td>
<td>University of Virginia</td>
</tr>
<tr>
<td>2006</td>
<td>M. Sean Grady, MD</td>
<td>University of Pennsylvania</td>
</tr>
<tr>
<td>2005</td>
<td>Gary Steinberg, MD, PhD</td>
<td>Stanford University</td>
</tr>
</tbody>
</table>
Faculty, Residents and Visitors
Visiting Scholars & Observers

- Pablo Ajler, MD  
  *Clinical Observer*  
  Skull Base Surgery  
  Hospital Italiano de Buenos Aires  
  Buenos Aires, Argentina  
  (October 26, 2015 – October 30, 2015)

- Selvaperumal Arthanarisami, MCh  
  *Visiting Observer*  
  Skull Base Surgery  
  Erode Trust Hospitals  
  Erode, India  
  (August 21, 2015 – August 21, 2015)

- Alpha Bah, MD  
  *Visiting Research Fellow*  
  Skull Base Surgery  
  Hospital de Kipe  
  Conakry Guinea  
  (November 3, 2015 – November 6, 2015)

- Spiros Blackburn, MD  
  *Visiting Research Fellow*  
  Skull Base Surgery  
  University of Florida  
  Gainesville, Fla.  
  (July 1, 2015 – August 21, 2015)

- Hamid Borghedi-Razavi, MD  
  *Visiting Research Fellow*  
  Skull Base Surgery  
  Munster University/Clemens Hospital  
  Munster, Germany  
  (May 1, 2016 – May 1, 2017)

- Giulio Cecchini, MD  
  *Visiting Research Fellow*  
  Skull Base Surgery  
  Universita Politecnica delle Marche  
  Putignano, Italy  
  (April 6, 2016 – May 11, 2016)

- Emrah Cetikci, MD  
  *Visiting Research Fellow*  
  Skull Base Surgery  
  Yildirim Beyazit University Yenimahalle Training & Research Hospital  
  Ankara, Turkey  
  (April 1, 2016 – April 1, 2017)

- Kwan Ho (Jason) Chow, MBChB  
  *Visiting Observer*  
  Skull Base Surgery  
  Princess Margaret Hospital Hong Kong  
  Hong Kong, China  
  (July 13, 2015 – July 14, 2015)

- Tomasz Dziędziec, MD  
  *Visiting Research Fellow*  
  Skull Base Surgery  
  Medical University of Warsaw  
  Warsaw, Poland  
  (April 1, 2016 – September 30, 2016)

- Ahmad Elsawy, MD, MSc  
  *Visiting Observer*  
  Skull Base Surgery  
  Ain Shams University  
  Cairo, Egypt  
  (October 1, 2015 – November 30, 2015)

- Dmitry Fomichev, MD, PhD  
  *Visiting Observer*  
  Skull Base Surgery  
  Burdenko Neurosurgical Institute  
  Moscow, Russia  
  (November 2, 2015 – November 6, 2015)

- Clara Frias-Taveras, MD  
  *Visiting Observer*  
  University of Hartford  
  Hartford, Conn.  
  (October 2015)

- Ethem Taner Goksu, MD  
  *Visiting Observer*  
  Skull Base Surgery  
  Akdeniz University  
  Antalya, Turkey  
  (April 6, 2016 – June 30, 2016)

- Daigo Goto, MD  
  *Visiting Observer*  
  Image-Guide Neurosurgery  
  Teine Keijinkai Hospital  
  Sapporo, Hokkaido, Japan  
  (March 2016)
Faculty, Residents and Visitors
Visiting Scholars & Observers

Xiaosheng He, MD, PhD
Visiting Observer
Skull Base Surgery
Xijing Hospital/Fourth Military Medical University
Xi’an, China
(January 6, 2016 – March 31, 2016)

Yuan Hong, MD
Visiting Observer
Skull Base Surgery
Zhejiang University
Hangzhou, China
(July 1, 2015 – September 25, 2015)

Abel Huang, MD
Visiting Observer
Skull Base Surgery
National Taiwan University Hospital
Taipei, Taiwan
(January 22, 2016 – January 25, 2016)

Sukhdeep S. Jhawar, MBBS, MS, MCh
Visiting Research Fellow
Skull Base Surgery
Christian Medical College
Punjab, India
(October 1, 2015 – March 31, 2016)

Jacob Joseph
Fellowship Interview, Observer
Spine
University of Michigan Health System
Ann Arbor, Mich.
(January 20, 2016)

Pavel Kalinin, MD
Visiting Observer
Skull Base Surgery
Burdenko Neurosurgical Institute
Moscow, Russia
(November 2, 2015 – November 6, 2015)

Melissa Kukowski
Visiting Observer
Spine
University of Pittsburgh
Pittsburgh, Pa.
(February 18, 2016)

Fernando Latorre, MD
Visiting Observer
Skull Base Surgery
Hospital Ramos Mejia de la CABA
Buenos Aires, Argentina
(May 26, 2016 – May 27, 2016)

Jasmine Lee
Visiting Observer
Spine
Vanderbilt University
Knoxville, Tenn.
(August 20 - September 20, 2015)

Silvio Lessa, MD
Visiting Observer
Skull Base Surgery
Federal University of Uberlandia/Santa Genoveva Hospital
Uberlandia, Brazil
(June 27, 2016 – July 8, 2016)

Stefan Lieber, MD
Visiting Research Fellow
Skull Base Surgery
University Hospital Zurich
Zurich, Switzerland
(April 23, 2015 – December 31, 2016)

Jiang Liu, MD, PhD
Visiting Observer
Skull Base Surgery
China-Japan Friendship Hospital
Beijing, China
(May 24, 2016 – August 3, 2016)

Xiaoming Lu, MD
Visiting Observer
Skull Base Surgery
Jiangsu Province Hospital
Nanjing, China
(June 27, 2016 – July 1, 2016)

Roger Neves Mathias, MD
Visiting Research Fellow
Skull Base Surgery
State University of Campinas
Campinas, Brazil
(February 1, 2015 – July 31, 2015)
## Faculty, Residents and Visitors

### Visiting Scholars & Observers

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Department</th>
<th>Institution/Location</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jason McGowan</td>
<td>Fellowship Interview, Observer</td>
<td>Spine</td>
<td>MedStar Georgetown University Hospital Washington, D.C.</td>
<td>(January 27, 2016)</td>
</tr>
<tr>
<td>Jorge Diaz Molina, MD</td>
<td>Visiting Observer</td>
<td>Skull Base Surgery</td>
<td>Complejo Hospitalario de Navarra Pamplona, Spain</td>
<td>(February 1, 2016 – March 30, 2016)</td>
</tr>
<tr>
<td>Ana Nakassa, MD</td>
<td>Visiting Clinical Research Fellow</td>
<td>Skull Base Surgery</td>
<td>IMSETRO Maring, Brazil</td>
<td>(August 31, 2015 – September 2, 2017)</td>
</tr>
<tr>
<td>Shilei Ni, MD, PhD</td>
<td>Visiting Observer</td>
<td>Skull Base Surgery</td>
<td>Shandong University Jinan, China</td>
<td>(February 1, 2016 – April 12, 2016)</td>
</tr>
<tr>
<td>Cristian Ferrareze Nunes, MD</td>
<td>Visiting Research Fellow</td>
<td>Skull Base Surgery</td>
<td>Internneuro Rio de Janeiro, Brazil</td>
<td>(March 1, 2016 – August 31, 2016)</td>
</tr>
<tr>
<td>Maximiliano Nunez, MD</td>
<td>Visiting Research Fellow</td>
<td>Skull Base Surgery</td>
<td>Hospital de Alta Complejidad Buenos Aires, Argentina</td>
<td>(October 20, 2015 – October 15, 2016)</td>
</tr>
<tr>
<td>Robert Zanabria Ortiz, MD</td>
<td>Visiting Research Fellow</td>
<td>Skull Base Surgery</td>
<td>Hospital General Universitario de Ciudad Real Real, Spain</td>
<td>(June 7, 2016 – November 30, 2016)</td>
</tr>
<tr>
<td>Paolo Pacca, MD</td>
<td>Visiting Research Fellow</td>
<td>Skull Base Surgery</td>
<td>AO Citta Della Salute e della Scienza Torino, Italy</td>
<td>(October 7, 2015 – March 21, 2016)</td>
</tr>
<tr>
<td>Gustavo Perez-Prat, MD</td>
<td>Visiting Observer</td>
<td>Skull Base Surgery</td>
<td>Hospital Universitario Virgen del Rocio Seville, Spain</td>
<td>(August 1, 2015 – September 30, 2015)</td>
</tr>
<tr>
<td>Fabio Guerra Restrepo, MD</td>
<td>Visiting Research Fellow</td>
<td>Skull Base Surgery</td>
<td>Hospital Universitario Reina Sofia Cordoba, Spain</td>
<td>(January 1, 2015 – August 22, 2015)</td>
</tr>
<tr>
<td>Kamran Sattarov, MD</td>
<td>Visiting Research Fellow</td>
<td>Skull Base Surgery</td>
<td>Institute of Neurosurgery Kiev, Ukraine</td>
<td>(August 15, 2015 – March 4, 2016)</td>
</tr>
<tr>
<td>Oldrich Soula, MD</td>
<td>Visiting Observer</td>
<td>Skull Base Surgery</td>
<td>NA Homocle Hospital Prague, Czech Republic</td>
<td>(November 9, 2015 – December 4, 2015)</td>
</tr>
<tr>
<td>Jan Sroubek, MD</td>
<td>Visiting Observer</td>
<td>Skull Base Surgery</td>
<td>NA Homocle Hospital Prague, Czech Republic</td>
<td>(November 9, 2015 – November 17, 2015)</td>
</tr>
<tr>
<td>Mohan Subbarayan, MCh</td>
<td>Visiting Observer</td>
<td>Skull Base Surgery</td>
<td>Sudha Institute of Medical Sciences Erode, India</td>
<td>(August 21, 2015 – August 21, 2015)</td>
</tr>
</tbody>
</table>
Faculty, Residents and Visitors

Visiting Scholars & Observers

Jegan Thanabalan, MBBS
Visiting Observer
Skull Base Surgery
University Kebangsaan Malaysia
Kuala Lumpur, Malaysia
(July 6, 2015 – July 17, 2015)

Gloria Tresserras, MD
Visiting Observer
Skull Base Surgery
Hospital Universitari Mutua de Terrassa
Barcelona, Spain
(October 7, 2015 – December 21, 2015)

Huy Truong, MD
Visiting Research Fellow
Skull Base Surgery
International Neurosurgery Hospital
Ho Chi Minh City, Vietnam
(November 16, 2015 – April 30, 2017)

Daniel Seclen Voscoboinik, MD
Visiting Research Fellow
Skull Base Surgery
Hospital de Alta Complejidad en Red “El Cruce”
Buenos Aires, Argentina
(December 17, 2015 – May 27, 2016)

MingDong Wang, MD
Visiting Research Fellow
Skull Base Surgery
Affiliated Hospital of HeBei University
HeBei, China
(September 14, 2014 – October 1, 2015)

Weihsin Wang, MD
Visiting Research Fellow
Skull Base Surgery
Taipei Veteran General Hospital
Taipei, Taiwan
(December 1, 2013 – July 20, 2015)

Zhebao Wu Sr, MD, PhD
Visiting Observer
Skull Base Surgery
Jiaotong University/Ruijin Hospital
Shanghai, China
(August 20, 2015 – September 12, 2015)

Xiaojun Wu, MD
Visiting Research Fellow
Skull Base Surgery
Changzheng Hospital
Shanghai, China
(October 1, 2014 – September 16, 2015)

Zhijun Yang, MD
Visiting Observer
Skull Base Surgery
Beijing Tiantan Hospital
Beijing, China
(January 6, 2016 – January 28, 2016)
Faculty, Residents and Visitors

Course Participants

**Principles & Practice of Gamma Knife Radiosurgery**

- **July 13-17, 2015:**
  - Shaun Loewen, MD, PhD, Winnipeg, Canada
  - Ravi Shridhar, MD, PhD, Orlando, Fla.
  - Junzhao Sun, MD, Beijing, China
  - Lingling Qian, MD, Beijing, China
  - Leiming Zhang, MS, Beijing, China
  - David Shultz, MD, PhD, Toronto, Canada
  - Subhakar Mutyala, MD, Phoenix, Ariz.
  - Tim J. Kruser, MD, Chicago, Ill.
  - Vaughan Moutrie, MS, Australia
  - Bernardo P. Salvajoli, MD, Sao Paulo, Spain
  - Magda Martir, PhD, Houston, Texas
  - Bee Ching Ong, PhD, Philippines
  - Fabio Guerra Restrepo, MD, Barcelona, Spain
  - Felix Quezada, MD, Dominican Republic

- **September 14-18, 2015:**
  - Brad Zacharia, MD, Hershey, Pa.
  - Jennifer Wei Zou, PhD, New Brunswick, N.J.
  - Mohammad S. Al-Olama, MS, Dubai
  - Matthew G. Rodriguez, MS, Merrillville, Ind.
  - Edgar Hiram M. Miramontes, MD, Guadalajara, Mexico
  - Emily E. Voigt, RN Atlanta, Ga.
  - Ali R. Malek, MD, West Palm Beach, Fla.
  - Afshin Forouzannia, MD, Orlando, Fla.
  - Muhammad Omar Chohan, MD, Albuquerque, N.M.
  - Shelley Machuta, MD, Alpharetta, Ga.
  - Peter W. Possert, MD, Atlanta, Ga.
  - Michael Mitchum, MS, Canton, Ga.
  - Levi Maliwat, MD, Philippines

- **November 9-13, 2015:**
  - Kyle Arneson, MD, PhD, Sioux Falls, S.D.
  - Peter Bouz, MD, Kettering, Ohio
  - Matthew Pearson, MD, Pensacola, Fla.
  - Wissam Asfahani, MD, Sioux Falls, S.D.
  - Shifeng Chen, PhD, Baltimore, Md.
  - Ethan A. Benardete, MD, PhD, Temple, Texas
  - Laura Brainard, MD, Albuquerque, N.M.
  - Samer M. Elfallal, DO, Trenton, Mich.
  - Babak S. Jahromi, MD, PhD, Chicago, Ill.
  - Matthew M. Kimball, MD, Roseville, Calif.
  - Chad A. Levitt, MD, Atlanta, Ga.
  - Alejandro Berlin, MD, Canada
  - Felipe Erlich, MS, Rio De Janeiro, Brazil
  - Alexander M. L. Mason, MD, Atlanta, Ga.
  - Justin Wittkopf, MD, Hindsdale, Ill.
  - Paul Anderson, MD, Lubbock, Texas
  - Jonathan Chilton, MD, Kansas City, Mo.
  - Marsha Arndt, RN, Sioux Falls, S.D.
  - Jeffrey Suplica, MD, Vacaville, Calif.

- **January 11-15, 2016:**
  - Allison Lindsey, MS, Lancaster, Pa.
  - Rohan Ramakrishna, MD, New York, N.Y.
  - Edie E. Zusman, MD, Castro Valley, Calif.
  - Lincoln M. Jimenez, MD, Pensacola, Fla.
  - Bart Witherspoon, MD, Columbia, S.C.
  - Michelle Showdhary, MD, Seattle, Wash.
  - Nils Mueller-Kronast, MD, Delray Beach, Fla.
  - Hai Sun, MD, PhD, Shreveport, La.
  - Tim Lautenschlaeger, MD, Indianapolis, Ind.
  - Thomas P. Kole, MD, Paramus, N.J.
  - Sanjay Maraboyina, MD, Little Rock, Ark.
  - Susannah Ellsworth, MD, Indianapolis, Ind.
  - Ricardo Cabello, MS, San Francisco, Calif.
  - Ed Slowey, MS, Billings, Mont.
  - Cully A. Cobb, III, MD, Sacramento, Calif.
  - Troy Richards, MD, Shreveport, La.

- **March 21-25, 2016:**
  - Jacob Chodakiewitz, MD, Los Angeles, Calif.
  - Chengwei Wang, MD, Shandong, China
  - Chikezie Eseonu, MD, Baltimore, Md.
  - Andrea Irarte, RN, Sioux Falls, S.D.
  - Yuefei Fan, MD, Shandong, China
  - Eric Slattery, MD, Salt Lake, Utah
  - Wade Bullington, MS, Mobile, Ala.
  - Jean Courquin, RN, Sacramento, Calif.
  - Robert Piroli, MD, Pittsburgh, Pa.
  - Ke Nie, PhD, New Brunswick, N.J.
  - Carl Daniel Elliston, MA, New York, N.Y.
  - Sean Sachdev, MD, Chicago, Ill.
  - Juan Felix Ronderos, MD, Pensacola, Fla.
  - Brandon Stone, MD, Columbia, S.C.
  - Roland Teboh Forbang, PhD, Hackensack, N.J.
  - Jeffrey Schweitzer, MD, PhD, San Diego, Calif.
  - Sheri Dewan, MD, Winfield, Ill.

- **May 9-13, 2016:**
  - Adriana S. Russi, MD, Cali-Valle
  - Christopher Kellner, MD, New York, N.Y.
  - Ravi A. Chandra, MD, PhD, Newton, Mass.
Faculty, Residents and Visitors

Course Participants

David Y. Lee, MD, PhD, Albuquerque, N.M.
Saranya Kakumanu, MD, Winnipeg, Canada
Andrew J. Bishop, MD, Houston, Texas
Lalith K. Kumaraswamy, PhD, Buffalo, N.Y.
Zachary N. Litvack, MD, Seattle, Wash.
Travis James McCaw, PhD, Pittsburgh, Pa.
E. Ronald Hale, MD, Kettering, Ohio
Joshua Palmer, MD, Columbus, Ohio
Steven Johnson, MS, Paramus, N.J.
Marlin D. Richardson, MD, Aurora, Colo.
Brian A. Wolthuis, MS, New York, NY
James Kavanaugh, MS, St. Louis, Mo.
Lynn Bussi, RN, Australia
Janet Vanoni, RN, Portland, Ore.

Innovations in Endoscopic Intracranial Surgery: A Hands-On Course

• June 22-24, 2016:
Maria Peris Celda, Albany Medical Center, Albany, N.Y.
Nasrollah Fatehi, Virginia Beach, Va.
Silvio Lessa, Universidade Federal de Uberlandia eHospital de Santa Genoveva, Uberlandia, Brazil
Jiang Liu, China-Japan Friendship Hospital, Beijing, China
Hideki Ogata, Hamamatsu Rosai Hospital, Hamamatsu, Japan
Wayne Paullus Jr., Southwest Neuroscience & Spine Center, Amarillo, Texas
Abhishek Ray, University Hospitals Case Medical Center, Cleveland, Ohio
Takamitsu Tamura, University of Ryukyu Hospital, Okinawa, Japan
Teddy Totimeh, Korle Bu Teaching Hospital, Accra, Ghana
Florentino Francisco Hernandez Vazquez, Hospital Lic Adolfo Lopez Mateos, Toluca, Mexico
Kam Tong Yeung, Tuen Mun Hospital, Hong Kong, China

Minimally Invasive Endoscopic Surgery of the Cranial Base and Pituitary Fossa

• August 16-19, 2015:
Bruce Abkes, Johnson City, Tenn.
Alfonso Arellano Reynoso, Miguel Hidalgo, Mexico
Selvarperumal Arthanarisi, Erode, India
Bernard Bendok, Phoenix, Ariz.
Anders Bilde, Copenhagen, Denmark
Alexa Bodman, Syracuse, N.Y.
Alfred Bowles Jr., Windber, Pa.
Shamik Chakraborty, Glen Oaks, N.Y.
Pierre-Olivier Champagne, Montreal, Canada
Ridha Dharmajaya, Medan, Indonesia
Scott Dulebohn, Johnson City, Tenn.
Hironori Furukawa, Obihiro, Japan
Silvia Gesheva, New Orleans, La.
Takuichiro Hide, Kumamoto, Japan
Stan Hoang, Palo Alto, Calif.
Jun Kang, Beijing, China
Huseyin Hayri Kertmen, Ankara, Turkey
Javed Khader Eliyas, Chicago, Ill.
Hyung Cheol Kim, Anyang, South Korea
Rob Kopp, Syracuse, N.Y.
Devyani Lal, Phoenix, Ariz.
Hao Cheng Liu, Beijing, China
Devin Mistry, Jenison, Mich.
Peter Gichuru Mwangi, Nairobi, Kenya
Arjun Parasher, New York, N.Y.
Ranjit Peter, Bandar Seri Begawan, Brunei
Anna Piippo, Helsinki, Finland
Nick Rowan, Pittsburgh, Pa.
Christopher Roxbury, Baltimore, Md.
Amy Schell, Pittsburgh, Pa.
Joon Ho Song, Anyang, South Korea
Pugazhendi Srinivasan, Salem, India
Mohan Subbarayan, Erode, India
Joao Subtil, Sesimbra, Portugal
Qingfang Sun, Shanghai, China
Jared Tompkins, Memphis, Tenn.
Yu Wang, Shanghai, China
Todd Wannemuehler, Indianapolis, Ind.
Meghan Wilson, Philadelphia, Pa.
Marcus Zachariah, Boston, Mass.

• November 18-21, 2015:
Greer Albergotti, Pittsburgh, Pa.
Joao Paulo Almeida, Sao Paulo, Brazil
Jordan Amadio, Atlanta, Ga.
Uzi Ben David, Ramat-Gan, Israel
Jesper Billie, Aarhus, Denmark
Anindita Chakraborty, Gainesville, Fla.
Alexandra Cotici, Birmingham, United Kingdom
Andrew Coughlin, Omaha, Neb
Eileen Dauer, St. Cloud, Minn.
Ryan Demarchi, Sudbury, Canada
Claudio De Tommasi, Christchurch, New Zealand
Faculty, Residents and Visitors

Course Participants

Suzan Dyve, Aarhus, Denmark
Walid El Gaddafi, St. Johns, Canada
Fernando Fernandes, Campinas, Brazil
Mark Gilbert, Pittsburgh, Pa.
Chad Glenn, Oklahoma City, Okla.
Marguerite Harding, Adelaide, Australia
Ingale Harshal, Oxford, United Kingdom
Dustin Hatfi, San Diego, Calif.
Tony McGilligan, Brighton, United Kingdom
Romulo Mota, Sao Paulo, Brazil
Debraj Mukherjee, Madison, Wis.
Christian Musahl, Wiesbaden, Germany
Alberto Perez-Contreras Sr., Mexico City, Mexico
Joshua Romero, Syracuse, N.Y.
Jayson Sack, San Diego, Calif.
Martin Antonio Saez, Buenos Aires, Argentina
Fabio Serra, Sao Paulo, Brazil
Kashif Shaikh, Indianapolis, Ind.
Jaimo Shi, Guangzhou, China
Sandep Solanki, Nottingham, United Kingdom
Ethan Soudry, Binyamina, Israel
Oldrich Soula, Prague, Czech Republic
Jan Sroubek, Prague, Czech Republic
Daniel Surdell, Omaha, Neb.
Luisam Tarrats, San Juan, P.R.
Valerii Timirgaz, Chisinau, Moldova
Yu Chi Wang, New Taipei City, Taiwan
Peter Wilson, Randwick, Australia
Hidenori Yokoi, Tokyo, Japan

April 13-16, 2016:
Ali Akbar, Larkana, Pakistan
Mahmoud Albarazi Sr., Aarhus, Denmark
Abdul Aleem, Dubai, UAE
Mohammed Aref, Ancaster, Canada
Shankar Ayyappan Kutty, Abu Dhabi, UAE
Diran Bairamian, Modesto, Calif.
Regan Bergmark, Boston, Mass.
Jerome Boatey, Accra, Ghana
Kristian Bruun Petersen, Aarhus, Denmark
Edwin Miguel Canche Martin Sr., Obregon, Mexico
Eric Carro Sr., Bayamon, P.R.
Mohamad Chaaban, Galveston, Texas
Danqi Chen, Shanghai, China
Liang Chen, Shanghai, China
Sung-Woo Cho, Seoul, Korea
Davi Garcia, Baltimore, Md.
Mathew Geltzeiler, Pittsburgh, Pa.
Wes Griffitt, Green Bay, Wis.
Michael Haupert, Southfield, Mich.

Abhijit Hazra, Nagpur, India
David Hersh, Baltimore, Md.
Phillip Huyett, Pittsburgh, Pa.
Jaime Inserni, San Juan, P.R.
Amrith Jamoona, Modesto, Calif.
Salazar Jones, Baltimore, Md.
Ian Koszewski, Madison, Wis.
Todd Loehr, Milwaukee, Wis.
Emil Margolin, Jerusalem, Israel
Ricardo Horacio Menendez Sr., Buenos Aires, Argentina
Marcel Miyake, Boston, Mass.
Peter Morone, Nashville, Tenn.
Samuel Moscovici, Jerusalem, Israel
Srinivasan Paramasivam, New York, N.Y.
Asmeeta Patel, Nairobi, Kenya
Laura Yanelli Ruiz Soto, Mexico City, Mexico
Raphael Sacho, Milwaukee, Wis.
Yougan Saman, Durban, South Africa
Ming Shen, Shanghai, China
Hai Ping Shi Sr., Suining, China
Xicheng Song Sr., Yantai, China
Rob Sonnenburg, Green Bay, Wis.
Prasad John Thottam, Southfield, Mich.
Gentian Toshkezi, Syracuse, N.Y.
Kyle VanKoevering, Ann Arbor, Mich.
Andrew Venteicher, Boston, Mass.
John Victor, Abu Dhabi, UAE
Krish Vigneswaran, Atlanta, Ga.
Chengshuo Wang, Beijing, China
Xiangdong Wang, Beijing, China
Ian White, Indianapolis, Ind.
Xuehai Wu, Shanghai, China
Yong Gang Wu Sr., Urumqi, China
Yan Sun Sr., Yantai, China
In Memoriam

Peter J. Jannetta, MD (1932-2016)

It’s said that a true measure of a man’s legacy is not gauged by the things he has accomplished, but rather it is measured by the impression he has made on others throughout his life. We are often judged by how we have touched others...how we have strived to make the lives of others better.

By those standards, the legacy of Peter J. Jannetta, MD, will stretch long in the history of medicine.

Dr. Jannetta, long-time former chairman of the University of Pittsburgh Department of Neurological Surgery, passed away this year at the age of 84. He was widely acclaimed for his development of microvascular decompression (MVD), a novel 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’ in the neurosurgical community. People would come from around the world to seek out his expertise.

Perhaps as significant, P.J.—as he was known by friends and colleagues—will be long-remembered for his friendly bedside manner and his ability to easily communicate with patients with his ‘old-school charm.’ He had a knack for explaining the intricacies of complex brain surgery in an easy-to-understand manner, much the same way a grandfather would explain the uncertainties of life to an apprehensive grandchild.

He enjoyed his private moments with patients as much as anything, taking a sincere interest in their backgrounds, hobbies, and hometowns. His compassionate approach connected one-on-one with his patients in a way that is sometimes forgotten in today’s fast-paced medical environment. If a patient could not make his usually busy clinic day, P.J. would make every effort to squeeze that patient into his schedule, even on his busiest operating days.

This ‘old-school charm,’ combined with his surgical prowess, made his name legendary in cranial nerve support groups around the world.

He ran his operating room with much the same personality. Ray F. Sekula Jr., MD, a former student and now director of the University of Pittsburgh Cranial Nerve Disorder Center, recalls how P.J.’s operating room reminded him of an organized baseball game. “He knew everyone by his or her first name. While he was clearly the leader of this team, he insisted that everyone call him P.J.,” Sekula said. He commanded respect by his stature, but he treated you with respect as well.

In a recent Journal of Neurosurgery article remembering P.J., Dr. Sekula wrote, “He was a born leader. He was tall, good-looking, athletic, and charismatic. When he came into a room, all eyes moved towards him. He focused on what could be in life. He rarely complained. Despite keeping extremely long hours as a physician, he often told patients that he ‘hadn’t worked a day in his life’ since he started in medicine.”

Despite the life-saving and groundbreaking MVD procedure that P.J. developed, his proudest accomplishment was said to be the number and success of his trainees. He helped create one of the most outstanding schools of neurological surgery in the world, training dozens of residents, many of whom have gone on to be leaders in the field themselves. The late Albert Rhoton Jr., a fellow groundbreaking neurosurgeon, said P.J. “is the godfather to almost every neurosurgeon in the world.”

Much of what you see in the pages of this annual report has its foundation in the work of Peter J. Jannetta. His fingerprints and influence are all over our work. Indeed, he has left us with a most indelible impression.

His work was monumental. His personality was larger than life. His legacy is long, proud and forever.
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 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 13,300 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.

In June of 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 neurological surgery 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 2015-16 full-time faculty includes eight professors, 10 associate professors and 16 assistant professors. In addition, there are 11 clinical faculty, seven research faculty and 26 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.

**Comprehensive Center for Cerebrovascular Neurosurgery**

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. Tudor Jovin, MD, of the UPMC Stroke Institute, heads up our Center for Neuroendovascular Therapy. Other members of our team include Andrew F. Ducruet, MD, Bradley Gross, MD, Ashutosh Jadhav MD, PhD, Brian Jankowitz, MD, Paul A. Gardner, MD, and Daniel A. Wecht, MD.
Department Overview

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.

• Human Neural Prosthetics Program
The Human Neural Prosthetics Program 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.

Elizabeth Tyler-Kabara, MD, PhD, and Wei Wang, MD, PhD (Department of Physical Medicine & Rehabilitation) 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 principle 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, chairman of the Department of Physical Medicine & Rehabilitation, is the principle investigator. In the study, two 96-channel electrode arrays were implanted into the brain of a quadriplegic patient. This patient 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 has been implanted with two recording arrays in motor cortex and two stimulating arrays in sensory cortex.

Future studies are currently under development. Researchers are working on FDA approval for chronic ECoG implantation. Investigators hope to begin up to one-year studies soon. Development of a wireless system is also under development and it hoped that the pre-IDE studies will begin in the next year. It is anticipated that over the next year that the Department of Neurological Surgery will assume the leadership role for the ECoG based studies as Dr. Tyler-Kabara assumes the PI role for the ongoing studies and future studies.

• 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, in the Department of Neurological Surgery and Carl H. Snyderman, MD, MBA, in the Department of Otolaryngology—is the first skull base center to be established in North America and has
Department Overview

pioneered both transcranial microscopic and endoscopic endonasal approaches to the skull base and brain. L. Dade Lunsford, MD, established the gamma knife center at UPMC 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, including associate directors Juan Fernandez-Miranda, MD and Eric Wang, MD, 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 3000 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 like transorbital and endoscopic-assisted retromastoid approaches, the team at UPMC provides the full array of options for cutting edge treatment of skull base disease. Children’s Hospital of Pittsburgh of UPMC is unique in its ability to provide comprehensive skull base surgery with a dedicated skull base team under the leadership of pediatric neurosurgeon Elizabeth Tyler-Kabara, MD, PhD.

Drs. Gardner, Snyderman, Fernandez-Miranda, Wang, and Tyler-Kabara, along with Tonya Stefko, MD, in ophthalmologic surgery, and Barry Hirsch, MD, and Andrew McCall, MD in neuro-otology, 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.

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 destination for surgeons and other health care professionals looking to learn more about these techniques. Faculty teach four courses a year at UPMC, featuring live cases and hands-on lab work. They also travel the world teaching these procedures.

- Center for Cranial Nerve and Brainstem Disorders
The Center for Cranial Nerve and Brainstem 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. In addition, the center continues to expand and pioneer treatments directed at other abnormalities in and around the brainstem.

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.
• 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 three primary divisions: the Adult Neurosurgical Oncology Program, the Pediatric Neurosurgical Oncology Program, and the Brain Tumor Program located at the Hillman Cancer 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, led by Johnathan Engh MD, (director) and Nduka Amankulor, MD, (associate director), 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.

This 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. In addition, minimally invasive techniques for tumor removal using intracranial endoscopic port surgery (NeuroendoportSM) 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, fluorescent-guided brain tumor resection and awake craniotomy techniques have been 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 neuroscience 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 in a multidisciplinary clinic that includes representation from neurosurgery, 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, 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.

The University of Pittsburgh is a member of the American Brain Tumor Consortium, which conducts clinical trials to evaluate novel chemotherapy and molecular treatments for adults with malignant primary brain tumors. In addition to membership in this group, the site is one of the few in the country that is also a member of the Pediatric Brain Tumor Consortium and the Collaborative Ependymoma Research Network, highlighting the breadth of the neuro-oncology expertise across the age spectrum. The University of Pittsburgh serves
as the coordinating center for the North American Gamma Knife Consortium, which links 18 academic centers of excellence in radiosurgery. Moreover, investigators have been at the forefront of development of innovative biological therapeutic approaches for patients with brain tumors, such as immunotherapy using brain tumor vaccines and radiosurgery coupled with bevacizumab.

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 malignant 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.

- Spine Services Division

The Neurosurgical Spine 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 community division is led by Joseph Maroon, MD, and Matt El-Kadi, MD, PhD.

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 intractable 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.
Department Overview

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.

• Center for Image-Guided Neurosurgery
The Center for Image-Guided Neurosurgery, led by L. Dade Lunsford, MD, incorporates the expertise of individuals in image-guided stereotactic and functional neurosurgery, brain tumor surgery, Gamma Knife radiosurgery, neuro-oncology, radiation oncology and neuroradiology. Ajay Niranjan, MD, MBA, is associate director of the center. Edward Monaco III, MD, PhD, joined the center in July of 2013 as co-associate director. The goal of the center is to provide quality patient care using minimal access or minimally invasive stereotactic and radiosurgery 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. The suite was updated in 2009.

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. Our center owns the distinction of being 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 here. This generation Gamma Knife unit incorporates advanced robotics, expands the role of radiosurgery to include extracranial targets, provides greater patient access, and enhances patient safety. 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. More than 14,000 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 Chair in spinal neurological surgery. In 2016, UPMC installed its sixth Gamma Knife, the newest generation ICON Gamma knife with cone beam CT imaging.

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 1,900 neurosurgeons, neurootologists, radiation oncologists, medical physicists, and nurses have been 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. The center also has a dedicated Elekta 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.

In addition, the center conducts numerous clinical, long-term outcome research projects and is the coordinating center for the International Gamma Knife Research Foundation (IGKRF) a multi-institutional international clinical consortium of centers of excellence performing stereotactic radiosurgery using the Leksell Gamma Knife. The IGKRF currently has members from the US, Canada, the Czech republic, Spain, Taiwan, Egypt, Turkey and China. Multiple retrospective clinical trials have been published or are underway. Three prospective clinical trials have begun. 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 that have been cited more than 100 times. More than 500 peer reviewed articles, several hundred book chapters, and eleven books have been published by individuals affiliated with this center since it opened in 1981.
This multidisciplinary center includes the clinical and research efforts of neurosurgeon Hideyuki Kano, MD, PhD, and radiation oncologists John Flickinger, MD; Yoshio Arai, MD; Susan Rakfal MD; Duk il Sung, MD; and Melvin Deutsch, MD. The participating medical physics group consists of Andy Xu, PhD; Jagdish Bhatnagar, ScD; Mubina Quadar, PhD; Jong Oh Kim, PhD; and Greg Bednarz, PhD. Grace Yum provides assistance in medical informatics.

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. 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 opportunity is approved by the Society of Neurological Surgeons Committee on Advanced Specialty Training (CAST).

- Pediatric Neurosurgery

The Pediatric Neurosurgery Division at Children’s Hospital of Pittsburgh of UPMC is led by Ian Pollack, MD, and includes three other full-time faculty, Elizabeth Tyler-Kabara, MD, PhD, Stephanie Greene, MD, and Mandeep Tamber, MD, PhD. 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 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 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.

In addition, Dr. Tyler-Kabara has helped to pioneer the use of endoscopic endonasal approaches to the skull base in the pediatric population. Children's Hospital offers this minimally invasive approach to skull base pathologies (tumor, congenital, and trauma), even in children under the age of two. The clinical program is augmented by NIH-funded, laboratory-based research initiatives examining molecular markers of prognosis and novel treatment strategies in patients with glial tumors and ependymomas.

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 Surgical Epilepsy Program is the only center in the region able to provide comprehensive evaluation and surgical treatment options for children with intractable epilepsy. Dr. Tamber, the lead epilepsy neurosurgeon, collaborates closely with epileptologists within the Division of Pediatric Neurology. A comprehensive pre-surgical evaluation, using state-of-the-art neuro-imaging resources, is carried out to identify the specific site in the brain causing
seizures and to determine its relationship to important functional areas of the brain. Surgical candidates benefit from a full spectrum of treatment options, ranging from lesionectomies (guided by intraoperative electrocorticography), tailored cortical resections following a period of invasive subdural EEG monitoring, corpus callosotomies and hemispherectomies. Other patients may benefit from vagus nerve stimulation. Children's Hospital of Pittsburgh of UPMC has implanted more than 350 vagus nerve stimulators (VNS) making it one of the busiest VNS programs in the country.

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. The Spasticity and Movement Disorders Clinic, led by Dr. Tyler-Kabara, 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 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 or other therapies.

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 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 of Pittsburgh, one of the largest such clinics in the country. Expectant mothers are referred by the Fetal Diagnosis and Treatment Center at Magee Women's 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. Dr. Greene and Lorelei J. Grunwaldt, MD of plastic surgery perform the necessary operations on infants together, bringing their different expertise to bear on the problem in a collaborative fashion. 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. Patients with peripheral nerve tumors or injuries are seen by Dr. Greene outside of the Brachial Plexus Program.

Dr. Tamber has worked to include Children's Hospital of Pittsburgh of UPMC in several large multi-center clinical networks that are dedicated to the study of common pediatric disorders. CHP is a member of the Hydrocephalus Clinical Research Network, a group of seven premier pediatric neurosurgical departments in North America that are dedicated to designing and undertaking field-changing prospective research into pediatric hydrocephalus. In addition, CHP has been selected as 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. Dr. Tamber is the institutional principal investigator for both of these endeavors. In addition, Dr. Tamber is the principal investigator at CHP for a new prospective multicenter collaboration dedicated to studying and improving the clinical outcomes of children with craniofacial disorders.
Patients with vascular anomalies such as aneurysms, arteriovenous malformations, cavernous malformations, and moyamoya syndrome are managed by Dr. Greene. 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 interventional radiology 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.

• 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 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 to persons suffering from traumatic brain injury.

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 Office 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. The BTRC is a multidisciplinary, multidepartmental research program aimed at improving outcome following severe traumatic brain injury. 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.

The Pediatric Neurotrauma Center (PNTC), under the leadership of Michael J. Bell, MD (Critical Care Medicine) and Mandeep Tamber, MD, PhD, (Pediatric Neurosurgery) has both basic science and clinical research programs aimed at understanding the pediatric response to neural injury, as well as the unique elements of recovery that are specific to traumatic central nervous system injuries in children. This section coordinates services for injured children at Children’s Hospital of Pittsburgh of UPMC, which operates the region’s only Level I pediatric trauma center. The goal of the center is to provide optimal care between the time of injury and discharge. Subspecialists in all pediatric medical and surgical disciplines are readily available to provide definitive care. As one of the most established and comprehensive programs in the country, the PNTC has been at the forefront of pediatric neurotrauma research not only locally but also nationally and internationally, serving as
Department Overview

an important resource for collaborative programs such as multi-institutional clinical trials designed to improve outcomes, as well as efforts aimed at developing consensus clinical guidelines for the care of children with traumatic neurological injury. Research is progressing at a vigorous pace, with the implementation of several new phase I/II clinical trials, the start of a comparative effectiveness study to discern barriers to implementation of evidence-based guidelines and the continuing support of a T32-training grant in pediatric neurocritical care.

- **Brain Stimulation and Epilepsy Surgery Program**
  The Epilepsy and Movement Disorders Program at the University of Pittsburgh, directed by Mark Richardson, MD, PhD, encompasses the treatment of movement disorders, obsessive-compulsive disorder, and epilepsy. 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 as multidisciplinary teams that deliver surgical care to these special groups of patients.

  The University of Pittsburgh Department of Neurological Surgery is the only department in Pennsylvania offering asleep, interventional-MRI based deep brain stimulation (DBS)—in addition to frame-based DBS—to treat Parkinson’s disease, essential tremor, dystonia (including Meige syndrome), and pediatric movement disorders. In addition to Dr. Richardson's DBS volume being among the highest in the nation, the movement disorders surgery program is one of only two participating in the Phase 1b clinical trial of iMRI-guided AAV2-AADC Gene Therapy in Parkinson’s disease. The program also performs DBS for the treatment of OCD in patients who have had a diagnosis of chronic, severe, treatment-resistant OCD that has become disabling.

  UPMC Presbyterian also houses the region’s foremost center for the comprehensive neurosurgical treatment of all types of adult epilepsy, including epilepsy caused by lesions visible on MRI (sclerosis, dysplasia, brain tumors, cavernous malformations) and epilepsy where the seizure onset location is not obvious and must be discovered by intracranial monitoring, including stereo-electroencephalography. Part of the University of Pittsburgh Comprehensive Epilepsy Center, the surgery program is one of the busiest in the nation, offering the latest treatments for patients suffering from multiple types of epilepsy, including Responsive Neurostimulation and laser thermal ablation. In August 2016, the Epilepsy and Movement Disorders Program will begin using the Rosa stereotactic robotic system for implantation of electrodes in SEEG surgeries.

- **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 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
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The CCN is the largest and busiest academic IONM program in the country, offering and providing services at all UPMC hospitals including UPMC Hamot and Altoona. In addition, the CCN provides professional and technical services at Mon Valley, Jameson and Trinity (Steubenville, OH) Hospitals. 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), 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) 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 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.

• Community Neurosurgery

The University of Pittsburgh Department of Neurological Surgery Community Division provides state-of-the-art neurosurgical care in community hospitals in the greater Pittsburgh area, offering excellent care in an environment close to family and friends. Community neurosurgeons see patients and provide advanced clinical care in an area stretching from Ohio to Indiana, Pa., and from West Virginia to Erie. These physicians offer a wide range of subspecialty skills, including minimally invasive neurosurgery, general and complex spine surgery, peripheral nerve surgery, and brain and vascular neurosurgery. This local initiative is offered to help provide convenience for the community and to promote an atmosphere of reassurance and comfort for the patient.
Accomplishments and Highlights of Note in Fiscal Year 2015-16

July 2015
• Nduka Amankulor, MD, was awarded the 2015 Leo H. Criep, MD, Excellence in Patient Care Award from the University of Pittsburgh Cancer Institute.

• Thieme Publishing released Intracranial Stereotactic Radiosurgery, coedited by L. Dade Lunsford, MD, a 304-page look into this highly precise brain treatment technique, laying the foundation for understanding the differentiations in various types of stereotactic radiosurgery technologies.

August 2015
• Nitil Agarwal, MD, was appointed to the American Association of Neurological Surgeons Young Neurosurgeons Committee.

• Thieme Publishing released Spine Radiosurgery, co-edited by Peter C. Gerszten, MD, MPH, a comprehensive look into the latest devices, treatment planning techniques, target definition, and patient selection process in the field of spine radiosurgery.

• R. Mark Richardson, MD, PhD, was noted in a Pittsburgh Tribune-Review article that featured one of his epilepsy patients treated with the new RNS Neurostimulator, an implantable device designed to help halt oncoming seizures.

September 2015
• Ian Pollack, MD, was appointed to the faculty rank of Distinguished Professor at the University of Pittsburgh. This appointment honors extraordinary, internationally recognized scholarly attainment and constitutes the highest honor the university can accord a member of the professoriate.

• David O. Okonkwo, MD, PhD, was featured in a Discover Magazine feature article that discussed how high-definition fiber-tracking helps doctors treat traumatic brain injury patients.

• The University of Pittsburgh Department of Neurological Surgery ranked among the top five neurosurgical residency programs in the country in terms of academic publishing output of faculty, according to an in-depth, five-year study published online by the Journal of Neurosurgery.

• Joseph C. Maroon, MD was noted in a Pittsburgh Post-Gazette article that detailed how National Football League teams are monitoring the health of players during games.

October 2015
• Avniel Ghuman, PhD, was awarded the Biobehavioral Research Award for Innovative New Scientists (BRAINS) from the National Institute of Mental Health.

• Sabrina Yancey, Gamma Knife processing technician, received the UPMC Award for Commitment and Excellence in Service (ACES).

• Joseph C. Maroon, MD, was featured in Indiana University Alumni Magazine. The article reviewed Dr. Maroon’s life in sports and his dedication to improving the management of sports related concussions.
Department Overview

Accomplishments and Highlights of Note

- Parthasarathy Thirumala, MD, was elected a fellow member of the American Academy of Neurology.
- Brian Jankowitz, MD, discussed strokes and how to treat them on the KDKA Radio Morning News Show with Larry Richert and John Shumway.
- David O. Okonkwo, MD, PhD, was quoted in the Pittsburgh Post-Gazette, as well as numerous other media outlets, regarding findings from a UPMC Concussion Conference that concluded rest may not be the best option for concussion patients.
- Joseph C. Maroon, MD, was a guest on KDKA-TV’s Pittsburgh Today Live morning talk show where he discussed tips for living a healthy life.

November 2015

- Springer Publishing released Microvascular Decompression Surgery, co-edited by Raymond F. Sekula Jr., MD, MBA. The first-edition textbook provides an update on MVD surgery, an effective remedy for cranial nerve hyperexcitability disorders including hemifacial spasm, trigeminal neuralgia, and glossopharyngeal neuralgia.
- Juan C. Fernandez-Miranda, MD, completed a comprehensive update of the “Intracranial Anatomy” chapter in the newest edition of Gray’s Anatomy: The Anatomical Basis of Clinical Practice, the renowned anatomical reference text used by medical practitioners and students around the world.
- “Network Effects of Deep Brain Stimulation,” a review article authored by R. Mark Richardson, MD, PhD, and his staff at the Brain Modulation Laboratory, was chosen for the cover of the Journal of Neurophysiology.
- Nduka Amankulor, MD, was awarded one of the four best oral poster presentation awards during the Society for Neuro-Oncology annual meeting held in San Antonio, Tex.

December 2015

- Joseph C. Maroon, MD authored an article on livestrong.com article, entitled “10 Tips to Live Healthier and Longer.”

January 2016

- R. Mark Richardson, MD, PhD, was quoted in a Dell.com article that focused on how the new wave of neurotechnology is changing the way we study the brain and treat neurological diseases.
- Juan C. Fernandez-Miranda, MD, was featured in a spotlight article in the Pituitary Network Association’s Highlights newsletter discussing his work and research in minimally invasive approaches in skull base surgery.

February 2016

- L. Dade Lunsford, MD, was a guest on the KDKA Radio Morning News Show with Larry Richert and John Shumway discussing the Gamma Knife®.

- An article discussing a novel approach to find aberrant connections in certain hippocampal structures in temporal lobe epilepsy, coauthored by R. Mark Richardson, MD, PhD, was featured on the cover of the journal Human Brain Mapping.
Department Overview
Accomplishments and Highlights of Note

- R. Mark Richardson, MD, PhD, was featured on KDKA-TV 2 Evening News and the Pittsburgh Tribune Review regarding his work in a new gene therapy enzyme study under way to aid in treatment of Parkinson’s disease patients.

- Ezequiel Goldschmidt, MD, was awarded the best abstract award at the North American Skull Base Society annual meeting held in Scottsdale, Ariz. Dr. Goldschmidt received the award for the abstract, “Effect of In Vivo Oxidized Cellulose on In Vitro Growth of Human Respiratory Mucosa and Sub-Mucosa During Endoscopic Skull Base Approaches.”

- Joseph Maroon, MD, was featured in a todayspigskin.com article that addressed his stance on concussion and CTE through his treatment of WWE star wrestler Daniel Bryan.

March 2016

- Adam S. Kanter, MD, received the Early Achievement Award from the University of Vermont School of Medicine. The award is presented to an alumnus who has graduated within the past 15 years and has demonstrated outstanding community, scientific, or academic achievement.

- Nitin Agarwal, MD, Gurpreet Gandhoke, MD, Ezequiel Goldschmidt, MD, Michael McDowell, MD, Alp Ozpinar, MD, David J. Salvetti, MD, and Zachary Tempel, MD, were each selected as Charles Kuntz Scholars at Spine Summit 2016, the 32nd annual meeting of the AANS/Congress of Neurological Surgeons (CNS) Joint Section on Disorders of the Spine and Peripheral Nerves, held in Orlando, Fla. The Kuntz scholarship is presented to authors of outstanding abstracts detailing a laboratory or clinical investigation in the area of spinal disorders.

- Zachary Tempel, MD, was awarded the Young Investigator Award at the 2016 Society for Lateral Access Surgery (SOLAS) annual meeting held in Carlsbad Calif. Dr. Tempel received the award for the abstract, “Does Concave Versus Convex Approach Matter When Using Lateral Lumbar Interbody Fusion For Adult Scoliosis?”

- Amir Faraji, MD, was selected as the winner of the Society of Neurological Surgeons/Research Update in Neuroscience for Neurosurgeons (RUNN) course resident award for his submission, “Antioxidant Nanoparticles for Use in Traumatic Brain Injury.”

- The University of Pittsburgh Neurosurgery Interest Group (NSIG) was profiled in the American Association of Neurological Surgeons’ Young Neurosurgeons News newsletter. Ray Sekula, MD, is the group’s faculty sponsor and Nitin Agarwal, MD, is resident advisor.

- L. Dade Lunsford, MD, was the 2016 recipient of the American Association of Neurological Surgery (AANS) Cushing Award for Technical Excellence and Innovation in Neurosurgery. The award recognizes the recipient’s technical prowess and skill and/or innovation in the development of new procedures that have become part of the arsenal neurosurgeons use to treat disease or trauma.

- Ian Pollack, MD, Gurpreet Gandhoke, MD, Christopher Deibert, MD, Nathan Zwagerman, MD, and Ajay Niranjan, MD, received awards for abstracts submitted for the American Association of Neurological Surgeons Annual Meeting, held in Chicago, Ill.

- Joseph Maroon, MD, was lauded in a Pittsburgh Post-Gazette opinion article—authored by a representative of former Pittsburgh Steeler Mike Webster—that praised him for his work in brain injury and player safety.
Department Overview

Accomplishments and Highlights of Note

- R. Mark Richardson, MD, PhD, was featured in a GoErie.com article that talked about the expansion of the deep brain stimulation program at UPMC Hamot.

April 2016

- R. Mark Richardson, MD, PhD, was featured in a *Journal of Neurophysiology* podcast discussing the neurobiology of deep brain stimulation.

- Joseph Maroon, MD, authored a column in the *Pittsburgh Tribune Review* that detailed steps to help reduce unwanted inflammation in the brain and body to reduce chances of acquiring diseases.

May 2016

- Nitin Agarwal, MD, was selected as a Council of State Neurological Societies (CSNS) Socioeconomic Fellow for 2016-17.

- Adnan Abla, MD; Daniel M. Bursick, MD; Hikmat (Matt) El-Kadi, MD, PhD; Johnathan Engh, MD; Juan C. Fernandez-Miranda, MD; Robert M. Friedlander, MD; Paul A. Gardner, MD; Peter C. Gerszten, MD; D. Kojo Hamilton, MD; Brian Jankowitz, MD; Adam S. Kanter, MD; L. Dade Lunsford, MD; Joseph C. Maroon, MD; Vincent J. Miele Jr, MD; Edward A. Monaco, MD, PhD; John J. Moossy, MD; Ajay Niranjan, MD; David O. Okonkwo, MD, PhD; Ian Pollack, MD; R. Mark Richardson, MD, PhD; Raymond Sekula, MD; and Elizabeth Tyler-Kabara, MD, PhD were named among the tri-state’s area’s top doctors in their field in a national survey published locally in *Pittsburgh Magazine*.

June 2016

- R. Mark Richardson, MD, PhD, was noted in a feature article in central Oregon’s *The Bulletin* explaining how Parkinson’s disease patients are finding relief through deep brain stimulation surgery.

- Ian Pollack, MD, received the Children’s Brain Tumor Foundation’s Award for Scientific Excellence at the group’s 14th Annual Dream and Promise Gala in New York.

- Benjamin Zussman, MD, wrote a commentary for the American Association of Neurological Surgeon’s neurosurgeryblog.org discussing drug and opioid abuse prevention.

- Joseph Maroon, MD—along with Julian Bailes, MD, and Mark Lovell, PhD—was awarded the Lifetime Leadership Award for Concussion Research at the Emerging Frontiers in Concussion Conference sponsored by the UPMC Sports Medicine Concussion Program.

- UPMC Presbyterian became the first hospital in the region and the third institution in the United States to treat patients with the next generation Leksell Gamma Knife Icon®.
Future Initiatives

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

Dr. Balzer will continue to explore SAH and its implications in DCI. Specifically we will be attempting to create new classifications of cerebrovascular reactivity in an attempt to tailor treatment. To this end, newly approved IRB will assay vasomotor reactivity using TCD and CO2 challenge in patients with SAH.

Dr. Balzer will also begin a Copeland funded project investigating a first step that seeks to improve safety and the integrity of nerve function during surgical resection of tumors in and around cranial nerves of the cerebellopontine angle. Ultimately, his approach seeks to investigate the efficacy of utilizing a novel instrument which is directly linked with neurophysiologic computer-controlled feedback and can react in real-time to potential threats to nervous structures by the operator. Specifically, electrophysiologic feedback will stimulate immediate and automatic adjustment of limits on applied force and instrument tip velocity. Specifically, the goal of this proposal is to establish and validate an in vivo animal model capable of generating free-run electromyography (f-EMG). This data will eventually be used to program the hand-held device so that its effectiveness can be tested using the same model. The model also affords us the opportunity to evaluate the safety profile of the dissection related to f-EMG activity by performing pre-, intra- and post-operative neurophysiological testing.

Diane L. Carlisle, PhD
Assistant Professor

In the upcoming year, Dr. Carlisle plans to capitalize on her optimization of lung organoid differentiation in vitro to examine the effects of genetic manipulation and chemical exposure. This allows her to investigate the effects of gene environment interactions on lung development. Furthermore, she plans to continue to implement the neural organoid differentiation system to expand our studies of gene environmental interactions to neurological disease.

C. Edward Dixon, PhD
Professor
The Neurotrauma Chair in Neurosurgery
Vice Chair, Research
Director, Brain Trauma Research Center
Research Health Scientist at the Geriatric Research, Education and Clinical Center in the Veteran’s Affairs Pittsburgh Health Care System

Future studies will evaluate the role of proteins involved with SNARE protein assembly after TBI. These include cysteine string protein alpha and native alpha-synuclein. Dr. Dixon will also continue work with Operation Brain Trauma Therapy to screen addition drugs on his CCI model.
Department Overview
Future Initiatives

Paul A. Gardner, MD
Associate Professor
Executive Vice Chair, Surgical Services
Neurosurgical Director, Center for Skull Base Surgery

Dr. Gardner recently completed a molecular prognostication panel evaluation for clival chordoma. Ninety-two tumors were evaluated for genetic alterations using FISH, LOH and IHC studies. Six markers were found which predicted progression following surgery and three which predicted progression following radiation. This panel for chordoma will be applied prospectively to determine its clinical utility.

Further evaluation of the exome sequences performed on chordoma will be performed using newer algorithms to seek damaging and meaningful mutations (largely copy number variants and insertions/deletions). In addition, this technique will be evaluated for application to other rare tumors treated at our center (eg. Esthesioneuroblastoma).

Retrospective review of chordoma recurrence will be performed to try to determine the proper surveillance pattern. This will provide rationale for surveillance guidelines.

Further animal studies of NeuroGel will be performed to determine applicability for other models such as simple transection and crush, as well as evaluating non-motor outcomes such as pain.

Avniel Singh Ghuman, PhD
Assistant Professor
Director, MEG Research

Dr. Ghuman's lab has a number of new initiatives planned for the next year. One major high-risk/high-reward new initiative is to begin to explore the neural basis of natural vision and natural social interactions. This will involve recording brain activity while subjects go about their days, interacting with friends, family, etc. This will provide a rich data set that will be analyzed with modern machine learning and neural network analyses to understand the neural basis of human perception and interactions "in the wild."

In addition, Dr. Ghuman plans to expand on his work on the neural basis of face and word perception to assess how information flows through broad-based brain networks in service of visual recognition and social and affective perception processing. This work involves combining network analysis methods with machine learning algorithms in novel ways to understand the neural representation of information across the brain.

Esther Jane, PhD
Research Assistant Professor

Resistance to apoptosis is a major obstacle for most cancer therapeutics and can arise because of overexpression of apoptosis inhibitors. Since many signaling components are frequently affected in glioma, targeted therapies that inhibit multiple targets are required. Bcl-2 inhibitor (ABT-737) is a promising agent being tested in clinical trials for solid tumors and lymphoid malignancies. One of the major limitations of ABT-737 reported in preclinical studies is that high levels of Mcl-1 confer resistance to ABT-737, suggesting the need for combined modality therapies. Overall, present findings establish that most drugs as a single agent, displayed modest cytotoxic/cytostatic activity. A combination study potently inhibits cell growth and induces apoptosis regardless of PTEN status, suggesting a potential mechanistic rationale for these inhibitors in clinical application.
L. Dade Lunsford, MD  
Lars Leksell Distinguished Professor  
Director, Center for Image-Guided Neurosurgery  
Director, Residency Training Program  

The newest radiosurgical technology Elekta ICON was installed at UPMC in May 2016. This advanced generation device now facilitates both frame and mask based interventions for a wide variety of brain tumors, vascular disorders, and pain movement disorders. Our efforts will help to define the growing role of radiosurgery in the field of neurosurgery.

Ajay Niranjan, MD, MBA  
Professor  
Director, UPMC-Brain Mapping Center (MEG)  
Associate Director, Center for Image-Guided Neurosurgery  
Director, Radiosurgery Research  

Dr. Niranjan’s future research initiative includes “High Definition Imaging for Functional Radiosurgery.” The goal of this project is to develop thalamic and trigeminal nerve segmentation using High Definition Fiber Tractography (HDFT) technique. This will be accomplished by performing off-line data analysis with a variety of data processing techniques to visualize white matters tracts and thalamic nuclei. These images will finally be converted into an imaging format (e.g. Dicom RT) which can be imported in Gamma Plan. These high definition images will significantly improve the targeting accuracy for thalamic and trigeminal radiosurgery.

Daniel R. Premkumar, PhD  
Research Assistant Professor  

Dr. Premkumar’s research program has centered on several molecules that control discrete steps of programmed cell death. The immediate goal of his research is to understand how anticancer drugs kill glioma cancer cells. In the long term, he will attempt to use this knowledge to identify novel molecular targets and treatment strategies to improve glioma cancer chemotherapy. Recently, Dr. Premkumar has examined target-directed strategies for inhibiting a number of receptors, such as EGFR, PDGFR, and IGFR1, and growth signaling mediators, such as PKC, Raf, and Src, that have been implicated in glial neoplasia. Among the regulators of apoptosis that may participate in cancer, interest has been recently focused on histone deacetylase inhibitors (HDACIs). Histone deacetylases (HDACs) play an important role in gene regulation. Inhibitors of HDACs (HDACI) are novel anti-cancer drugs, which induce histone acetylation and counteract aberrant gene repression. Inhibitors of HDACs can change the expression pattern of genes, and were shown to induce growth arrest, differentiation or apoptosis in cancer cells in vitro and in vivo. As monotherapies, HDACIs have thus far been shown to be less effective against solid tumors as single agents and, the full therapeutic potential of HDACIs will probably be best realized through combination with other anticancer agents.

Mingui Sun, PhD  
Professor  

Recent advances in microelectronics, wireless communication, and bioengineering have produced many forms of implantable medical devices. Among them, smart implants that perform diagnostic functions from the inside the human body play an increasing role in modern medicine. Access to real time biometric information can disrupt traditional
symptom and lab based diagnostic approaches, and usher in a new era of technology-based preventive and predictive medicine. Despite the high potential impact of diagnostic implants, numerous problems in both technical and biological domains must be solved. This initiative focuses on a critical objective common to almost all diagnostic implants: Making the implants small. There are many compelling reasons to miniaturize diagnostic implants. First, smaller implants in millimeter scales are easier to deliver in vivo using minimally invasive means, which in turn reduce surgical cost and complication rates. Second, smaller implants can be placed within less accessible compartments inside or between organs and tissues without interfering with normal biologic functions. Third, smaller implants improve biocompatibility and immune tolerance due to a smaller biological footprint. We will develop new forms of resonant coils to allow effective delivery of electric power from outside the body to millimeter-sized diagnostic implants. We will investigate external power transmitters and establish an ultra-low-power communication channel integrated fully with the wireless power system; we will study the electromagnetic safety of the proposed wireless power system and evaluate the energy absorption in biological tissues. We envision a strong impact of this research on enabling not only a new spectrum of medical diagnostics inside the body, but also a substantial reduction in the costs of care associated with next-generation diagnostic implants.
Educational Programs
Educational 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 both 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 undergraduate students obtain faculty permission and complete on line training courses related to patient confidentiality.

Medical Students
Faculty participate in teaching clinical neuroscience and neuroanatomy to first- and second-year medical students. Several such 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.

Selected 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.

One-month clerkships offered to senior medical students from other medical schools attract 10 to 20 students each year. In their senior year, selected 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 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.

The course Introduction to Clinical Neurophysiology exposes students to the Neurophysiology Laboratory, where they learn to use electrodiagnostic tools to study clinical neurological disorders in humans. Instruction also is provided in intraoperative and ICU monitoring. Students participate in patient testing and analysis of results, and they also can take part in research projects in electrophysiology and computational data analysis.

Graduate Students
The Department of Neurological Surgery offers a graduate-level experience in the use of advanced computer techniques in biological research. A course in bioengineering systems, offered to University of Pittsburgh first-year graduate students in electrical engineering, is also taught by department faculty. Various faculty participate in the training of masters-level physician assistants from Chatham University.

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
Educational Programs

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 was founded more than 75 years ago with a strong commitment to patient care, education and research. Today, the department is the largest neurosurgical academic provider in the United States, performing nearly 8,000 procedures annually at UPMC academic hospitals and nearly 11,000 system wide.

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 in academic neurosurgery. Still another article, published in *informaHealthcare*, showed that our stereotactic research effort was the most productive in the world.

Seventy-five years at the forefront of neurosurgical care have demonstrated that we are a proven international leader in patient care, research and training.

- **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 a total of 24 weeks on the clinical neurosurgical service, as well as 12 weeks on the clinical neurology service. First-year residents also will also participate in 16 weeks clinical experience on various surgical subspecialties, such as otolaryngology, surgical subspecialties, critical care medicine and the emergency room.

- **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 on the spine service, 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 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.
Educational Programs

• PGY-3
The PGY-3 year emphasizes clinical experience in vascular neurosurgery (an initial introduction to endovascular and exovascular techniques), neuropathology and image-guided surgery (including stereotactic radiosurgery, and functional neurosurgery) and neuro-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 stereo-tactic 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 years, 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 eight to nine months on the adult service and three to four months as senior resident on the pediatric service. Typically a senior resident participates in between 400 and 500 cases per year.

• PGY-5/6
The PGY-5 and PGY-6 blocks provides a total of 18-24 months of focused career development opportunities for senior residents. During this time, residents will spend between three and four months 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 block of time is designed for residents to actively pursue research-focused subspecialty training, along with clinical investigation 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 and PGY-6 years: the Clinical Investigator Path and the Surgeon Scientist Investigator Path:

Clinical Investigator Path:

The clinical investigator path includes an 18-month period of time during the PGY-5 and PGY-6 year for focused subspecialty training. Residents must identify a primary mentor during 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
Educational Programs

(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 between 18-20 months to further develop an academic research career, working in a functional and dedicated laboratory. Residents must identify a primary mentor during their PGY-4 year. They are expected to submit a Copeland Grant during their PGY-4 year on their research topic of choice. Residents in this path are able to submit for a national grant using existing mechanisms from the AANS, CNS, foundations or 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-7
PGY-7 residents return to the service as chief residents on the clinical service at UPMC Presbyterian. 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-7, 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.

• General
Residents in this program have a particularly unique experience in microneurosurgery, pediatric, endoscopic, and image-guided neurosurgery including radiosurgery. In addition to daily teaching rounds, led by individual members of the department faculty, the department
Educational 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)
- 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 presented cases. 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 five to 10 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. Four 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. At the 2016 AANS annual meeting in Chicago residents and faculty together received a total of 19 named awards for their research and clinical accomplishments.

Given the extensive experience in microneurosurgery, skull base surgery, endovascular surgery, endoscopic surgery, and image-guided neurosurgery, many residents no longer require post residency fellowships and entered directly into academic or private practice. Residents who want 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 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
Educational Programs

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. 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 (Perfexion and ICON)
- Spinal Radiosurgery (CyberKnife or TrueBeam)
- 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)

- 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:

  - Animal Models of Epilepsy
  - Clinical and Basic Science Head Injury Program
  - Computer-Image Integration into Surgical Planning
  - Brain Tumor Research
  - Intracranial Blood Flow and Saccular Aneurysm Formation
  - Clinical Outcomes of Radiosurgery
  - 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.
The coordinator of the department’s medical education program is Melissa Lukehart. L. Dade Lunsford, MD, is the program’s residency director.

Each academic year ends with a gala farewell celebration. (See photos on page 212.)

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 staff). In 2015-16—for the second year in a row—the faculty award was given to Raymond Sekula Jr., MD. The resident honor was shared by graduating chief residents Ali Kooshkabadi, MD, and Robert Miller, MD.

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 1850 professionals from across the world have been trained in more than 113 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.

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.

Minimally Invasive Endoscopic Surgery of the Cranial Base and Pituitary Fossa Course, co-directed by Paul Gardner, MD, and Carl Snyderman, MD, MBA, teaches endoscopic surgery of the cranial base and pituitary fossa. Experts present technical aspects of those operations, along with risks, benefits and outcomes. Live cases and hands-on lab work are included in the course schedule. This course is designed for neurosurgeons, minimally invasive surgeons and other allied health professionals. The week-long course is presented three times a year.

Innovations in Endoscopic Intracranial Surgery, co-directed by Paul Gardner, MD, Juan Fernandez-Miranda, MD, and Johnathan Engh MD, is a comprehensive overview of the basic concepts of cranial endoscopy as well as multiple endoscopic and minimally invasive corridors of approach to all areas of the brain and skull base. The course combines 3D anatomical and didactic lectures with hands-on anatomical dissection, prosection and live interactive surgical cases.

Ray Sekula Jr., MD, hosted the Facial Pain Association’s (TNA) Regional Conference at the Pitt University Club, April 23. The conference was a one-day event designed to provide education and support to facial pain sufferers, and their friends and family.
Educational Programs

Online CME
Department faculty currently lecture in a number of online CME courses for physicians and other medical professionals. The following courses are available through UPMC Physician Services or through the University of Pittsburgh:

- Brain Stimulation: Overview
- Brain Stimulation Future Directions
- Controversies in Cranial Base Surgery
- Endoscopic-Assisted Retromastoid Approach
- Endoscopic Endonasal Approach: Crista Galli to the Dens (Sagittal Plane)
- Endoscopic Endonasal Approach in the Pediatric Population
- Endoscopic Endonasal Pituitary Surgery
- Gamma Knife Radiosurgery for Acoustic Neuromas: Treatment Options
- Immunotherapy for Brain Tumors
- Radiosurgery and Cranial Base Surgery
- Radiosurgery for Pituitary Surgery (Part 2): Stereotactic Radiosurgery for Endocrine Active Pituitary Tumors
- Vertebral Body Compression Fractures: Interventional Management Strategies

Speakers Bureau
The department has a speakers bureau service available for organizations interested in keeping abreast with the latest advances and techniques in the field of neurological surgery. This service is promoted through the University of Pittsburgh’s Center for Continuing Education and UPMC’s Office of Physician Relations, as well as through the department website.

The ultimate goal of the speakers bureau is to enhance education of current management of neurological disorders at area hospitals and to help area physicians—and the community in general—become more aware of the services and advanced care available at the University of Pittsburgh Department of Neurological Surgery. Some of the speakers available for this service include Drs. Robert Friedlander, Peter Gerszten, Adam Kanter, L. Dade Lunsford, Joseph Maroon, David Okonkwo, Ian Pollack, Elizabeth Tyler-Kabara, Mark Richardson, Ray Sekula Jr. and others. Speakers cover a wide variety of subjects from brain and spine surgical techniques to cancer research.

Stuart Rowe Society Lectureship and Research Day
On October 21, 2015, the department hosted the 11th annual Stuart Rowe Society Lectureship and Research Day. The event is intended to showcase research activities in the field of neurological surgery and provide a forum for discussion. (See photos on next page.)

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 visiting professor prominent in the field of neurosurgery. The 2015 honored guest was Robert E. Harbaugh, MD, distinguished professor and chair of neurosurgery at Penn State Milton S. Hershey Medical Center.

The visiting professor also selects a “best presentation” award, presented later in the evening at a special dinner and reception. For 2015, PGY-3 resident David Salvetti, MD, received the best presentation award for his talk, "Preoperative Prealbumin as an Indicator of Postoperative Infection Risk in Spine Surgery."
Dr. Harbaugh gives lecture on "The Science of Practice: A New Algorithm for Clinical Research and QI in Neurosurgery."

Residents listen to Stuart Rowe Honored Guest Lecturer Robert E. Harbaugh, chair of neurosurgery at Penn State Milton S. Hershey Medical Center.

Dr. Harbaugh provides evening lecture, "The Case for Carotid Endarterectomy," at special reception and dinner at Pittsburgh's Duquesne Club.

Department chairman Robert Friedlander and Dr. Harbaugh present 2015 Stuart Rowe Best Lecture award to PGY-3 resident David Salvetti.

Drs. Friedlander and Harbaugh present 2015 Stuart Rowe Runner-Up Lecture award to PGY-5 resident Gregory Weiner.

Drs. Harbaugh and Friedlander along with Stuart Rowe Lecture award winners and other department residents.
Educational Programs

PGY-5 resident Gregory Weiner, MD, received a runner-up award at Stuart Rowe Research Day for his presentation “Prophylactic Antiepileptic Medications and Seizure Incidence Following Subarachnoid Hemorrhage.”

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.

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.
On March 30, 2016, Peter J. Jannetta, former long-time department chairman and world-renowned developer of a groundbreaking procedure to relieve facial spasms, and Mary Ellen Dandy-Marmaduke, daughter of Walter Dandy, visited the department to provide a special joint casual talk, “Remembering Walter Dandy,” on the life of the neurosurgical icon. Sadly, it would be Dr. Jannetta’s last public speaking engagement as he would pass away only days later, April 11, from injuries suffered in a fall. You can view the lecture at youtu.be/cMCbF_26I-w.

Dr. Jannetta shares a moment and laugh with former colleague John J. Moossy before his talk on Dr. Dandy.

Dr. Friedlander and Dandy-Marmaduke look at a signed photograph of her father, Walter Dandy, that hangs in Dr. Friedlander’s office.


Department of Neurosurgery chairman Robert Friedlander with Mary Ellen Dandy-Marmaduke and Peter Jannetta.
Faculty Biographies
Adnan A. Abla, MD

Clinical Professor

Adnan Abla, MD, completed his neurosurgical residency training at the Medical College of Pennsylvania and at the University of Oklahoma. To obtain cross-training in spinal instrumentation, he completed a year in the orthopedic residency program at the University of Oklahoma. He also completed a clinical fellowship at Allegheny General Hospital. He is certified by the American Board of Neurological Surgery and the American College of Surgeons. Dr. Abla served as an associate professor of neurosurgery at Allegheny University of the Health Sciences in Pittsburgh, PA, as well as the director of spine services for Allegheny General Hospital. He is a clinical professor of neurosurgery at the University of Pittsburgh School of Medicine. Dr. Abla specializes in the treatment of complex spine disorders including spinal instrumentation and tumors. He has co-authored 12 book chapters, and has published 40 articles. He is an active participant in multiple professional and scientific societies.

Specialized Areas of Interest
Microdiscectomy; laminectomy; anterior cervical discectomy; spinal instrumentation and fusion; spinal tumors.

Board Certifications
American Board of Neurological Surgery
American College of Surgeons

Hospital Privileges
Heritage Valley Hospital, Sewickley
Sharon Regional Health System
UPMC Horizon
UPMC Passavant
UPMC Presbyterian
UPMC St. Margaret
UPMC Shadyside
Washington Hospital

Professional Organization Membership
Allegheny County Medical Society
American Association for Advance of Science
American Association of Neurological Surgeons
American Medical Association
Congress of Neurological Surgeons
Joint Committee on Spine and Peripheral Nerves - AANS/CNS
Oklahoma State Medical Association
Pennsylvania Medical Society
Pennsylvania Neurosurgical Society
World Association of Lebanese Neurosurgeons

Education & Training
BSc, Biology, American University of Beirut, 1970
MSc, Biochemistry, American University of Beirut, 1972
MD, American University of Beirut, 1978 Residency, Urology, King Faisal Specialist Hospital, 1980
Residency, Neurosurgery, American University of Beirut, 1984
Fellowship, Neurosurgery, Allegheny General Hospital, 1988
Adnan A. Abla, MD

Residency, Neurosurgery, Medical College of Pennsylvania, 1991
Residency, Neurosurgery/Spinal Instrumentation, Oklahoma University, 1993

Editorial Service
• Editorial Board:
  Spinal Cord

• Ad Hoc Reviewer:
  PAM Spinal Implant Steering Committee

Publications: 2015-16
• Refereed Articles:

Nduka Amankulor, MD
Assistant Professor
Associate Director, Adult Neurosurgical Oncology

Nduka Amankulor, MD, a specialist in the surgical treatment of complex brain and spine tumors, joined the Department of Neurological Surgery in June of 2012. 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 who is studying the biological underpinnings of gliomas and metastatic brain tumors.

Specialized Areas of Interest
Surgical treatment of complex brain and spine tumors.

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

Education & Training
BA, Philosophy, New York University, 1998
MD, Yale School of Medicine, 2004
Residency, Yale School of Medicine, 2011
Fellowship, Neurosurgical Oncology, Memorial Sloan-Kettering Cancer Center, 2012

Editorial Service
• Editorial Board:
  Frontiers in Radiation Oncology

• Ad Hoc Reviewer:
  Journal of Immunotherapy
Faculty Biographies

Nduka Amankulor, MD

Journal of the National Cancer Institute
Nature Communications, Microvascular Research
Neurosurgery

Interdepartmental and Medical Center Activities
• University of Pittsburgh:
Research Executive Committee

Honors and Awards
Leo H. Cripp Patient Care Award, Best Oral Presentation Award for the Tumor Biology Session, 20th Annual Scientific Meeting and Education Day of the Society for Neuro-Oncology (SNO), 2015.
University of Pittsburgh Physicians Foundation Scholar, 2016

Publications: 2015-16
• Refereed Articles:

Invited Lectures: 2015-16
• National:

Jeffrey Balzer, PhD
Associate Professor
Director, Clinical Operations, 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 the utilization of genetic biomarkers for the prediction of delayed cerebral ischemia in subarachnoid hemorrhage to the use of blood flow measures in mild head injury and concussion to vagal nerve stimulation to control cardiac arrhythmias. 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 71 refereed articles and 14 book chapters.

Specialized Areas of Interest
Intraoperative neurophysiological monitoring, subarachnoid hemorrhage, concussion, cerebral blood flow.

Board Certifications
American Board of Neurophysiological Monitoring
Faculty Biographies

Jeffrey Balzer, PhD

Hospital Privileges
Children's Hospital of Pittsburgh of UPMC
Jameson Hospital
Monongahela Valley Hospital
UPMC Altoona
UPMC Hamot
UPMC Horizon
UPMC McKeesport
UPMC Mercy
UPMC Passavant
UPMC Presbyterian
UPMC St. Margaret's
UPMC Shadyside

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
Spine
World Neurosurgery

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

• University of Pittsburgh:
Course Director, Foundations of Clinical Neurophysiology, Department of Neuroscience

Professional Activities
Secretary/Treasurer, American Board of Neurophysiologic Monitoring
Board of Directors, American Society of Neurophysiological Monitoring

Honors and Awards
Research Snapshot Award, Society of Critical Care Medicine, 45th Critical Care Congress, February 21-24, 2016, Orlando, Fla.
Faculty Biographies

Jeffrey Balzer, PhD

Publications: 2015-16

• Refereed Articles:
  


Faculty Biographies

Jeffrey Balzer, PhD


• Invited Papers:

**Invited Lectures: 2015-16**

• National:


• Local/Regional:

J. Brad Bellotte, MD
Clinical Assistant Professor
Chief of 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

Professional Activities
Former Vice Chair, Young Neurosurgeon’s Committee of AANS
Former AANS/CNS Washington Committee Liaison
Councilor at Large, Pennsylvania State Neurosurgical Society
Pennsylvania representative to Council of State Neurosurgical Societies 2012-13
Reference committee member, Council of State Neurosurgical Societies, 2012
Physician Advisory Council, UPMC Hamot
Infection Control Committee UPMC Hamot
ICU Steering Committee UPMC Hamot
Electronic Medical Records Physician Advisory group member, UPMC Hamot
Medical Director of 8S (neuro floor), UPMC Hamot

Honors and Awards
Orthopedic Teaching Award, UPMC Hamot, 2011-12
David J. Bissonette, PA-C, MBA

Assistant Professor
Executive Administrator

David J. Bissonette joined the Department of Neurological Surgery at the University of Pittsburgh in 1975. He holds an MBA degree from the Katz Graduate School of Business at the University of Pittsburgh. He also received a BA degree in zoology from the University of Wisconsin in Madison in 1973 and a BS in community and allied health resources (Physician Assistant) from the University of Alabama in Birmingham in 1975. He has published 44 articles in refereed journals, and seven book chapters. Bissonette retired from his position of executive administrator of the Department of Neurological Surgery effective June 30, 2016.

Specialized Areas of Interest
Physician practice management.

Board Certifications
National Commission on Certification of Physician Assistants

Hospital Privileges
UPMC Presbyterian

Professional Organization Membership
American Academy of Physician Assistants
American Association of Neurological Surgeons
Medical Group Management Association
Pennsylvania Society of Physician Assistants

Education & Training
BA, Zoology, University of Wisconsin, 1973
BS, Community and Allied Health Resources, University of Alabama, 1975
MBA, University of Pittsburgh, 1990

Interdepartmental and Medical Center Activities
• UPMC Presbyterian:
  Credentials Committee, Allied Health Subcommittee

• University of Pittsburgh:
  Planning & Budget Committee

Honors and Awards
Distinguished Fellow, American Academy of Physician Assistants

Jeffrey Bost, PA-C

Clinic Instructor

Jeffrey Bost, PA-C, graduated with a BS in 1983 from Allegheny College and attended Community College of Allegheny County for his physician assistant degree. After working with a cardiology practice from 1985 to 1987 he joined Joseph Maroon, MD, and his Tri-State Neurosurgical Associates group at Allegheny General Hospital in June of 1987. In 1999, he and Tri-State moved to UPMC. He is a clinical instructor in the Department of Neurosurgery. He has 65 invited lectures, 55 national posters, 29 coordinated research projects, five work-
Jeffrey Bost, PA-C

shops presentations, 35 refereed articles and 24 book chapter. He also co-wrote two books. Bost is also clinical assistant professor for Chatham College. He is currently the webmaster for www.josephmaroon.com.

**Board Certifications**
National Certification issued by NACCPA
Medical Assistant License, State of Pennsylvania
Medical Assistant License, State of Ohio

**Hospital Privileges**
Heritage Sewickley Valley Hospital
UPMC Passavant
UPMC Presbyterian

**Professional Organization Membership**
American Academy of Physician Assistants
American Association of Neurological Surgeons

**Education & Training**
BS, Allegheny College, 1983
PA, Community College of Allegheny County, 1985

**Publications: 2015-16**
- **Refereed Articles:**

- **Book Chapters:**

**Invited Lectures: 2015-16**
- **Local/Regional:**

Daniel M. Bursick, MD
*Clinical Assistant Professor*

Daniel M. Bursick, MD, is clinical professor of neurosurgery at UPMC Mercy. His clinical interests include neurosurgical trauma, brain stem injuries, spinal neurosurgery, and the surgical treatment of pain. He received his medical degree from the M.S. Hershey School of Medicine at Pennsylvania State University in Hershey, Pa., completed his neurosurgical residency at the University of Pittsburgh Medical Center and received postgraduate fellowship training in neurosurgery at the National Hospital for Nervous Diseases in London. He is a fellow of the American College of Surgeons and a member of the American Association of Neurological Surgeons and the Congress of Neurological Surgeons.
Specialized Areas of Interest
Spine surgery, neurosurgical trauma, neuromodulation for pain.

Board Certifications
American Board of Neurological Surgeons

Hospital Privileges
Monongahela Valley Hospital
UPMC Mercy

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

Education & Training
BS, Biology, University of Pittsburgh, 1972
MD, Pennsylvania State University, 1976
Residency, University of Pittsburgh, 1982
Fellowship, Neurology, National Hospitals for Nervous Diseases, 1982

Honors and Awards
Pittsburgh's Best Doctors, Pittsburgh Magazine, 2012-2016

Diane L. Carlisle, PhD
Assistant 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 as a developmental model to determine the molecular alterations in cell fate decisions caused by prenatal nicotine exposure, including dysregulation of the canonical WNT/NMYC axis. She investigates gene-environment interactions using developmental models in neural and lung development for the purpose of understanding the effect of fetal exposures on the development of diverse adult diseases, including ALS and COPD. Furthermore, 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. In addition, she 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); chronic obstructive lung disease (COPD).
Faculty Biographies

Diane L. Carlisle, PhD

**Professional Organization Membership**
American Association for Cancer Research
American Society for Cell Biology
International Society for Stem Cell Research

**Education & Training**
BA, Biology, Washington & Jefferson College, 1994
PhD, Molecular and Cellular Oncology, George Washington University, 1999
Fellowship, Johns Hopkins University, 2001

**Editorial Service**
- Ad Hoc Reviewer:
  - Stem Cells
  - PLoS ONE

**Interdepartmental and Medical Center Activities**
- Department of Neurological Surgery:
  - Journal Club Organizer

**Professional Activities**
FAMRI (Flight Attendants Medical Research Institute), Study Section

**Community Activities**
Judge, Science Olympiad, North Hills School District Elementary School

**Publications: 2015-16**
- Refereed Articles:

**Invited Lectures: 2015-16**
- National:

Yue-Fang Chang, PhD

*Research Assistant 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 degree 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, image 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. In the past ten years she has been involved in numerous grant preparations, providing statistical expertise in design, analysis and power/sample size calculations.
Yue-Fang Chang, PhD

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: 2015-16
• 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 1998. 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
Donald J. Crammond, PhD

behavioral and systems-level neurophysiology, examining the neuronal substrates of higher cognitive processes such as movement planning and speech in 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).

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.

Board Certifications
American Board of Neurophysiological Monitoring

Hospital Privileges
Children’s Hospital of Pittsburgh of UPMC
Magee-Womens Hospital of UPMC
UPMC Altoona
UPMC East
UPMC Hamot
UPMC Horizon
UPMC McKeensport
UPMC Mercy
UPMC Northwest
UPMC Passavant, Cranberry
UPMC Passavant, McCandless
UPMC Presbyterian
UPMC St. Margaret
UPMC Shadyside

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:
  Clinical Neurophysiology
  Journal of Neurology, Neurosurgery and Psychiatry
  World Neurosurgery
Donald J. Crammond, PhD

Faculty Biographies

Interdepartmental and Medical Center Activities
• University of Pittsburgh:
  Lecturer, Neuroscience 1026, Foundations of Clinical Neurophysiology

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

Professional Activities
  Chairman, American Board of Neurophysiologic Monitoring

Publications: 2015-16
• Refereed Articles:


• Presentations:


C. Edward Dixon, PhD
Professor
The Neurotrauma Chair in Neurosurgery
Vice Chair, Research
Director, Brain Trauma Research Center
Research Health Scientist at the Geriatric Research, Education and Clinical Center in the Veteran’s Affairs Pittsburgh Health Care System

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 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 201 papers in refereed journals, two books (coeditor), 28 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 in TBI patients.

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
  Journal of Neurotrauma
  Metabolic Brain Disease
  Neural Regeneration Research
  Neurosurgery

• Ad Hoc Reviewer:
  Brain Injury
  Brain Research
  Journal of Biomechanical Engineering
  Journal of Cerebral Blood Flow and Metabolism
  Journal of Neurochemistry
  Journal of Neurosurgery
C. Edward Dixon, PhD

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
  (Patrick Kochanek, principal investigator)
- Training Faculty Member, Center for Neuroscience at the University of Pittsburgh
- Pittsburgh VA Healthcare System Institutional Animal Care and Use Committee, Chair 2016
- Pittsburgh VA Healthcare System R&D Committee

Professional Activities

- Kentucky Spinal Cord & Head Injury Study Section, Chicago Ill.
- Veterans Administration RR&D State-of-the Art on TBI, Invited Participant.
- NIH SEP Member Conflict Study Section ZRG1 BDCN-K (02)
- NIH SEC Member Conflict Study Section
- Veterans Administration RR&D Service Scientific Merit Review Board
- NIH SEC Member Conflict Study Section
- NIH BINP Study Section

Publications: 2015-16

Referred Articles:


• Published Abstracts:


• Presentations:


**Invited Lectures: 2015-16**

• National:


• Local/Regional:

Andrew F. Ducruet, MD
Assistant Professor

Andrew Ducruet, MD, joined the Department of Neurological Surgery as an assistant professor on July 8, 2013. Dr. Ducruet's clinical practice focuses on cerebrovascular disease. He is an expert in the latest endovascular techniques used to treat patients with vascular disease of both the brain and spinal cord. This includes both coil embolization and flow diversion strategies for the treatment of cerebral aneurysms, as well as embolization of arteriovenous malformations, arteriovenous fistulas, and tumors. He also performs arterial and venous stenting procedures, and treats patients with acute ischemic stroke. Dr. Ducruet was born and raised in the Pittsburgh area. He received his undergraduate degree from Princeton University, and his medical degree from Columbia University's College of Physicians & Surgeons. He completed his surgical internship and residency in neurological surgery at New York Presbyterian Hospital/Columbia University Medical Center. Dr. Ducruet then completed a two-year fellowship in endovascular neurosurgery at the Barrow Neurological Institute in Phoenix, Ariz. Dr. Ducruet left the department in June of 2016.

Specialized Areas of Interest
Cerebrovascular disease, subarachnoid hemorrhage, intracranial aneurysms, arteriovenous malformations, arteriovenous fistulas, intracerebral hemorrhage, carotid stenosis, venous sinus stenosis, normal pressure hydrocephalus, ischemic stroke.

Board Certifications
American Board of Neurological Surgeons

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

Professional Organization Membership
American Association of Neurological Surgeons
American Heart Association/American Stroke Association
Congress of Neurological Surgeons
Society of Neurointerventional Surgery
Faculty Biographies

Andrew F. Ducruet, MD

**Education & Training**
AB, Chemistry, Princeton University, 1999.
MD, Columbia University College of Physicians and Surgeons, 2004
Residency, New York Presbyterian Hospital, 2011
Fellowships, Endovascular, Barrow Neurological Institute, 2011

**Honors and Awards**
NINDS Neurosurgery Research Career Development Program Award, 2014-2016.

**Publications: 2015-16**
• Refereed Articles:

• Invited Papers:


**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.

**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
Faculty Biographies

Interdepartmental and Medical Center Activities
- UPMC Passavant:
  Board of Directors, Passavant Hospital Foundation
  Chief of Neurosurgery
  Credentialing Committee
  Critical Care Committee
  Director, Spine Center
  Medical Executive Committee
  Operating Room Block Committee

Community Activities
Board Member, UPMC Passavant Hospital Foundation, 2011
Chair of Development Committee, UPMC Passavant Hospital Foundation, 2015

Honors and Awards
Best Doctors in America, 2009-16
Pittsburgh’s Best Doctors, Pittsburgh Magazine, 2012-16
Castle Connelly Top Doctors, 2009-16

Johnathan Engh, MD
Associate Professor
Director, Neuroendocrine Surgery Program
Director, Adult Neurosurgical Oncology

Johnathan Engh, MD, joined the University of Pittsburgh Department of Neurological Surgery in 2008 as an assistant professor and director of the Neuroendocrine Surgery Program after completing the department’s seven-year residency program. He subsequently built this program into a national referral center for deep-seated brain tumors and colloid cysts. Dr. Engh became the director of adult neurosurgical oncology at the University of Pittsburgh in 2014. He was promoted to associate professor in 2014 and he received a secondary appointment as associate professor in the Department of Radiation Oncology in 2016. Dr. Engh’s primary medical staff appointments are at UPMC Shadyside and UPMC Presbyterian but he also has consulting privileges at Children’s Hospital of Pittsburgh of UPMC, Magee-Womens Hospital and UPMC Passavant. In addition, he provides outpatient consulting services via telemedicine at UPMC Bedford and UPMC Northwest. Originally from northern Virginia, Dr. Engh is a graduate of Duke University and the University of Virginia Medical School. Dr. Engh’s clinical focus is on neurosurgical oncology, especially minimally invasive operations for central nervous system tumors and intraventricular lesions. From a research perspective, his major interests are the development of minimally invasive tools for cranial surgery and surgical trials for the treatment of brain tumors.

Specialized Areas of Interest
CNS tumors, minimally invasive surgery, neurosurgical technology and innovation.

Board Certifications
American Board of Neurological Surgery

Hospital Privileges
Children’s Hospital of Pittsburgh of UPMC
Magee-Womens Hospital of UPMC
UPMC Passavant
UPMC Presbyterian
UPMC Shadyside
Faculty Biographies

Johnathan Engh, MD

Professional Organization Membership
Allegheny County Medical Society
Alpha Omega Alpha
American Association of Neurological Surgeons
Congress of Neurological Surgeons
Pennsylvania Medical Society
Society of Neuro-Oncology
University of Pittsburgh Cancer Institute

Education & Training
BS, Biology and Religion Duke University, 1997
MD, University of Virginia, 2001
Residency, Neurological Surgery, University of Pittsburgh, 2008
Fellowship, Neurosurgical Oncology, University of Pittsburgh, 2007

Editorial Service
• Editorial Board:
  Frontiers in Radiation Oncology
  Journal of Neurology and Neurosurgery
  Neurosurgery Science Times

• Ad Hoc Reviewer:
  European Journal of Cancer
  Journal of Medical Case Reports
  Journal of Neurology, Neurosurgery and Psychiatry
  Neurosurgery

Interdepartmental and Medical Center Activities
• University of Pittsburgh:
  Ad Hoc member, University of Pittsburgh Human Research Protection Office

• UPMC Shadyside:
  Quality and Patient Safety Committee

• Department of Neurological Surgery:
  Core Competency Committee

Professional Activities
  University of Pittsburgh Medical Center, Pittsburgh, Pa., July 15-17, 2015; June 22-24, 2016.

Course Director, Resident’s Board Prep Course, University of Pittsburgh Medical Center,


Honors and Awards
America’s Best Doctors, 2011-16
Pittsburgh’s Best Doctors, Pittsburgh Magazine, 2012-2016
UPMC ACES Award, 2014

Publications: 2015-16
• Refereed Articles:

• Invited Papers:


• Presentations:

• Web-Based Presentation:
Engh JA. “Microscope Visualization of Intraoperative Yellow Fluorescein for Guided Tumor Identification and Resection.” Congress of Neurological Surgeons webinar, May 12, 2016.

Invited Lectures: 2015-16
• International:

• Local/Regional:


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; craniomaxillofacial; traumatic brain injury.

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

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

Juan C. Fernandez-Miranda, MD
*Associate Professor  
Associate Director, Center for Skull Base Surgery  
Director, Surgical Neuroanatomy Lab  
Director, Fiber Tractography (HDFT) Lab*

Juan C. Fernandez-Miranda, MD, is associate professor of neurological surgery, associate director of the Center for Cranial Base Surgery, and director of the Surgical Neuroanatomy Lab and Fiber Tractography Lab at the University of Pittsburgh School of Medicine. He joined the faculty at the University of Pittsburgh Department of Neurological Surgery on July 1, 2008 to complete a two-year clinical fellowship in open and minimally invasive skull base, pituitary, and brain surgery with Amin Kassam, MD, Paul Gardner, MD, and Daniel Prevedello, MD. Prior to joining the faculty at University of Pittsburgh, Dr. Fernandez-Miranda completed a clinical fellowship in cerebrovascular surgery at the University of Virginia—under the direction of Neal F. Kassell, MD—and a two-year research fellowship in microsurgical neuroanatomy at the University of Florida—under the mentoring of Albert L. Rhoton, Jr., MD. Dr. Fernandez-Miranda, received his medical degree from the Complutense University of Madrid (Spain) and completed his neurological surgery residency at “La Paz” University Hospital of Madrid. Upon completion of his residency, he was awarded the Sanitas Prize 2006 to the best medical postgraduate trainee in Spain. Dr. Fernandez-Miranda’s clinical focus is endoscopic endonasal skull base and pituitary surgery, open skull base surgery, and complex brain surgery. His research interests lie in the study of surgical neuroanatomy and brain connectivity, and the application of innovative techniques into the operating room. He has published more than 140 scientific peer-review papers, and he has lectured extensively at national and international scientific meetings and professional courses. The Surgical Neuroanatomy Lab that he directs has a dual educational and research role aiming to improve surgical techniques and outcomes by mastering knowledge of relevant surgical neuroanatomy. Many national and international physicians have conducted training and
research at the Surgical Neuroanatomy Lab. The lab has three main research areas: microsurgical neuroanatomy, endoscopic skull base anatomy, and white matter anatomy. Dr. Fernandez-Miranda has major publications and awards on each of these areas, and his research work has contributed significantly to the development and expansion of endoscopic skull base surgery. The Fiber Tractography Lab, funded with a major NIH award, is focused on the application of advanced fiber mapping techniques—High-Definition Fiber Tractography (HDFT)—for presurgical planning and intraoperative navigation to facilitate brain function preservation and improve resection rates in patients with complex brain lesions. Dr. Fernandez-Miranda’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. In addition to his clinical and research activities, Dr. Fernandez-Miranda is greatly devoted to teaching and education of 3D surgical neuroanatomy and techniques at local, national, and international venues.

**Specialized Areas of Interest**
Endoscopic pituitary surgery; minimally invasive endoscopic skull base and brain surgery; open skull base surgery; brain tumors. Research focuses on surgical neuroanatomy (microsurgical neuroanatomy, endoscopic skull base anatomy, and white matter anatomy), advanced brain imaging techniques, and brain connectivity.

**Board Certifications**
Spanish Society of Neurosurgery, Spanish Ministry of Science and Education
European Association of Neurosurgical Societies, European Board of Neurosurgery

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

**Professional Organization Membership**
American Association of Neurological Surgeon
Cajal Club
Congress of Neurological Surgeons
European Association of Neurosurgical Societies
German Skull Base Society
International Head and Neck Scientific Group
Joint Section on Tumors – AANS & CNS
North American Skull Base Society
Spanish Society of Neurosurgery

**Education & Training**
MD, Complutense University of Madrid, 2000
Residency, Neurosurgery, “La Paz” University Hospital of Madrid, 2006
Fellowship, Surgical Anatomy, University of Florida, 2006
Fellowship, Cerebrovascular Surgery, University of Virginia, 2008
Fellowship, Endoscopic Endonasal/Skull Base Surgery, University of Pittsburgh, 2010

**Editorial Service**
• Ad Hoc Reviewer:
  *BMC Medical Imaging*
  *Brain Structure and Function*
Faculty Biographies

Juan C. Fernandez-Miranda, MD

Cerebral Cortex
Clinical Neurology and Neurosurgery
Head and Neck
Journal of Neurosurgery
Laryngoscope
Neurosurgery
Neuroscience Letters

Interdepartmental and Medical Center Activities

• University of Pittsburgh:
MRRC (Magnetic Resonance Research Center) Committee

Professional Activities

Course Director, Innovations in Endoscopic Intracranial Surgery: A Hands-On Course, University of Pittsburgh School of Medicine, Pittsburgh, Pa, July 15-17, 2015.
Course Director, Endoscopic Endonasal Surgery of the Cranial Base and Pituitary Fossa, University of Pittsburgh School of Medicine, Pittsburgh, Pa, August 16-19, 2015; November 18-21, 2015.
Course Director, 3-D Surgical Neuroanatomy (Supratentorial) Course, Congress of Neurological Surgeons Annual Meeting, New Orleans La., September 26, 2015.
Course Director, 3-D Surgical Neuroanatomy (Infratentorial) Course, Congress of Neurological Surgeons Annual Meeting, New Orleans La., September 26, 2015.
Course Director, Comprehensive Endoscopic Endonasal Surgery of the Skull Base, University of Pittsburgh School of Medicine, Pittsburgh, Pa, April 13-16, 2016.
Course Director, 3D Anatomy and Approaches to the Posterior Fossa and Posterior Skull Base, (Rhoton Lecture Series), American Association of Neurological Surgeons Annual Meeting, Chicago, Ill., May 1, 2016.
Course Director, 3D Anatomy and Approaches to the Supratentorial Area and Anterior Skull Base, (Rhoton Lecture Series), American Association of Neurological Surgeons Annual Meeting, Chicago, Ill., May 1, 2016.
Course Faculty, 3-D Surgical Anatomy Course for Senior Residents, Congress of Neurological Surgeons, Houston, Texas, August 20, 2015.
Course Faculty, Microscopic /Endoscopic Skull Base Surgery Course and Vascular Bypass Animal Lab, Allegheny General Hospital, Pittsburgh, Pa., November 4-7, 2015.
Course Faculty, University of South Florida Masters in Skull Base Surgery, Tampa, Fla., February 6, 2016.

Honors and Awards

Pedro Mata Award of the Neurosurgical Society of Madrid to the Best Neurosurgical Research for the work “Three-Dimensional Microsurgical Anatomy and Tractography of the White Matter of the Human Brain.”
Sanitas Prize 2006 to the Best Medical Postgraduate Trainee in Spain.
Recipient of the Synthes CMF (Cranio-Maxillofacial) Anatomical Fellowship.
Aesculap EANS (European Association of Neurosurgical Societies) Research Prize for the work “Three-Dimensional Structure of the White Matter of the Human Brain.”
European Skull Base Fellowship Award, 2009.
VII National Research Award, Barclays Foundation, 2009
NIH-R01 Award (R01DC013803-01A1), 2015-2020
**Faculty Biographies**

Juan C. Fernandez-Miranda, MD

**Publications: 2015-16**

- **Refereed Articles:**
  


Faculty Biographies

Juan C. Fernandez-Miranda, MD


• Invited Papers:

• Book Chapters:


• Invited Lectures: 2015-16
• International:

Faculty Biographies

Juan C. Fernandez-Miranda, MD


• National:


• Live Surgery:

Robert M. Friedlander, MD, MA
Chair, Walter E. Dandy Professor
Head of Cerebrovascular Neurosurgery

On June 1, 2010, Robert Friedlander, MD, MA, became the fourth chair in the department’s history. Prior to joining the department, Dr. Friedlander was professor of neurosurgery at Harvard Medical School and vice-chairman of neurosurgery and associate director of cerebrovascular surgery at Brigham and Women’s Hospital in Boston. 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 (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 and brain tumors. Dr. Friedlander’s major research interests lie in the study of the mechanistic pathways of the caspase apoptosis gene family. As co-director of Brigham and Women’s Neuroscience Research Center, 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. Dr. Friedlander’s research has received significant media attention including major work published in Nature, Science, and Nature Medicine. His work has also been recognized through
many academic awards, including the Neurosurgery Resident Award from the Congress of Neurological Surgeons, the Bayer Cerebrovascular Award from the Joint Section of Cerebrovascular Surgery, the International Charcot Prize for Motor Neuron Diseases, and the Award from the Academy of Neurological Surgeons. In 2006, he was elected as a member of the prestigious American Society for Clinical Investigation. Dr. Friedlander is only one of two neurosurgeons elected as a member of the American Association of Physicians.

**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**
Children’s Hospital of Pittsburgh of UPMC
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
Joint Section of Cerebrovascular Surgery
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*
Faculty Biographies

Robert M. Friedlander, MD, MA

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
Neuron
Neuropharmacology
Neuroscience Letters
Neurosurgery
New England Journal of Medicine
Proceedings of the National Academy of Sciences
Science
Trends in Neuroscience

Interdepartmental and Medical Center Activities

• UPMC Presbyterian:
  Global Care Steering Committee
  Medical Executive Committee
  MEG Oversight Committee
  Surgical Services Oversight Committee
  Co-Director, UPMC Neurological Institute
  UPP Finance Committee

• University of Pittsburgh:
  School of Medicine Executive Committee

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

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 Academy of Neurological Surgeons
  Annual Meeting Committee
  Research Committee

The American Academy of Neurological Surgery:
  Scientific Program Committee Chair
  AANS/CNS Joint Cerebrovascular Surgery Section Chair
Honors and Awards
Best Doctors in America, 2012-2015
America’s Top Surgeons, 2013
H. Richard Winn Prize for Neurosurgical Research
Castle Connolly Top Doctor in the Field of Neurological Surgery, 2013
Honored Guest, US Ambassador, Belgrade, Serbia, 2013
Honored Guest, HRH Crown Prince Alexander and HRH Crown Princess Katherine,
Belgrade, Serbia, 2014
Honored Guest, Academic Congress of Nanjing Neurosurgical Society, Nanjing, China, 2015
Honored Guest, Peking Union Medical College, Beijing, China, 2015

Publications: 2015-16
• Refereed Articles:
  Khattar NK, Yablonska S, Baranov SV, Baranova OV, Kretz ES, Larkin TM, Carlisle DL, Richard-
  son RM, Friedlander RM. Isolation of functionally active and highly purified neuronal
  Paigen B, Weiss ST. Integrative Mouse and Human Studies Implicate ANGPT1 and ZBTB7C
  Glorioso JC, Cohen JB, Carlisle DL, Munoz-Sanjuan I, Friedlander RM. Moving toward a
  Faraji AH, Abhinav K, Jarbo K, Yeh FC, Shin SS, Pathak S, Hirsch BE, Schneider W, Fernan-
dez-Miranda JC, Friedlander RM. Longitudinal evaluation of corticospinal tract in patients
with resected brainstem cavernous malformations using high-definition fiber tractography
and diffusion connectometry analysis: preliminary experience. *J Neurosurg* 123(5):1133-44,
2015.
  Agarwal N, Shah K, Stone JG, Ricks CB, Friedlander RM. Educational Resources “Over the
Head” of Neurosurgical Patients: The Economic Impact of Inadequate Health Literacy. *World
Neurosurg* 84(5):1223-6, 2015.
  Shin SS, Murdoch G, Hamilton RL, Faraji AH, Kano H, Zwagerman NT, Gardner PA,
Lunsford LD, Friedlander RM. Pathological response of cavernous malformations following
  Sirianni AC, Jiang J, Zeng J, Mao LL, Zhou S, Sugarbaker P, Zhang X, Li W, Friedlander RM,
Wang X. N-acetyl-L-tryptophan, but not N-acetyl-D-tryptophan, Rescues Neuronal Cell

Invited Lectures: 2015-16
• International:
  Friedlander RM. “Melatonin Modulation of Huntingtin-Mediated Neurotoxicity.” Federa-
tion of American Societies for Experimental Biology (FASEB) Summer Research Conference,
  Friedlander RM. “Fiber Tractography as a Tool in the Surgical Management of Lesions in
Eloquent Brain.” Peking Union Medical College Hospital, Beijing, China, August 15-20, 2015.
Friedlander RM. "Role of Caspase Cell Death Pathways in Neurological Disease." Peking Union Medical College Hospital, Beijing, China, August 15-20, 2015.

Friedlander RM. "Fiber Tractography as a Tool in the Surgical Management of Lesions in Eloquent Brain." Jiangsu Province Hospital American Congress of Nanjing Neurological Surgery Society, Nanjing, China, August 20-26, 2015.

Friedlander RM. "Role of Caspase Cell Death Pathways in Neurological Disease." Jiangsu Province Hospital American Congress of Nanjing Neurological Surgery Society, Nanjing, China, August 20-26, 2015.

Friedlander RM. "High Definition Fiber Tractography for Resection of Brain Stem Cavernomas." National Centre of Neurosurgery, Astana, Kazakhstan, November 1-6, 2015.

• National:


  Friedlander RM. "High Definition Tractography as a tool in the surgical management of lesions in eloquent brain." West Virginia University, Morgantown, W.Va., September 15-16, 2015.


• Local/Regional:

  Friedlander RM. "Volume to Value." Fourth Year Medical Student Address, University of Pittsburgh, Pa., February 26, 2016.
Paul A. Gardner, MD
Associate Professor
Executive Vice Chair, Surgical Services
Neurosurgical Director, Center for Skull Base Surgery

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, 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 analysis of rare tumors. In April of 2008, Dr. Gardner was named neurosurgical director of the Center for Minimally Invasive Cranial Base Surgery at the University of Pittsburgh Medical Center. 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. In addition, he is an author on over 183 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**
Children’s Hospital of Pittsburgh of UPMC
UPMC Mercy
UPMC Presbyterian
Veterans Affairs Pittsburgh Healthcare System

**Professional Organization Membership**
American Association of Neurological Surgeons
American Medical Association
Congress of Neurological Surgeons
North American Skull Base Society
Pennsylvania Neurological Society
Pituitary Network Association

**Education & Training**
AA, Okaloosa-Walton College, 1993
BS, Biochemistry, Florida State University, 1997 (Magna Cum Laude)
MD, University of Pittsburgh, 2001
Fellowship, Min Inv endoNeurosurgery, 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 Reviewer*
  - *Neurosurgery*
  - *World Neurosurgery*

**Interdepartmental and Medical Center Activities**

• **UPMC Presbyterian:**
  - Surgical Services Oversight Committee Representative
  - Executive Vice Chairman, Surgical Services
  - Neurosurgical Director, Center for Skull Base Surgery

**Professional Activities**

Course Co-Director, Innovations in Endoscopic Intracranial Surgery: A Hands-On Course, University of Pittsburgh School of Medicine, Pittsburgh, Pa., July 15-17, 2015.

Course Co-Director, Endoscopic Endonasal Surgery of the Cranial Base and Pituitary Fossa, University of Pittsburgh School of Medicine, Pittsburgh, Pa., August 16-19; November 18-21, 2015.

Course Co-Director, Comprehensive Endoscopic Endonasal Surgery of the Skull Base, University of Pittsburgh School of Medicine, Pittsburgh, Pa., April 13-16, 2016.

Course Co-Director, Endonasal Endoscopic Hands-On Skull Base Cadaver Dissection Course, National Yang-Ming University & Taipei Veterans General Hospital, Taipei, Taiwan, July 27-29, 2015.

Course Co-Director, Endoscopic Endonasal Surgery of the Cranial Base and Pituitary Fossa Course, Pre-Congress Workshop, Annual Conference of Skull Base Surgery of India, Bangalore, India, October 8-9, 2015.

Course Co-Director, Endoscopic Base of Skull Surgery Course, Kerala, India, October 11-13, 2015.


Course Faculty, V Brain Tumor & Minimally Invasive Spine Symposium, Hollywood, Fla, March 17-19, 2016.

Course Faculty, Skull Base Center: Second Annual Symposium. Manhasset, N.Y., May 6, 2016.


**Honors and Awards**


**Media Appearances: 2015-16**


**Publications: 2015-16**

• **Refereed Articles:**
Faculty Biographies

Paul A. Gardner, MD


- Invited Papers:

- Letters to the Editor:

- Book Chapters:


**Invited Lectures: 2015-16**

- International:


  Gardner PA. “Practical Anatomy of the Endoscopic Endonasal Approach.” Symposium 4 Lecture, Tohoku University Graduate School of Medicine, Department of Neurosurgery, Sendai, Japan, November 6, 2015.

  Gardner PA. “Advances and Limitations in Endoscopic Endonasal Skull Base Surgery.” Keynote Lecture, Tohoku University Graduate School of Medicine, Department of Neurosurgery, Sendai, Japan, November 6, 2015.


• National:


• Local/Regional:

Gardner PA. "Update on Cranial Base Chordoma: Advances in Treatment." Neurosurgery Conference Series, University of Pittsburgh Medical Center, Pittsburgh, Pa., June 1, 2016.
Faculty Biographies

Paul A. Gardner, MD

- Visiting Professorships:
  Helsinki University Central Hospital, Töölö Hospital, Department of Neurosurgery, Helsinki, Finland: “Endoscopic Management of Pituitary Adenomas—UPMC Experience,” November 26, 2015; Snellman Lecture, November 26, 2015; Academic Dissertation-Opponent, November 27, 2015.


- Panel Participation:


- Telementoring Surgery:
  Gardner PA. "Endoscopic Endonasal Pituitary Tumor.” Moderator. Helsinki University Central Hospital, Töölö Hospital, Department of Neurosurgery, Helsinki, Finland, November 25, 2015.
Paul A. Gardner, MD

• Live Surgery:
  Gardner PA. "Endoscopic Endonasal Surgery." Trivandrum Medical College Hospital, Kerala, India, October 11-13, 2015.

Peter C. Gerszten, MD, MPH, FACS
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 and oversees the instruction of this developing area of neurosurgery for the American Association of Neurological Surgery. 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, The Journal of Radiosurgery and SBRT, and Frontiers in Radiation Oncology*.

**Specialized Areas of Interest**
Outcomes research applied to spinal surgical interventions; failed back syndrome; epidural fibrosis; stereotactic radiosurgery of spinal lesions; minimally invasive spine surgical techniques; spinal motion preservation techniques.

**Board Certifications**
American Board of Neurological Surgeons

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

Peter C. Genszen, MD, MPH, FACS

Professional Organization Membership
Allegheny County Medical Society
American Academy of Neurological Surgery
American Association of Neurological Surgeons
American College of Surgeons
American Medical Association
Cervical Spine Research Society
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
Sociedad Iberolatinoamericano de Radiocirugia

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:
  Neurosurgery
  The Spine Journal
  Frontiers in Radiation Oncology
  The Journal of Radiosurgery and SBRT

• Ad Hoc Reviewer:
  Cureus
  European Spine Journal
  International Journal of Radiation Oncology Biology Physics
  The Journal of Radiosurgery and SBRT
  Oncology
  Neurosurgery
  Radiation Oncology
  PLOS ONE
  Neuro-Oncology
  The Spine Journal
  Cancer Control
  Technology in Cancer Research and Treatment
  World Neurosurgery
  Nigerian Journal of Clinical Practice

Interdepartmental and Medical Center Activities
• UPMC Presbyterian:
  Total Quality Council
Faculty Biographies

Peter C. Gerszten, MD, MPH, FACS

University of Pittsburgh:
Chair, Data Safety Monitoring Board, "A Sensorimotor Microelectrode Brain—Machine Interface for Individuals with Tetraplegia," 2013-present.
Editor, Department of Neurological Surgery Neurosurgery News quarterly newsletter.

UPMC:
Director of Percutaneous Spine Surgery
Director of Spine Radiosurgery
Physician Services Division Physician Clinical Quality Leadership Committee
Hospital Acquired Conditions (HAC) Steering Committee, UPMC Presbyterian and UPMC Shadyside Hospitals

Professional Activities
International Spine Radiosurgery Consortium Member
The Radiosurgery Society Annual Meeting:
Scientific Program Committee
Abstract Review Committee

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

Honors and Awards

Publications: 2015-16
Refereed Articles:


Faculty Biographies


- **Book Chapters:**


- **Published Abstracts:**


- **Presentations:**


Invited Lectures: 2015-16
• International:

Avniel Singh Ghuman, PhD

Assistant Professor
Director, MEG Research

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 R. Mark Richardson, 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
Society for Neuroscience
Cognitive Neuroscience Society
Organization for Human Brain Mapping
Vision Sciences Society
Avniel Singh Ghuman, PhD

Faculty Biographies

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

Editorial Service
• Editorial Board:
  Frontiers in Brain Imaging Methods

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

Honors and Awards
NARSAD Young Investigator Award
National Institute of Mental Health Biobehavioral Research Award for Innovative New Scientists

Publications: 2015-16
• Refereed Articles:


**Invited Lectures: 2015-16**
- **National:**

**Paola Grandi, PhD**  
*Assistant Professor*

Paola Grandi, PhD, joined the Department of Neurological Surgery as an assistant professor in April of 2005. She has a joint appointment in the Department of Microbiology and Molecular Genetics. Dr. Grandi received a bachelor degree in biology from University of Ferrara in 1996 and her master's degree in genetics in 1997. She earned a PhD in biochemistry from the University of Ferrara in 2001. In 2001 Dr. Grandi received a fellowship for U.S. study from University of Ferrara and was a post-doctoral fellow from 2001-2005 in the Molecular Neurogenetics Department at the Massachusetts General Hospital. She is a member of the American Society of Gene Therapy and American Association Cancer Research and is the assistant editor of the journal Gene Therapy. Dr. Grandi’s research interests include studies to understand the development and progression of brain tumors emphasizing the role of miRNAs in cancer genetics. She has a long standing interest in the molecular biology of herpes simplex virus, mechanisms of virus replication and neuropathogenesis and virus host cells interactions that result in innate immune responses to infection. Much of her recent work has centered on the creation of herpes viral vectors for treatment of glioblastoma.

**Specialized Areas of Interest**
Gene therapy for brain tumors using HSV-based vectors; molecular targeting to tumor cells; molecular mechanisms of tumor cell migration and the role of miRNAs in cancer progression; extra-cellular Matrix (ECM).

**Professional Organization Membership**
- American Society of Gene and Cell Therapy
- American Association of Cancer Research
- Society for Neuroimmunology
- International Society for Stem Cell Research

**Editorial Service**
- **Editorial Board:**
  *Molecular Therapy Oncolytics*
- **Ad Hoc Reviewer:**
  *Gene Therapy*
  *Journal of Virology*
  *Molecular Therapy*
  *Nature Reviews*
  *Plos One*

**Professional Activities**
- Organizer, World Congress on Virology 2014, OMICS meeting
- Abstract review chair, Cancer-Targeted Gene and Cell Therapy, American Society of Gene & Cell Therapy (ASGCT) annual meeting
9th International Conference on Oncolytic Virus Therapeutics organizing committee
Chair, Cancer-Oncolytic Viruses (ASGCT meeting)
Chair, Targeted Gene & Cell Therapy (ASGCT meeting)
Ad hoc reviewer, NIH GDD study section
Ad hoc reviewer, NIH DT study section

Publications: 2015-16
• Refereed Articles:

Stephanie Greene, MD
Assistant Professor

Stephanie Greene, MD, joined the faculty of the Department of Neurological Surgery in the pediatric neurosurgery division at 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 program at Seattle Children’s Hospital in 2005. She was the director of pediatric neurosurgery at Hasbro Children’s Hospital, affiliated with Brown University, prior to accepting her position 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 Surgeons
American Board of Pediatric Neurological Surgeons

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

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 Neurosurgical Society
Sigma Xi
Women in Neurosurgery
World Federation of Neurosurgical Societies
Stephanie Greene, MD

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

**Editorial Service**
- Ad Hoc Reviewer:
  - Anesthesia and Analgesia
  - Child's Nervous System
  - Case Reports in Ophthalmology
  - Cancer Medicine
  - Neurosurgery
  - Pediatric Neurosurgery

**Interdepartmental and Medical Center Activities**
- Children’s Hospital of Pittsburgh:
  - Brachial Plexus Birth Trauma Committee
  - Fetal Diagnosis and Treatment Committee
  - Pediatric Neuro-oncology Board
  - Vascular Anomalies Committee

- University of Pittsburgh:
  - School of Medicine Admissions Interview Committee
  - Scholarly Project Mentor
  - Physician-Scientist Training Program Mentor

**Professional Activities**
Abstract reviewer for national meetings of CNS, AANS, Joint Pediatric Section, and ASPN
AANS Resident Mentor

**Honors and Awards**
America’s Most Compassionate Doctors 2011-16
Patients’ Choice Award, 2008-16

**Publications: 2015-16**
- **Refereed Articles:**


**Presentations:**

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**Miguel E. Habeych, MD, MPH, FACNS**
*Assistant Professor*

Miguel E. Habeych, MD, MPH, FACNS, joined the Department of Neurological Surgery in September of 2005 as associate director of the Center for Clinical Neurophysiology. He was appointed director of the center in March of 2008. Dr. Habeych attended medical school and did his internship at the Universidad Industrial de Santander (Colombia), obtaining his medical degree in 1989. He completed training in clinical neurology at the National University of Colombia, graduating in 1995. After practicing general neurology and electroencephalography for three years, he pursued a master of public health degree at the Graduate School of Public Health of the University of Pittsburgh, graduating in 2000. He did a post-doctoral fellow research with the Center for Education and Drug Abuse Research (CEDAR) of the University of Pittsburgh’s School of Pharmacy, and worked there as a research associate from 2001 to 2004. Dr. Habeych completed a fellowship in clinical neurophysiology/intraoperative neurophysiological monitoring at the Center for Clinical Neurophysiology in July of 2005. He was elected fellow of the American Clinical Neurophysiology Society (ACNS) in 2013. Dr. Habeych left the department in March of 2016.

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**D. Kojo Hamilton, MD**
*Associate Professor*

*Residency Program Director, UPMC Mercy*
*Co-Director, Spine Fellowship Program*

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.

**Specialized Areas of Interest**
Scoliosis, adult and pediatric spinal deformity, cranial and spine trauma.

**Board Certifications**
American Board of Neurological Surgery  
Fellow of the American Association of Neurological Surgeons

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

**Professional Organization Membership**
American Association of Neurological Surgeons (AANS)  
AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves  
AANS/CNS Joint Section on Neurotrauma and Critical Care  
AOSpine North America (AOSNA)  
Congress of Neurological Surgeons (CNS)  
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 (Advisory Editorial Board Member)  
  Neurosurgery

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

**Professional Activities**
One Spine Faculty, Seattle Science Foundation, Yearly fellows and residents course  
One Spine Masters Course, Co-Director, Seattle Science Foundation, Yearly advanced spine course for practicing orthopedic and neurological surgeons
Faculty, AANS/SRS Spine Deformity Solutions: A Hands On Course, Houston, Texas
Co-director, Spine Conference, University of Pittsburgh School of Medicine.
Instructional Course Lecturer, Lumbar Spine Research Society, Outcome Measures

Honors and Awards
Distinguished Alumni, University of Virginia Summer Medical and Dental Education Program
Pittsburgh’s Best Doctors, Pittsburgh Magazine, 2016

Publications: 2015-16
• Refereed Articles:

- **Invited Papers:**

- **E-Books:**


- **Presentations:**


**Invited Lectures: 2015-16**

* National:
Faculty Biographies

D. Kojo Hamilton, MD

Hamilton DK. “Distinguished Alumni Lecture Invitation: Finding Your Path.” University of Virginia Summer Medical and Dental Education Program,” University of Virginia, Charlottesville, Va., June 20, 2016.


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, and brain tumors. He also performs 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 Presbyterian
UPMC Shadyside

Professional Organization Membership
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

Publications: 2015-16
• Refereed Articles:

Faculty Biographies


Esther Jane, PhD

*Research Assistant Professor*

Esther Jane, PhD, graduated from Madurai Kamaraj University in India. She did her post doctoral 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: 2015-16**

- Refereed Articles:
• Presentations:

Brian Jankowitz, MD
Assistant Professor
Co-Director, Endovascular Therapy
Director, Neuroendovascular Fellowship Program

Brian Jankowitz, MD, joined the Department of Neurological Surgery faculty as an assistant professor on July 1, 2010 after completing the department’s seven-year residency program and cerebrovascular fellowship. This unique skill set allows unbiased treatment options ranging from carotid stenting versus carotid endarterectomy, aneurysm coiling versus clipping, and AVM embolization versus resection. Dr. Jankowitz has a keen interest in treating ischemic cerebrovascular disease including carotid or vertebral artery revascularization and acute stroke interventions. He believes a combination of open and endovascular means, working synergistically, holds the key to improving outcomes. He works closely with Tudor Jovin, MD, director of the UPMC Stroke Institute, to evaluate and treat hemorrhagic and ischemic disease in a multidisciplinary cerebrovascular clinic at UPMC Mercy. Originally from Montgomery County, Maryland, Dr. Jankowitz received his medical training at Temple University in Philadelphia and received his undergraduate degree from the University of Notre Dame.

Specialized Areas of Interest
Vascular neurosurgery

Board Certifications
American Board of Neurological Surgeons

Hospital Privileges
Children’s Hospital of Pittsburgh of UPMC
UPMC Magee
UPMC Mercy
UPMC Passavant
UPMC Presbyterian
UPMC St. Margaret
UPMC Shadyside

Professional Organization Membership
Allegheny County Medical Society
American Association of Neurological Surgeons/Cerebrovascular Section
American Heart Association: Stroke Council
Congress of Neurological Surgeons
Pennsylvania Medical Society
Pennsylvania State Neurosurgical Society

Education & Training
BS, Biology, Notre Dame, 1999
MD, Temple, 2003
Fellowship, Vascular, University of Pittsburgh, 2009
Residency, University of Pittsburgh, 2010
Faculty Biographies

Brian Jankowitz, MD

Editorial Service
- Editorial Board:
  Biomaterials & Biomedical Engineering
  Neurology & Neurosciences
  Austin Journal of Clinical Neurology

- Ad Hoc Reviewer:
  Clinical Medicine & Research
  European Radiology
  Interventional Neurology
  Journal of Neuroimaging
  Journal of NeuroInterventional Surgery
  Neuro-Ophthalmology
  Neurosurgery
  The Spine Journal
  World Neurosurgery
  Yonsei Medical Journal

Professional Activities
Scientific Program Coordinator for the 2016 Congress of Neurological Surgeons
  CV sub-section meeting
Scientific Program Coordinator for the 2017 American Association of Neurological Surgeons
  CV sub-section meeting
Scientific Program Coordinator for the 2016 Pennsylvania Neurosurgical Society meeting

Media Appearances: 2015-16

Publications: 2015-16
- Refereed Articles:

Invited Lectures: 2015-16
- National:

- Local/Regional:


Wenyan Jia, PhD
Research Assistant Professor

Wenyan Jia, PhD, received her PhD in biomedical engineering from Tsinghua University, China, in 2005 before joining the University of Pittsburgh as a postdoctoral scholar. In 2009, she was promoted to research assistant professor in the Department of Neurological Surgery.

Specialized Areas of Interest
Biomedical signal and image processing; wearable electronic device; mobile health.

Professional Organization Membership
IEEE Engineering in Medicine & Biology Society

Education & Training
BS, Biomedical Engineering, Capital University of Medical Sciences, 1998
MS, Biomedical Engineering, Capital University of Medical Sciences, 2001
PhD, Biomedical Engineering, Tsinghua University, 2005

Editorial Service
• Ad Hoc Reviewer:
  Journal of Selected Topics in Signal Processing

Publications: 2015-16
• Refereed Articles:


**Published Abstracts:**

**Presentations:**

Jia W. "eButton: a wearable computer for evaluation of diet, physical activity and lifestyle.” Small Devices—Big Potentials, Automating Assessment & Collection of Dietary Data with ICT, Aalborg University, Copenhagen, Denmark, August 28, 2015.

**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 100 articles in refereed journals, 32 book chapters and/or invited publications, and has edited one book.

**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
Hideyuki Kano, MD, PhD

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

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

Hideyuki Kano, MD, PhD

Publications: 2015-16

• Refereed Articles:


• Presentations:


Invited Lectures: 2015-16

• International:

Adam S. Kanter, MD
Associate Professor
Chief, UPMC Presbyterian Spine Services
Director, Minimally Invasive Spine Program
Co-Director, Neurosurgical 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 with Cum Laude honors. He obtained his masters 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 associate professor in 2013. 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 versus open 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
Magee-Womens Hospital of UPMC
UMPC Passavant
UPMC Presbyterian
UPMC St. Margaret
UPMC Shadyside

Professional Organization Membership
AANS/CNS Joint Section on Spine & Peripheral Nerves
American Association of Neurological Surgeons
Congress of Neurological Surgeons
Society of Lateral Access Surgeons
Society of Minimally Invasive Spine Surgeons

Education & Training
BS, Psychology, University of Massachusetts, 1993
MS, Medical Sciences, Boston University, 1997
MD, University of Vermont, 2001
Residency, University of Virginia, Neurosurgery, 2007
Faculty Biographies

Adam S. Kanter, MD

Editorial Service

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

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

Interdepartmental and Medical Center Activities

• UPMC Presbyterian:
  Medical Executive Committee

Professional Activities

AANS/CNS Division of Spine & Peripheral Nerves:
  Executive Committee Member
  2015-16 Scientific Program Chairman
  2016-17 Annual Meeting Chair
  Research & Awards Committee, Past Chair
  Fellowships Committee, Past Chair
Lecturer and Lab Proctor, One Spine Residents and Fellows Course, Seattle, Wash., August 14-16, 2015

Honors and Awards

Early Achievement Award, University of Vermont School of Medicine, 2016
Best Doctors in America, 2009-16
Pittsburgh’s Best Doctors, Pittsburgh Magazine, 2012-16
Patients’ Choice Award, October 2012-2016
Top 10 Doctor, Vitals Neurosurgical Specialists, 2012-2016
Vitals On-Time Recognition Award, 2015
Most Compassionate Doctor Award, December 2012

Publications: 2015-16

• Refereed Articles:
Faculty Biographies

Adam S. Kanter, MD


Invited Lectures: 2015-16

• National:


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

David L. Kaufmann, MD, specializes in spinal and general neurosurgery. His clinical interests include degenerative spinal disorders, spine and brain tumors, and the treatment of spinal and cranial trauma. Dr. Kaufmann received his medical degree from the Albert Einstein College of Medicine in New York City and completed a surgical internship at the John Hopkins Hospital. 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 a member of the American Association of Neurological Surgeons, the Congress of Neurological Surgeons and the Pennsylvania Neurological Society.

Specialized Areas of Interest
Spinal surgery.

Board Certifications
American Board of Neurological Surgeons

Hospital Privileges
Monongahela Valley Hospital
UPMC Mercy

Professional Organization Membership
Allegheny County Medical Society
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

L. Dade Lunsford, MD

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. Following a one-year fellowship in stereotactic and functional neurosurgery at the Karolinska Institute in Stockholm, Sweden—
studying 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 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 595 published articles and 284 book chapters as well as the editor or co-editor of twelve books. Dr. Lunsford also served as department chairman for ten years, stepping down in July of 2006 to devote more time to his clinical work, clinical investigation, and resident and fellow training.

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
Children’s Hospital of Pittsburgh of UPMC
UPMC Presbyterian
UPMC St. Margaret’s
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 Pain Society
American Society for Stereotactic and Functional Neurosurgery (president, 1995-97)
Congress of Neurological Surgeons
Elekta Scientific Advisory Board
Florida Medical Association
International Association for the Study of Pain
International Gamma Knife Research Foundation, Chairman
International Radiosurgery Association, Chairman, Medical Advisory Board
International Stereotactic Radiosurgery Society, Co-Founder and President, 1991-1993
Japan Neurosurgical Society, Guest Member
Mid-Atlantic Neurosurgical Society
North American Skull Base Society
Pennsylvania Medical Society
Pennsylvania Neurosurgical Society
Phi Sigma Biological Society
Pittsburgh Neuroscience Society
Research Advisory Committee of the Focused Ultrasound Surgery Foundation
Society for Neuro-Oncology Society of Neurological Surgeons
University of Virginia Alumni Association, Regional Committee, Jefferson Scholars Program
World Society for Stereotactic and Functional Neurosurgery
L. Dade Lunsford, MD

**Education & Training**
BA, Psychology, 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:**
  Progress in Neurological Surgery
  Stereotactic and Functional Neurosurgery
  Surgical Neurology

- **Ad Hoc Reviewer:**
  Acta Neurologica Scandinavica
  American Journal of Otology
  British Journal of Neurosurgery
  Cancer
  Cancer Research UK
  Case Reports in Neurological Medicine
  Cerebrovascular Section Newsletter
  Chinese Journal of Cancer Research
  Environmental Research
  International Journal of Computer Assisted Radiology and Surgery
  International Journal of Endocrinology
  International Journal of Radiation Biology
  International Journal of Radiation Oncology, Biology and Physics
  JAMA
  Journal of Image-Guided Neurosurgery
  Journal of Microsurgery
  Journal of Neurosurgery
  The Lancet Oncology
  Nature Reviews Endocrinology
  Nature Clinical Practice Neurology
  Neurology
  Neurology India
  Neuroradiology
  Neurosurgery
  Neurotherapeutics
  New England Journal of Medicine
  Oncology
  Otology and Neurotology
  Radiation Oncology
  Radiotherapy and Oncology
  Scholarly Research Exchange
  Technology in Cancer Research and Treatment
  World Journal of Surgical Oncology

**Interdepartmental and Medical Center Activities**
- **UPMC:**
  Chair, Technology and Innovative Practice Committee
  Value Analysis Executive Steering Committee
L. Dade Lunsford, MD

Director, Neurological Surgery Residency Program, 1994-present
Co-Chair, Brain Mapping (MEG) Center, 2009-present

Professional Activities
Course Co-Director, Principles and Practices of Gamma Knife Radiosurgery, Pittsburgh Pa.,
(six courses per year)

Honors and Awards
BA with High Honors - University of Virginia, 1970
Phi Beta Kappa - University of Virginia, 1970
William P. Van Wagenen Fellowship, AANS, 1980
Good Housekeeping Best Doctors, 1996
International Stereotactic Radiosurgery Jacob Fabrikant Award, 1997
William S. McEllroy Award, University of Pittsburgh School of Medicine, 1997
Faculty Teaching Award, Department of Neurosurgery 1997, 1999, 2000, 2010
Lars Leksell Provost Lecture, 2000
America’s Top Doctors, Castle Connolly Medical, Ltd., 2002-2013, 2016
AANS Young Neurosurgeon Award, 2005
Academic Keys Who’s Who in Medical Sciences Education, 2005
Best Doctors in America, 2005-2011
Guide to America’s Top Surgeons, 2006-2009
Distinguished Professor, University of Pittsburgh, 2007
Who’s Who in Science and Engineering, 2007
Congress of Neurological Surgeons Honored Guest, 2007
Allegheny County Medical Society Ralph C. Wilde Award, 2008
Castle Connolly Medical Ltd. National Physician of the Year Award, 2008
Pioneers in Radiosurgery Award, Leksell Gamma Knife Society, 2010
Leading Health Professionals of the World, 2010
America’s Top Doctors for Cancer, Castle Connolly Medical, Ltd., 2005-2016
Best Doctors in America database, 2010-2016
Pittsburgh’s Best Doctors, Pittsburgh Magazine, 2012-2016
Best Doctors in America, Pittsburgh Business Times, 2016
American Most Honored Professionals, Top 1%, 2016
AANS Cushing Award for Technical Excellence and Innovation in Neurosurgery, 2016

Media Appearances: 2015-16

Publications: 2015-16
• Refereed Articles:


**Books:**

**Book Chapters:**


Faculty Biographies


Invited Lectures: 2015-16

• International:
  Lunsford LD. "Functional Disorders—Early radiosurgery provides superior pain relief for trigeminal neuralgia patients." Leksell Gamma Society Meeting, Amsterdam, Netherlands, May 16, 2016.

• National:
  Lunsford LD. "The Expanding Role of RS as part of NS." Research Update in Neuroscience for Neurosurgeons (RUNN), Woods Hole, Mass., October 29, 2015.

- Local/Regional:
  Lunsford LD. "Radiosurgery for Sellar and Parasellar Tumors." Pituitary Conference, Pittsburgh, Pa., December 17, 2015.

- Visiting Professorships:
  Washington University School of Medicine, St. Louis, Mo., William Coxe Inaugural Lecture: "Changing the Paradigm for Brain Metastasis Management." September 9, 2015.

Joseph C. Maroon, MD
Clinical Professor, Heindl Scholar in Neuroscience
Vice Chair, UPMC Community Medicine
Director, Tri-State Neurosurgical Associates

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. He obtained his medical and neurosurgical training at Indiana University, Georgetown University, Oxford University in England and the University of Vermont. 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 20 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 member of the board of directors and chairman of the scientific and technology committee of Mylan Laboratories, the third largest generic drug manufacturer in the world; 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 published four books, has written over 250 papers and 40 book chapters. His two most recent books include, *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*, released by Simon and Schuster in January of 2009. In his early years, his athletic abilities earned him a football scholarship to the University of Indiana in Bloomington. There 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 74 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.
with Joe Montana and Kareem Abdul Jabaar, 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. As medi-
cal director of the Live Free African Freedom Tour, on February 26, 2014, Dr. Maroon and his
daughter, Isabella—along with a group of amputees—summit 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.

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

**Board Certifications**
American Board of Neurological Surgery

**Hospital Privileges**
UPMC Passavant
UPMC Presbyterian
UPMC St. Margaret
Sewickley Valley Hospital
Wheeling Hospital

**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
Research Society of Neurological Surgeons
Society of Neuroscience

**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
  - The Turkish Journal of Neurosurgery

• Ad Hoc Reviewer:
  - Annals of Otology, Rhinology and Laryngology
  - 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
  - Neurosurgery
  - Stroke
  - Surgical Neurology
  - Spine Surgery Today
  - World Neurosurgery

Professional Activities

Team Neurosurgeon, Pittsburgh Steelers
Scientific Advisory Board, General Nutrition Corporation
Board of Directors, 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
Board of Directors, Phipps Conservatory
Chairman, Science and Technology Committee of Mylan Labs
Chairman, Medical and Scientific Advisory Board, Stemedica
Consulting Neurosurgeon, Operation Backbone

Honors and Awards

Listed in The Best Doctors in America, 2000-16.
Lou Holtz/Upper Ohio Valley Hall of Fame inductee, for excellence in athletics and medicine, June 1999.
Western Pennsylvania Chapter of the Sports Hall of Fame, May 2, 2009.
Distinguished Alumni Service Award, Indiana University, Bloomington, Ind., November 4, 2011.
Pioneer Award, 25th Anniversary UPMC Center for Cranial Base Surgery, Pittsburgh, Pa., November 17, 2012.
Faculty Biographies

Joseph C. Maroon, MD

Media Appearances: 2015-16
“Take these steps to avoid harmful inflammation,” Pittsburgh Tribune-Review, April 11, 2016.
“Dr. Joseph Maroon is one of the good guys,” Pittsburgh Post-Gazette, March 8, 2016.
“Tips to Staying Young,” KDKA-TV Pittsburgh Today Live, October 9, 2015.

Publications: 2015-16
• Refereed Articles:

• Book Chapters:

• Presentations:

Vincent J. Miele, MD
Clinical Assistant Professor

Vincent J. Miele, MD, joined the University of Pittsburgh Department of Neurosurgery as a clinical assistant professor on January 1, 2014. 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 Candeet-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 Beaver Falls, Greenville, Monroeville, Mt. Morris and Wexford in Pennsylvania, and Wheeling in West Virginia.

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

Hospital Privileges
UPMC Mercy
UPMC Passavant
UPMC Presbyterian
UPMC Shadyside
Faculty Biographies

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

**Edward A. Monaco III, MD, PhD**
**Assistant Professor**

Edward A. Monaco III, MD, PhD, joined the Department of Neurological Surgery faculty as an assistant professor in June of 2013 after completing the University of Pittsburgh's seven-year neurosurgery residency program. Prior to coming to the university, Dr. Monaco earned a PhD in neuroscience and physiology at SUNY Upstate Medical University in Syracuse and his medical degree from Columbia University College of Physicians and Surgeons in New York, N.Y. He completed undergraduate degrees in biology and chemistry at LeMoyne College in Syracuse, N.Y. Dr. Monaco was born in Charleston, S.C.

**Specialized Areas of Interest**
Brain tumors, Gamma Knife stereotactic radiosurgery, minimally invasive spine surgery, pain neurosurgery.

**Hospital Privileges**
- UPMC Altoona  
- UPMC Hamot  
- UPMC Mercy  
- UPMC Magee  
- UPMC Passavant  
- UPMC Presbyterian  
- UPMC Shadyside  
- VA Pittsburgh Healthcare System, University Drive, Pittsburgh
Faculty Biographies

Edward A. Monaco III, MD, PhD

**Professional Organization Membership**
- Allegheny County Medical Society
- AANS/CNS Spine and Peripheral Nerve Section
- AANS/CNS Tumor Section
- American Association of Neurological Surgeons
- American Medical Association
- American Society of Stereotactic and Functional Neurosurgeons
- Congress of Neurological Surgeons
- Pennsylvania Neurosurgical Society

**Education & Training**
- PhD, Neuroscience, SUNY, 2004
- MD, Columbia University, 2006
- Internship, University of Pittsburgh, 2007
- Fellowship, University of Pittsburgh, Stereotactic Radiosurgery, 2012
- Residency, University of Pittsburgh, 2013

**Editorial Service**
- Ad Hoc Reviewer:
  - Biomed Research International
  - BMC Surgery
  - CNS Oncology
  - International Journal of Molecular Sciences
  - Lung Cancer Management
  - Melanoma Management
  - Melanoma Research

**Interdepartmental and Medical Center Activities**
- University of Pittsburgh:
  - Faculty Compensation Committee
  - Resident Clinical Competency Committee Member/Promotion Evaluation Committee Member
  - Assistant Program Director, Presbyterian Residency Program
  - Team Physician, University of Pittsburgh Football Team
  - Faculty Research Mentor – First Experiences in Research for Undergraduates
  - Grant Review Panel, Copeland Grant Committee
  - University of Pittsburgh Institutional Review Board (IRB)

**Professional Activities**
- Faculty Lecturer, Principles and Practice of Gamma Knife Radiosurgery, Pittsburgh, Pa.
- Team Physician, Pittsburgh Penguins Hockey Team
- Adjunct Professor, Chatham University

**Community Activities**
- Coach, Shaler Soccer Club

**Publications: 2015-16**
- Refereed Articles:
Faculty Biographies


**Book Chapters:**


**Invited Lectures: 2015-16**

• International:
Faculty Biographies

- Local/Regional:
  Monaco EA 3rd. “Surgical Treatment of Hydrocephalus,” University of Pittsburgh School of Medicine, Pittsburgh, Pa., April 18, 2016.

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
Pennsylvania Medical Association
Pennsylvania Neurosurgical Society
Section on Pain of the AANS/CNS
Section on Disorders of the Spine & Peripheral Nerves of the AANS/CNS
Section on History of the AANS/CNS
John J. Moossy, MD

Faculty Biographies

Education & Training
BA, French, University of Pittsburgh, 1976
MD, Tulane University, 1980
Residency, Neurosurgery, Duke University, 1986

Honors and Awards
Department of Neurological Surgery, Resident Teaching Award, 2001-2003
Pittsburgh Magazine Top Doctor Award, 2012-2016
Rudlof Matas Prize in History of Medicine, 1980

Publications: 2015-16
• Refereed Articles:

Ajay Niranjan, MD, MBA
Professor
Director, UPMC-Brain Mapping Center (MEG)
Associate Director, Center for Image-Guided Neurosurgery
Director, Radiosurgery Research

Ajay Niranjan, MD, is a professor of neurological surgery at the University of Pittsburgh. 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 in the development of presurgical 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 following two projects: “Multicenter Phase II Study of Border Zone Stereotactic Radiosurgery with Bevacizumab Chemotherapy in Patients with Recurrent or Progressive Glioblastoma Multiforme” and “A Safety and Feasibility Study of Minocycline Therapy for Management of Adverse Radiation Effects after Brain Metastases Radiosurgery.” He has co-authored over 170 articles in refereed journals and over 80 book chapters. He has contributed guidelines for stereotactic radiosurgery for trigeminal neuralgia, pituitary adenomas, arteriovenous malformation, acoustic tumors, and brain metastases. He has edited three books.

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

Hospital Privileges
UPMC Presbyterian
Ajay Niranjan, MD, MBA

**Professional Organization Membership**
American Clinical MEG Society  
Congress of Neurological Surgeons  
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:**  
  Member, Radiation Safety Committee  
  Director of Operations, UPMC Brain Mapping Center  
  Member: Total Quality & Patient Safety Council, UPMC Presbyterian/Shadyside

**Professional Activities**
Board Member: AANS and ASTRO national SRS registry  
Member: International Gamma Knife Radiosurgery Foundation  
Course Co-Director: Principles and Practices of Gamma Knife® Radiosurgery, Pittsburgh, Pa.,  
  (six courses per year)

**Media Appearances: 2015-16**

**Publications: 2015-16**
- **Refereed Articles:**  
Faculty Biographies


- **Presentations:**
  Niranjan A. "Proposed Phase I/II Study of expanded 70% isodose volume for AVM Radiosurgery." International Leksell Gamma Knife Society Meeting, Amsterdam, Netherlands, May 19, 2016.

**Invited Lectures: 2015-16**

- **International:**


**David O. Okonkwo, MD, PhD**

*Professor*

*Executive Vice Chair, Clinical Operations*

*Clinical Director, Brain Trauma Research Center*

David O. Okonkwo, MD, PhD, is executive vice chair for clinical operations and is director of neurotrauma, director of scoliosis and spinal deformity at UPMC Presbyterian. He is also professor and clinical director of the Brain Trauma Research Center of the University of Pittsburgh. Dr. Okonkwo completed his undergraduate work at the University of Virginia, where he received the University Academic Achievement Award and was named 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, Auckland, New Zealand. He has additional specialized training in scoliosis and other spinal deformities. 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 advanced neuroimaging modalities and novel therapeutic interventions for brain and spinal cord injury. Dr. Okonkwo is the principal investigator of a nationally funded clinical core to study the pathophysiology of traumatic brain injury. He is also principal investigator of several ongoing clinical studies in neurotrauma in Pittsburgh. Dr. Okonkwo has published more than 120 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; experimental therapies for brain and spinal cord injuries.

**Board Certifications**

American Board of Neurological Surgery
David O. Okonkwo, MD, PhD

**Hospital Privileges**
- Children’s Hospital of Pittsburgh of UPMC
- Magee-Womens Hospital of UPMC
- UPMC Presbyterian
- UPMC Mercy
- Veterans Affairs Pittsburgh Healthcare System

**Professional Organization Membership**
- Alpha Omega Alpha Medical Honor Society
- American Association of Neurological Surgeons
- Congress of Neurological Surgeons
- National Neurotrauma Society

**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:
  - UPMC Presbyterian Medical Executive
  - Trauma Medical Audit Committee
- University of Pittsburgh:
  - Institutional Review Board Member

**Professional Activities**
- AANS/CNS Section on Neurotrauma and Critical Care, Executive Committee
- AANS/CNS Section on Spine and Peripheral Nerve Disorders, Program Committee

**Honors and Awards**
- Best Doctors in America, 2012-16
- Pittsburgh’s Best Doctors, Pittsburgh Magazine, 2012-16

**Media Appearances: 2015-16**
- “Concussion conference suggests that rest may not be the best treatment,” NBC Sports, October 17, 2015.
Publications: 2015-16

• Refereed Articles:


• Invited Papers:


Invited Lectures: 2015-16
• International:
Okonkwo DO. “Neuroimaging and Biomarkers for Traumatic Brain Injury.” AONEuro Neurotrauma Course, Changsha, China, April 21, 2016.


• National:
David O. Okonkwo, MD, PhD

Faculty Biographies


Okonkwo DO. "Adjacent Level Disease: to fuse or not to fuse." Congress of Neurological Surgeons Annual Meeting, New Orleans, La., September 26-29, 2015.


• Local/Regional:


• Visiting Professorships:

Jamie Pardini, PhD
Assistant Professor

Jamie Pardini, PhD, a neuropsychologist, joined the Department of Neurological Surgery in July of 2012. She received her PhD in clinical psychology with a subspecialization in psychology-law from the University of Alabama. Dr. Pardini completed a pre-doctoral neuropsychology internship at the VA Pittsburgh Healthcare system and then completed a post-doctoral neuropsychology fellowship at the UPMC Sports Concussion Program. Dr Pardini left the department in August of 2015.

Erin Paschel, PA-C
Clinical Instructor

Erin E. Paschel, PA-C, joined the Department of Neurological Surgery as a surgical physician assistant for the Spine Services Division in 2009. She currently serves as a clinical instructor in the University of Pittsburgh School of Medicine, and she is a member of the Preceptor Academy for Advanced Practice Providers. She also is a clinical assistant professor at Chatham University where she earned her masters of physician assistant studies degree. Erin was born and raised in Pittsburgh, completing her undergraduate degree at Allegheny College and post-baccalaureate graduate studies at Duquesne University. Erin’s research interests include treating cervical disc herniations and degenerative diseases with stand-alone zero-profile devices, balloon kyphoplasty for the treatment of vertebral compression fractures, and dynamic stabilization of the lumbar spine. She also serves as the co-principal investigator of a prospective clinical investigation into decreasing surgical site infections using chlorhexidine

Board Certifications
National Commission on Certification of Physician Assistants

Hospital Privileges
UPMC Passavant
UPMC Presbyterian

Professional Organization Membership
American Academy of Physician Assistants
American Association of Neurological Surgeons
Pennsylvania Society of Physician Assistants

Education & Training
BS, Biology, Allegheny College, 2003
Pre-Medical Program, Duquesne University, 2004
MPAS, Chatham University, 2009

Publications: 2015-16
• Refereed Articles:

Ian F. Pollack, MD
A. Leland Albright Distinguished Professor
Vice Chair, Academic Affairs
Chief, Pediatric Neurosurgery
Co-Director, Neurosurgical Oncology

Ian Pollack, MD, is co-director of the Brain Tumor Program at the University of Pittsburgh Cancer Institute, chief of Pediatric Neurosurgery at Children's Hospital of Pittsburgh of UPMC, and A. Leland Albright Professor of Neurosurgery at the University of Pittsburgh School of Medicine. 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. Pollack has published more than 320 papers in refereed journals, numerous book chapters and invited papers, and has edited two 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*. He is currently a principal investigator on numerous NIH grants focusing on novel therapies for brain tumors and evaluating molecular markers of tumor prognosis. Dr. Pollack was named vice chairman of academic affairs for the department in July of 2008. He has co-chaired the National Cancer Institute Brain Malignancy Steering Committee since 2010.

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

Professional Organization Membership
Academy of Neurological Surgeons
Alpha Omega Alpha
American Association for the Advancement of Science
American Association for Cancer Research
American Association of Neurological Surgeons (AANS)
American College of Surgeons
American Society of Pediatric Neurosurgeons
American Society for Clinical Investigation
Association of American Physicians
Children’s Oncology Group
Faculty Biographies

Ian F. Pollack, MD

Congress of Neurological Surgeons (CNS)
International Society of Pediatric Neurosurgery
Johns Hopkins Medical and Surgical Society
Joint Section on Tumors (AANS/CNS)
Pennsylvania Neurosurgical Society
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
Residency, University of Pittsburgh, 1991
Fellowship, University of Pittsburgh, 1990
Fellowship, Hospital for Sick Children, 1991
Fellowship, University of Lausanne, 1992
Fellowship, University of Uppsala, 1992

Editorial Service
• Editorial Board:
  ASCO PIWC
  Child’s Nervous System
  Pediatric Blood and Cancer

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

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

Professional Activities
Institutional PI, Pediatric Brain Tumor Consortium
Steering Committee, Pediatric Brain Tumor Consortium
Chairman, Drug Delivery Subcommittee, Pediatric Brain Tumor Consortium
NCI Brain Malignancy Steering Committee, Co-Chair
Director, American Board of Pediatric Neurological Surgery
Director, Accreditation Council for Pediatric Neurosurgery Fellowships
Chair, Translational Biology Committee, Pediatric Brain Tumor Consortium

Honors and Awards
Castle Connolly’s America’s Top Doctors, 2002-16
Who’s Who in America (Marquis), 2005-16
Who’s Who in the World (Marquis), 2008-16
Castle Connolly’s America’s Top Cancer Doctors, 2005-16
Van Wagenen Lecturer, 2014 AANS Meeting
Winn Prize, Society of Neurological Surgeons, 2015
Columbia Softball Charity Award, 2016 AANS Meeting
Children’s Brain Tumor Foundation, Award for Scientific Excellence, 2016
Publications: 2015-16

• Refereed Articles:


**Book Chapters:**


• **Published Abstracts:**


• **Presentations:**


**Invited Lectures: 2015-16**

• **National:**


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 PhD degrees. Dr. Premkumar then completed his post-doctoral training at Case Western Reserve University in Cleveland. Dr. Premkumar has published more than 40 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
ASPET (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 Neurosurgery
  Journal of Neurology and Neurosciences
Faculty Biographies

Daniel R. Premkumar, PhD

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

Publications: 2015-16
• Refereed Articles:

• Presentations:

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 associate scientist at the Safar Center for Resuscitative Research at the University of Pittsburgh upon completion of her doctorate degree. This was a reflection of her past and continuing collaborations with Patrick Kochanek, MD, C. Edward Dixon, PhD, and Hulya Bayir, MD, as well as multiple critical care medicine fellows. Dr. Puccio was appointed assistant professor in the Department of Neurological Surgery at the University of Pittsburgh in 2010 and was granted tenure-track in 2013. Dr. Puccio 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 21 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 a member of the Neurocritical Care Society, Society of Critical Care Medicine, National Neurotrauma Society and currently serves as the secretary/treasurer for the Women in Neurotrauma Research (WiNTR).
Ava Puccio, RN, PhD

**Specialized Areas of Interest**
Dr. Puccio's specialized areas of interest are exploring secondary injury mechanisms following traumatic brain injury to improve neurological outcomes in mild, moderate and severe traumatic brain injury patients. Focused mechanisms include use of controlled normothermia and hypothermia, brain oxygenation, genetic expression and variances and clinical studies of pharmacotherapy in TBI patients.

**Board Certifications**
RN License: Pennsylvania

**Hospital Privileges**
UPMC Mercy
UPMC Presbyterian

**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)

**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:
  Society of Critical Care Medicine
  State of the Science Congress on Nursing Research
  Pediatric Critical Care
  Neurocritical Care
  Therapeutic Hypothermia and Temperature Management

**Interdepartmental and Medical Center Activities**
- **UPMC Presbyterian:**
  Nurse training for Neuroscience Critical Care Course, UPMC
  Annual residents' training for 'TBI Management and Mayfield Technique'

- **University of Pittsburgh:**
  Mentor for two master's of nursing students, two doctoral of nursing students, and one post-doctoral fellow.
  Co-Director, Neurotrauma Clinical Trials Center

**Professional Activities**
Secretary/Treasurer for Women in Neurotrauma in Research (WiNTR)

**Honors and Awards**
Ruth Perkins Kuehn Nursing Research Award, 2011
Cold Spring Harbor Scholarship, 2012
Ava Puccio, RN, PhD

Publications: 2015-16

• Refereed Articles:


• Published Abstracts:


Invited Lectures: 2015-16

• National:

• Local/Regional:

R. Mark Richardson, MD, PhD, FAANS
Assistant Professor
Director, Adult Epilepsy and Movement Disorders Surgery
Director, Brain Modulation Laboratory
Faculty Member, Center for the Neural Basis of Cognition

R. Mark Richardson, MD, PhD, FAANS, is director of Epilepsy and Movement Disorders Surgery at UPMC Presbyterian. Dr. Richardson received his undergraduate education at the University of Virginia. He completed his medical and doctoral education in the MD/PhD program at the Medical College of Virginia, where his interest in adult neurogenesis led to an NIH National Research Service Award. Prior to joining the faculty at the University of Pittsburgh in 2011, Dr. Richardson completed neurosurgical residency at the University of California San Francisco where he received specialized training in epilepsy neurosurgery, deep brain stimulation, and brain mapping during awake craniotomies. Additionally, he received an NIH National Research Service Award to study gene therapy delivery to the brain. Dr. Richardson’s clinical specialization is comprehensive epilepsy surgery and deep brain stimulation for movement disorders. He started the interventional-MRI DBS program at UPMC, and his additional clinical expertise includes intraoperative mapping to preserve brain function, including language, in patients who are awake during epilepsy and tumor surgery.

Specialized Areas of Interest
Epilepsy surgery, deep brain stimulation for movement and limbic disorders (including interventional-MRI guided DBS surgery), awake surgery in eloquent brain areas.

Board Certifications
American Board of Neurological Surgeons

Hospital Privileges
UPMC Presbyterian
UPMC Hamot

Professional Organization Membership
American Association of Neurological Surgeons
American Association of Stereotactic and Functional Neurosurgery
American Epilepsy Society
American Society for Neural Transplantation and Repair
Congress of Neurological Surgeons
International Movement Disorders Society
Society for Neuroscience
Faculty Biographies

R. Mark Richardson, MD, PhD,

Education & Training
BA, Environmental Sciences, University of Virginia, 1997
MD/PhD, Medical College of Virginia, 2005
Fellowship, University of California San Francisco Postdoctoral Fellowship, 2010
Residency, University of California San Francisco Neurological Surgery, 2011

Editorial Service
• Editorial Board:
  Neurosurgery

• Ad Hoc Reviewer:
  Brain Stimulation
  Epilepsy
  Epilepsy Research
  Journal of Healthcare Engineering
  Journal of Neurology Neurosurgery and Psychiatry
  Journal of Neurophysiology
  Nature Protocols
  Neurochemistry International
  Neuroscience Letters
  PLoS One
  Scientific Reports

Interdepartmental and Medical Center Activities
• UPMC Presbyterian:
  Epilepsy Task Force

• Department of Neurological Surgery:
  Research Executive Committee

Professional Activities
Psychiatric Neurosurgery Committee, American Society for Stereotactic and Functional Neurosurgery

Honors and Awards
NARSAD Young Investigator Award, Brain and Behavior Research Foundation, 2015
Pittsburgh’s Best Doctors, Pittsburgh Magazine, 2016

Media Appearances: 2015-16
“Deep-brain stimulation helps Erie Parkinson’s patients,” GoErie.com, March 26, 2016
“Pitt professor’s gene therapy trial holds promise for Parkinson’s patients,” Pittsburgh Tribune-Review, February 29, 2016
“McCandless woman 1st in region with implant aimed at halting seizures,” Pittsburgh Tribune-Review, August 2, 2015
Faculty Biographies

R. Mark Richardson, MD, PhD,

Publications: 2015-16

• Refereed Articles:

• Invited Papers:

• Presentations:


Invited Lectures: 2015-16

- Local/Regional:
  Richardson RM. "Basal Ganglia-Cortical Interactions in Speech Production." Grand Rounds, Department of Neurological Surgery, University of Pittsburgh School of Medicine, Pittsburgh, Pa., March 2, 2016.

Richardson RM. "DBS for Dystonia." Joint Grand Rounds, Departments of Neurology and Neurological Surgery, University of Pittsburgh School of Medicine, PA., May 11, 2016.

Michael J. Rutigliano, MD, MBA
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. His clinical interests include a wide range of neurosurgical diseases, focusing mostly in the areas of spinal and peripheral nerve disorders, brain tumors, 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. Craniotomy for primary and metastatic brain tumors are also performed. 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; brain tumors.

**Board Certifications**
American Board of Neurological Surgery

**Hospital Privileges**
- Latrobe 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

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

**Interdepartmental and Medical Center Activities**
- University of Pittsburgh Physicians: Neurosurgery Compensation Committee

**Professional Activities**
- Joint Section on Disorders of the Spine and Peripheral Nerves (AANS/CNS)

**Raymond F. Sekula Jr., MD, MBA**
**Associate Professor**
**Director, Cranial Nerve and Brainstem Disorders Program**

Raymond Sekula Jr., MD, joined the Department of Neurological Surgery on March 1, 2013 as an assistant professor and director of the department’s Cranial Nerve and Brainstem Disorders program and was promoted to associate professor in 2015. Dr. Sekula is known internationally and nationally for his development of microvascular techniques, which provide patients with improved outcomes, reduced complications, and easier recoveries. He has performed more than 1,500 procedures for patients with trigeminal neuralgia,
Raymond F. Sekula Jr., MD, MBA

Faculty Biographies

hemifacial spasm, and other cranial neuralgias. Last year he performed more than 500
eurosurgical procedures. More than 100 of these patients traveled from other states or
outside of the United States for treatment. Dr. Sekula has also developed techniques in
brain surgeries of all types that reduce patients' hospital stays to one or two days with-
out the need for the intensive care unit after the procedure. He has been recognized with
numerous honors, including The American Association of Neurological Surgeon's Young
Investigator Award, The Trigeminal Neuralgia Association Fellowship Award, and Pittsburgh
Magazine's "40 Under 40" and "Best Doctor's" Award.Dr. Sekula received his undergraduate
degree from the University of Virginia and his medical degree from Georgetown University
School of Medicine. Following a surgical internship and residency in neurological surgery,
he completed advanced training in minimally invasive neurosurgery and a fellowship with
neurosurgical pioneer, and former University of Pittsburgh Department of Neurological
Surgery chairman, Peter Jannetta, MD. Following his training, he became assistant, and then
co-director, of the Cranial Nerve Disorders Center with Dr. Jannetta in Pittsburgh. Dr. Sekula
is also a renowned teacher of neurological surgery and is a frequent lecturer nationally and
internationally. He has been awarded the annual faculty teaching award by the department's
residents in 2015 and 2016. Dr. Sekula has authored or co-authored many original jour-
nal articles and book chapters, and is 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.

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

Professional Organization Membership
Allegheny County Medical Society
American Association of Neurological Surgeons
AANS/CNS Section on Pain
Congress of Neurological Surgeons
Facial Pain Association
Medical Advisory Board of TNA
Pennsylvania Neurosurgical Society

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
Faculty Biographies

Raymond F. Sekula Jr., MD, MBA

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

Interdepartmental and Medical Center Activities
- UPMC Presbyterian:
  Physician Champion, Neurosurgery Care Coordination, 2015-present
  Department Representative, AMA Medical Student Career Night, October 13, 2015

- University of Pittsburgh:
  Health Career Scholars Academy: Shadow Day

Community Activities
Cub Scout Den (Tigers and Wolves) Leader, Troop 373
Pittsburgh Children’s Museum, Gala Committee

Honors and Awards
Pittsburgh’s Best Doctors, Pittsburgh Magazine, 2015-16
Department of Neurological Surgery Faculty Teaching Award, 2016
Honored Guest, La Sociedad Ecuatoriana de Neurocirugia

Media Appearances: 2015-16

Publications: 2015-16
- Refereed Articles:


- Books:

- Book Chapters:


• Presentations:

Invited Lectures: 2015-16
• International:

• National:
  Sekula RE. “Microvascular decompression...what are the real risks?” TNA Conference, TNA The Facial Pain Association, NYU School of Dental Medicine, New York, N.Y., October 10, 2015.
  Sekula RE. “What is trigeminal neuralgia? Do I have it?” Facial Pain Association, Regional Conference, University of Pittsburgh School of Medicine, Pittsburgh, Pa., April 23, 2016.
  Sekula RE. “Everyone that has facial pain does not have the same diagnosis. An introduction to the different types of facial pain.” Facial Pain Association, Regional Conference, University of Pittsburgh School of Medicine, Pittsburgh, Pa., April 23, 2016.
  Sekula RE. “In Memoriam, Peter J. Jannetta, MD (video tribute).” Facial Pain Association, Regional Conference, University of Pittsburgh School of Medicine, Pittsburgh, Pa., April 23, 2016.

• Local/Regional:
  Sekula RE. “Update on Trigeminal Neuralgia (with L. Dade Lunsford, MD and Neil Busis, MD).” University of Pittsburgh School of Medicine, Combined Grand Rounds of the Department of Neurosurgery, Pittsburgh, Pa, November 11, 2015.
Faculty Biographies

Raymond F. Sekula Jr., MD, MBA

Sekula RF. "Microvascular Decompression." University of Pittsburgh School of Medicine, Combined Grand Rounds of the University Ear, Nose and Throat Specialists, Pittsburgh, Pa., January 13, 2016.


• Web-Based (ONLY) Lecture:

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 400 publications.

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

Editorial Service
• Editorial Board:
  International Journal of Information and Communication Engineering
  International Journal of Medical Implants and Devices
  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 Member, Biomedical and Life Science Systems, Circuit and Systems Society, IEEE
Faculty Biographies

Mingui Sun, PhD

Publications: 2015-16
• Refereed Articles:


• Presentations:


Invited Lectures: 2015-16
• International:
  Sun M. “Objective Measurements of Diet and Physical Activity Using a Smart Wearable Device.” International Conference on Diet and Activity Methods (ICDAM), Brisbane, Australia, September 1, 2015.

  Sun M. “Wear IT, See IT, Measure IT, Locate IT wearable multi-component devices to change behavior.” Symposium of Using Technology to Measure Diet and Physical Activity: Tools, Validity and Utility, Hunter Medical Research Institute, Newcastle, Australia, August 28, 2015.


Mandeepl Tamber, MD, PhD

Assistant Professor

Mandeepl S. Tamber, MD, PhD, joined the faculty of the University of Pittsburgh Department of Neurological Surgery in the pediatric neurosurgery division at Children’s Hospital of Pittsburgh on August 1, 2009. Dr. Tamber began his medical studies at the University of Alberta, Canada, where he earned a doctor of medicine degree with distinction and honors in research. After graduating from medical school in June 1999, he completed his neurosurgical residency at the University of Toronto. During residency, Dr. Tamber worked towards
Mandeep Tamber, MD, PhD

obtaining a PhD degree in clinical epidemiology and biostatistics from McMaster University. He completed a postgraduate fellowship in pediatric neurological surgery at the Hospital for Sick Children, Toronto and is board certified by the Royal College of Physicians and Surgeons of Canada and the American Board of Pediatric Neurological Surgery. Dr. Tamber is surgical director of the Pediatric Epilepsy Program at Children’s Hospital of Pittsburgh. In addition to the surgical management of pediatric epilepsy, Dr. Tamber’s practice also focuses on general pediatric neurosurgery, including the management of complex hydrocephalus, craniofacial disorders, pediatric neuro-oncology, spinal dysraphism, and pediatric neuro-trauma.

**Specialized Areas of Interest**
Epilepsy surgery; craniofacial surgery; endoscopic management of hydrocephalus.

**Board Certifications**
American Board of Pediatric Neurological Surgery
Royal College of Physicians and Surgeons of Canada

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

**Professional Organization Membership**
American Association of Neurological Surgeons (AANS)
AANS/CNS Joint Guidelines Committee
American Society of Pediatric Neurosurgeons
CNS/AANS Joint Section of Pediatric Neurosurgery
CNS/AANS Joint Section on Tumors
Congress of Neurological Surgeons (CNS)
Medical Advisory Board of the Hydrocephalus Association
Royal College of Physicians and Surgeons of Canada

**Education & Training**
BSc, Medical Sciences, University of Alberta, 1995
MD, University of Alberta, 1999
PhD, Clinical Epidemiology and Biostatistics, McMaster University, 2010
Residency, Neurosurgery, University of Toronto, 2008
Fellowship, Hospital for Sick Children, 2009

**Editorial Service**
- Ad Hoc Reviewer:
  * Child’s Nervous System
  * Canadian Journal of Neurological Sciences

**Interdepartmental and Medical Center Activities**
- **University of Pittsburgh:**
  Chair, Institutional Data and Safety Monitoring Board (DSMB)
  Brain-Computer Interface Study

- **Children’s Hospital of Pittsburgh of UPMC:**
  Medical Advisory Committee—Pediatric Trauma
  Surgical Epilepsy Program
  Pediatric Neuro-oncology Board
Faculty Biographies

Mandeep Tamber, MD, PhD

Media Appearances: 2015-16


Publications: 2015-16

• Refereed Articles:

• Presentations:


**Parthasarathy D. Thirumala, MD, FANS, FAAN**

*Associate Professor*

*Director, Center of Clinical Neurophysiology*

Parthasarathy D. Thirumala, MD, joined the Center of Clinical Neurophysiology in June 2008. Dr. Thirumala 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, NY. Prior to clinical training he completed his masters 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. Prior to joining the department, Dr. Thirumala was in private practice providing intraoperative neurophysiological monitoring.
Partha Thirumala, MD, FANS, FAAN

services. His group was one of the largest physician groups in the country providing intraoperative neurophysiological to approximately 90 hospitals across 12 states in the United States. 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 40 peer reviewed articles, book chapters, and invited articles in the journals including 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 and telemedicine.

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

Hospital Privileges
Children’s Hospital of Pittsburgh of UPMC
Jameson Hospital
Magee-Womens Hospital of UPMC
Monongahela Valley Hospital
UPMC Braddock
UPMC Hamot
UPMC Horizon-Greenville
UPMC Mercy
UPMC Passavant
UPMC Presbyterian
UPMC St. Margaret
UPMC Shadyside

Professional Organization Membership
American Academy of Neurology
American Clinical Neurophysiology Society
American Medical Association
American Society of Neurophysiological Monitoring
American Society of Electroneurodiagnostic Technologists
American Telemedicine Association

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
Faculty Biographies

Partha Thirumala, MD, FANS, FAAN

Editorial Service

• Ad Hoc Reviewer:
  American Journal of Electroneurodiagnostic Technology
  Frontiers in Neuroscience
  Journal of the American Medical Association
  Journal of Clinical Monitoring and Computing
  Neurological Research
  Neurology
  Stroke

Interdepartmental and Medical Center Activities

• UPMC Presbyterian:
  Telemedicine Oversight Committee, Center For Connected Medicine
  Regional Ambassador, UPMC Global Care

Professional Activities

Pennsylvania Neurological Society, President
Pennsylvania Medical Society, Specialty Leadership Cabinet
American Clinical Neurophysiology Society, Social Media and Website Committee

Publications: 2015-16

• Refereed Articles:


• Presentations:
Elizabeth C. Tyler-Kabara, MD, PhD

Associate Professor

Elizabeth C. Tyler-Kabara, MD, PhD completed her bachelor’s degree at Duke University, double majoring in biomedical and electrical engineering, in 1989. After leaving Duke, she worked at the National Institutes of Health as a biomedical engineer, developing and testing molecular biology software, developing a strategic plan for implementing computer networking, and recruiting a head for the newly formed Computational Biology Group. She left the NIH to attend Vanderbilt University, earning her MD and PhD in 1997. Her graduate research in the Department of Molecular Physiology and Biophysics investigated the neurophysiology of the corticostriatal synapse. This served as the basis for her interest in neuro-modulation, which has been a key aspect of her subsequent clinical research activities. She completed her internship in general surgery at the University of Pittsburgh in 1998 under the direction of Richard Simmons, MD. Following internship she specialized in neurological surgery during her residency at UPMC and VA hospitals from 1998-2004 under L. Dade Lunsford, MD. She then completed a fellowship in pediatric neurosurgery at the Children’s Hospital of Alabama in 2005 under the direction of W. Jerry Oakes, MD. Dr. Tyler-Kabara served as assistant professor in the Department of Neurological Surgery, University of Pittsburgh, from 2005-2014 and now as associate professor. She has secondary appointments in the Department of Bioengineering, Swanson School of Engineering, since 2006 and in the Department of Physical Medicine and Rehabilitation since 2007. Dr. Tyler-Kabara has been a faculty member of the McGowan Institute for Regenerative Medicine since 2000. She has been a member of the medical staff of Children’s Hospital of Pittsburgh of UPMC, UPMC Shadyside and UPMC Presbyterian since 2005 and a medical consultant at Magee Women’s Hospital of UPMC since 2007. Dr. Tyler-Kabara directs the Neural Enhancement Laboratory in the Department of Neurological Surgery. The focus of the laboratory is improving function following injury to the central nervous system. Dr. Tyler-Kabara’s research has been supported by the National Institutes of Health, NINDS and NICHD, DARPA, Craig Nielsen and Margot Anderson Foundations, The Copeland Fund and Pedal with Pete. She served as principal investigator on five of those grants. She was the co-principal investigator on the grant that kick-started the brain computer interface human trials at the University of Pittsburgh. Current efforts are focused on the use of brain computer interfaces to restore function. The current studies employ electrocorticography and microelectrode techniques in conjunction with brain computer interfaces for control of neural prosthetics. These studies are conducted in collaboration with the Human Rehabilitation Neural Engineering Laboratory in the Department of Physical Medicine and Rehabilitation combining expertise in engineering, neuroscience, and rehabilitation medicine. Her work was featured on CBS-TV’s 60 Minutes. Additionally, Dr. Tyler-Kabara has been the director of the Spasticity and Movement Disorder Program at Children’s Hospital of Pittsburgh since 2006. This program is one of the few multidiscipline movement disorder programs combining the expertise of neurological surgery, orthopedics, physiatry, occupational and physical therapy and social work. This program is one of the world’s largest pediatric intrathecal baclofen pump experiences with over 500 pump implants. Dr. Tyler-Kabara was the director of the Surgical Epilepsy Program at the University of Pittsburgh. She provide the support to build both the pediatric and adult epilepsy programs including recruiting new faculty members for each program. She serves on the Epilepsy Task Force created in 2012. She has served on the executive committee for the McGowan Institute for Regenerative Medicine since 2008. In her clinical work she has pioneered the use of expanded endonasal surgery of the skull base in extremely young children providing them with a minimally invasive alternative for the treatment of a variety of conditions. She supervises pediatrics, neurology, and physical medicine residents and fellows on the neurological surgery service and in the Spasticity and Movement Disorder clinic. Dr. Tyler-Kabara won the Department of Neurological Surgery teaching award in 2009 and is
actively engaged in teaching medical students, graduate students, and post-doctoral fellows in laboratory. She has taught numerous medical school courses including the first year Introduction to Being a Physician. She has been the ILS course director for the Neurosurgery and Head and Neck Dissection since 2007.

Specialized Areas of Interest
Cerebral palsy; spasticity; dystonia; movement disorders; spinal and skull base disorders.

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

Hospital Privileges
Children’s Hospital of Pittsburgh of UPMC
Magee-Women’s Hospital of UPMC
UPMC Presbyterian
UPMC Shadyside

Professional Organization Membership
Allegheny County Medical Society
American Association of Neurological Surgeons (AANS)
American Association for the Advancement of Science
American Medical Association
American Medical Student Association
American Medical Women’s Association
American Society of Pediatric Neurosurgery
American Society of Stereotactic and Functional Neurosurgery
Congress of Neurological Surgeons (CNS)
Engineering in Medicine and Biology Society
Institute of Electrical and Electronics Engineers (IEEE)
Joint Section on Neurotrauma and Critical Care (AANS/CNS)
Joint Section on Pediatric Neurological Surgery
Joint Section on Tumors (AANS/CNS)
North American Spine Society
Pennsylvania Medical Society
Sigma Xi
Society for Neuroscience
Women in Engineering
Women in Neurosurgery

Education & Training
BSE, Biomedical and Electrical Engineering, Duke University, 1989
MD, Vanderbilt University, 1997
PhD, Molecular Physiology and Biophysics, Vanderbilt University, 1997
Residency, Neurosurgery, University of Pittsburgh, 2004
Fellowship, Pediatric Neurosurgery, University of Alabama, 2005

Editorial Service
• Ad Hoc Reviewer:
  Children’s Nervous System
  Journal of Neurological Surgery
Elizabeth C. Tyler-Kabara, MD, PhD

Faculty Biographies

Interdepartmental and Medical Center Activities

• UPMC Presbyterian:
  Epilepsy Task Force

• University of Pittsburgh:
  Executive Committee, McGowan Institute for Regenerative Medicine
  Admission Committee, School of Medicine

Honors and Awards

Best Doctors in America
Marquis Who’s Who in America

Publications: 2015-16

• Refereed Articles:


• Presentations:
Daniel A. Wecht, MD, MSc
Clinical Professor
Chief of Neurosurgery, UPMC McKeesport
Chief of Neurosurgery, UPMC St. Margaret
Chief of 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 re-certified 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 Presbyterian
UPMC Shadyside
UPMC McKeesport
UPMC St. Margaret

Professional Organization Membership
AANS/CNS Joint Section on Cerebrovascular Surgery
AANS/CNS Joint Section on Trauma
Allegheny County Medical Society
American Association of Neurological Surgeons
American College of Surgery Associate Fellow
American Medical Association
American Heart Association-Stroke Council
Congress of Neurological Surgeons
Pennsylvania Medical Society

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

**Monte S. Weinberger, MD**  
*Clinical Assistant Professor*

Monte S. Weinberger, MD, joined the faculty of the University of Pittsburgh Department of Neurological Surgery in May of 2014. He graduated from the Medical University of South Carolina College of Medicine in 1987.

**Specialized Areas of Interest**  
Spinal cord stimulators; degenerative spinal disorders; brain tumors.

**Hospital Privileges**
- UPMC East
- UPMC Shadyside

**Professional Organization Membership**
- Allegheny County Medical Society
- American Medical Association
- Congress of Neurological Surgeons

**Education & Training**
- BS, Chemistry, College of William & Mary, 1977
- MMSc, Anesthesia/CCM, Emory University, 1983
- MD, Medical University of South Carolina, 1987

**Hong Qu Yan, MD, PhD**  
*Research Assistant Professor*

Hong Qu Yan, MD, is a licensed acupuncturist of Pennsylvania and New York states. Dr. Yan received his medical degree in 1982 from Shanghai College of Traditional Chinese Medicine, China and completed his residency program at the Shanghai First Pulmonary Hospital, in China. He then pursued his master’s and PhD degree in medical and pharmaceutical research at Free University of Brussels (VUB), Belgium. In 1992, he became a postdoctoral fellow in the University of Texas Health Science Center at Houston. In 1996, he joined the Department of Neurological Surgery at the University of Pittsburgh as a postdoctoral fellow.

**Specialized Areas of Interest**
Acupuncture research and treatment in neurological diseases such as traumatic brain injury, spinal cord injury, stroke, Alzheimer disease and Parkinson’s disease, etc.; mechanisms of induction and recovery of functional and pathological deficits following TBI; pharmaceutical therapies for recovery of post traumatic functional deficits; acupuncture and traditional Chinese medicine research and treatment in the other diseases such as cancer.

**Board Certifications**
Licensed Acupuncturist of New York and Pennsylvania

**Professional Organization Membership**
- National Neurotrauma Society
- Society for Neuroscience
Education & Training
Med Student, Shanghai College of Traditional Chinese Medicine, 1982
Bach Med, Shanghai College of Traditional Chinese Medicine, 1982
Residency, Acupuncture Research, Shanghai First Pulmonary Hospital, 1985
PhD, Med/Pharmaceutical Research, Free University of Brussels, 1992

Editorial Service
• Ad Hoc Reviewer:
  Medical Science Monitor

Publications: 2015-16
• Refereed Articles:


• Presentations:


Faculty Biographies


David S. Zorub, MS, MD
Clinical Associate Professor

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 1980 and has served as director of neurosurgery, and subsequently as chairman of surgery from July 1993 to September 30, 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 very active clinically. He has served in numerous positions at UPMC Shadyside, 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.

Hong Qu Yan, MD, PhD
Specialized Areas of Interest
Brain tumors, pituitary microsurgery, cranial nerve disorders like trigeminal neuralgia, hemi-facial spasm, treatment for benign and malignant disease and spine surgery.

Board Certifications
American Board of Neurological Surgery

Hospital Privileges
Jefferson Regional Medical Center
UPMC Cancer Center
UPMC East
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, 1976
Fellowship, University of Pisa, 1974
Fellowship, Duke University, 1974
Resident Biographies
Nitin Agarwal, MD

PGY-2 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 doctorate of medicine from Rutgers New Jersey Medical School. His funded research activities focus on improving patient education to optimize patient outcomes. Dr. Agarwal maintains an active role in organized neurosurgery as a member of the Young Neurosurgeons Committee. In May of 2016, he was selected as a Council of State Neurological Societies socioeconomic fellow. Outside of neurological surgery, Dr. Agarwal is deeply dedicated to martial arts, specifically the disciplines of taekwondo, Krav Maga, and Jiu-Jitsu.

Professional Organization Membership

American Association of Neurological Surgeons
Congress of Neurological Surgeons
Council of State Neurological Societies

Professional Activities

American Association of Neurological Surgeons:
- Young Neurosurgeons Committee
- Young Neurosurgeons Committee Marshall Subcommittee
- Young Neurosurgeons Committee Medical Student Chapter Resource Coordinator

Council of State Neurological Societies, socioeconomic fellow
UPMC Neurosurgery Interest Group, resident advisor

Honors and Awards

The Beckwith Institute Grant, 2016
Walter L. Copeland Grant, 2016
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
Armstrong Engineering Scholarship Award, 2007
Oval Society Award, Community Service Distinction, 2007

Media Appearances: 2015-16


Publications: 2015-16

• Refereed Articles:


**Invited Papers:**


**Book Chapters:**


**Presentations:**

Prabhu AV, Kashkoush AI, Myal S, Agarwal N, Sekula RF. “Implications of a Medical Student Interest Group on a Department’s Productivity: The University of Pittsburgh School of Medicine’s Neurosurgery Interest Group Experience.” Group on Student Affairs, Careers in Medicine, and Organization of Student Representatives Professional Development Conference. St. Louis, Mo., June 24, 2016.
Resident Biographies

Nitin Agarwal, MD


Nima Alan, MD
PGY-1 Resident

Nima Alan, MD, joined the University of Pittsburgh neurosurgery residency program in July 2015. He graduated from Case Western Reserve University School of Medicine with the Distinction in Research and Distinction in Teaching. He previously graduated from University of British Columbia, Vancouver, B.C. in 2010 with a degree in honors physiology. Dr. Alan’s research in undergraduate focused on spinal cord injury, for which he received the Top Student in Neurophysiology award. While in medical school, he studied outcomes in neurosurgery with focus on spine surgery, for which he received the AANS Best Medical Student Abstract Award.

Specialized Areas of Interest
Complex spine, skull base, endovascular intervention.

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

Honors and Awards
AANS Best Medical Student Abstract award (2012, 2013)
American Academy of Neurology Research Fellow
Dean’s Summer Research Award, Case School of Medicine
Dean’s Honor List, University of British Columbia
Distinction in Research and Teaching, Case School of Medicine
President’s Entrance Scholarship, University of British Columbia
Research Assistant Professional Development Award, University of British Columbia
Summer Scholarship, University of British Columbia
Top Student in Neurophysiology, University of British Columbia
Trek Excellence Scholarship, University of British Columbia
Undergraduate Student Research Award, Natural Sciences Research Council
Wai-Man Leung Memorial Bursary, University of British Columbia

Publications: 2015-16

- Refereed Articles:
  Cohen J, Alan N, Zhou J, Hamilton DK. The 100 Most Influential Articles in Metastatic Spine Disease. *Neurosurgical Focus* 41(2), 2016


Resident Biographies

William J. Ares, MD  
**PGY-4 Resident**

William J. Ares, MD, began his residency with the University of Pittsburgh Department of Neurosurgery in July of 2012. He graduated from Johns Hopkins University in 2006 with a degree in psychological and brain sciences and earned his medical degree from the University of Vermont in 2012. During his medical school career Dr. Ares was elected to the Alpha Omega Alpha Medical Honor Society and also received an Alpha Omega Alpha Student research fellowship for his work investigating the molecular mechanisms of cerebral vasospasm following subarachnoid hemorrhage. Dr. Ares will spend his PGY-5 and PGY-6 years pursuing subspecialty fellowship training in the field of endovascular neurosurgery.

**Specialized Areas of Interest**

Vascular neurosurgery.

**Honors and Awards**

- Alpha Omega Alpha Student Research Fellowship, 2011
- Johns Hopkins University Dean’s List, 2005-06

**Publications: 2015-16**

- **Presentations:**

Christopher Deibert, MD  
**PGY-6 Resident**

Christopher Deibert, MD, joined the University of Pittsburgh neurosurgical residency program in July of 2010. Son of Paul and Carol Deibert of Pottsville, Pa., Dr. Deibert received his undergraduate degree from Goucher College and his medical degree from the University of Pittsburgh.

**Specialized Areas of Interest**

Neuro-oncology; stereotactic radiosurgery; neuro-trauma.

**Professional Organization Membership**

- American Association of Neurological Surgeons
- Congress of Neurological Neurosurgeons
- International Stereotactic and Radiosurgery Society
- National Brain Tumor Society
- Watson Humanism Honor Society

**Honors and Awards**

- American College of Rheumatology REF Abbott Fellowship
- Ashlee DeSanctis Award for Outstanding Leadership
- CAC Academic All-American
- Captain Men’s Varsity Swim Team, Goucher College
- Outstanding Teaching Assistant University of Florida
- American Association of Neurological Surgeons, Ronald L. Bittner Award on Brain Tumor Research, 2016
Publications: 2015-16

- Refereed Articles:


- Presentations:


Amir Faraji, MD, PhD

PGY-3 Resident

Amir Faraji, MD, PhD, joined the University of Pittsburgh neurosurgical residency program in July of 2013. He graduated from the Medical Scientist Training Program at the University of Pittsburgh School of Medicine in 2012 after completing his PhD in chemistry in 2011. He graduated as valedictorian from the University of Florida in 2005. Dr. Faraji’s research interests focus on developing novel drug delivery systems for the central nervous system, including nanotechnology and convection-enhanced delivery. Dr. Faraji is a native of Clearwater, Fla.

Professional Organization Membership

American Association of Neurological Surgeons
American Association for the Advancement of Science
American Medical Association
American Chemical Society
American Physician Scientists Association
Allegheny County Medical Society
Congress of Neurological Surgeons

Honors and Awards

MSTP Post-Doctoral Research Fellowship
United States Delegate, 2010 Lindau Nobel Laureates Meeting
Clinical & Translational Research Pre-Doctoral Research Fellowship
Chemistry Graduate Excellence Fellowship, University of Pittsburgh
Program for Excellence in Science, American Association for the Advancement of Science
Valedictorian, College of Liberal Arts and Sciences, University of Florida
Florida Academic Scholars Award
Anderson Scholar, University of Florida
University of Florida Research Scholar
Society of Neurological Surgeons/RUIN Course Resident Award, 2016
Resident Biographies

Amir Faraji, MD, PhD

Publications: 2015-16

• Refereed Articles:


• Presentations:

Gurpreet S. Gandhoke, MD

PGY-5 Resident

Gurpreet S. Gandhoke, MD, began his neurosurgery residency at the University of Pittsburgh in July 2013. He completed his medical school and master’s degree in surgery at the University of Pune, India. He graduated from a neurosurgery residency at the King George’s Medical University in India. Dr. Gandhoke came to the United States in 2009, and spent time pursuing neurological research at the Barrow Neurological Institute in Phoenix and at the University of California, San Francisco. After completing a clinical pediatric neurosurgery fellowship at Northwestern University in Chicago, he came to the University of Pittsburgh Medical Center for a fellowship in spine surgery in July 2012.

Specialized Areas of Interest
Spine; general neurosurgery.

Board Certifications
Medical Council of India for Neurosurgery and General Surgery

Professional Organization Membership
American Association of Neurological Surgeons
Congress of Neurological Surgeons
North American Spine Society
Life Member Neurosurgical Society of India
Life Member Neurotrauma Society of India

Editorial Service
• Ad Hoc Reviewer:
  *British Journal of Neurosurgery*
  *Journal of Neurology: Neurosurgery and Psychiatry*
  *PLOS one Neurosurgery*
  *European Radiology*
  *BioMedCentral Surgery*
Resident Biographies

Gurpreet S. Gandhoke, MD

Honors and Awards
Sanford Larson Award, American Association of Neurological Surgeons Annual Meeting, 2016.
Mayfield Clinical Science Award, Spine Section of the American Association of Neurological Surgeons, 2015
Sanford-Larson Research Award, for Excellence in Neurosurgical Research, Spine Section of the American Association of Neurological Surgeons, March 2013.
Sonntag International Fellowship, Spine Section of the American Association of Neurological Surgeons, 2011.
Gold Medal, King Georges Medical University, Lucknow, 2009.
Congress of Neurological Surgeons Travel Award, 2009.
Gold Medal, BJ Medical College, 2005.

Media Appearances: 2015-16

Publications: 2015-16
• Refereed Articles:

• Presentations:
Ezequiel Goldschmidt, MD, PhD

PGY-3 Resident

Ezequiel Goldschmidt, MD, PhD, was born in Buenos Aires, Argentina. He received his medical degree from The University of Buenos Aires where he graduated Suma Cum Laude. He obtained his PhD focusing on tissue regeneration from the same university. He completed a neurosurgery residency program at Buenos Aires Italian Hospital. Dr. Goldschmidt joined the University of Pittsburgh Department of Neurological Surgery residency program in 2015 as a PGY-3.

Specialized Areas of Interest
Dural healing and tissue repair after surgery

Board Certifications
Argentinian Boards of Neurological Surgeons

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

Education & Training
MD, Buenos Aires University School of Medicine
PhD, Buenos Aires University School of Medicine

Honors and Awards

Publications: 2015-16
• Refereed Articles:
Resident Biographies

Ezequiel Goldschmidt, MD, PhD


Stephen A. Johnson, MD

*PGY-4 Resident*

Stephen A. Johnson, MD, joined the department residency program in June of 2012. He received his medical degree from the University of Pennsylvania. He also received his BA degree from Penn, graduating summa cum laude in 2008. Dr. Johnson is a native of Spring Lake, N.J.

**Publications: 2015-16**

- **Presentations:**
  


Ali Kooshkabadi, MD

*Chief Resident*

Ali Kooshkabadi, MD, graduated magna cum laude from Yale University in 2005 with a BS degree in biology. He subsequently earned his medical degree from Johns Hopkins School of Medicine in 2009. After completing his residency training at the University of Pittsburgh in June of 2016, Dr. Kooshkabadi accepted a position with UPMC Altoona.

**Specialized Areas of Interest**

Endoscopic endonasal and skull base neurosurgery; complex spine.

**Professional Organization Membership**

- Congress of Neurological Surgeons
- International Society of Poets
- Phi Beta Kappa
Resident Biographies

Philip S. Lee, MD, PhD
PGY-5 Resident

Philip S. Lee, MD, PhD, joined the department residency program in June of 2011 after graduating from the University of Pittsburgh School of Medicine. He received a BA degree in psychology from The George Washington University in 1998 and PhD degree in clinical psychology from George Mason University in 2005. He also completed an internship in clinical child psychology at Children’s National Medical Center in 2005 and a postdoctoral fellowship in developmental cognitive neuroscience at Georgetown University in 2007. Dr. Lee is a native of Kingsport, Tenn.

Professional Organization Membership
American Association of Neurological Surgeons
American Psychological Association
Cognitive Neuroscience Society
Congress of Neurological Surgeons
Society for Neuroscience

Honors and Awards
Theodore Kurze Senior Prize in Neurological Surgery and Clinical Neuroscience, University of Pittsburgh, 2011
Dean’s Summer Research Merit Award, University of Pittsburgh, 2008

Publications: 2015-16
• Presentations:

Michael McDowell, MD
PGY-2 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. His current research interests include the alteration of vascular malformations from childhood to adulthood, the evolution of spinal deformity, and the objectification of clinical outcomes using mobile software platforms. His interests outside of neurosurgery include medical education, dance, and theater. Dr. McDowell is the son of Douglas and Marti McDowell of Iron Mountain, Mich.

Specialized Areas of Interest
Health care improvement, cerebrovascular disease, health software development.
Michael McDowell, MD

Resident Biographies

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

Honors and Awards
Doris Duke Clinical Research Fellow, 2012
Brain Aneurysm Foundation Christopher Getch Chair of Research, 2013
Cook Medical Neurocritical Care Research Grant, 2014
Copeland Grant Winner, 2015
AANS/CNS Spine Summit Charlie Kuntz Scholar, 2016

Publications: 2015-16

• Referred Articles:


• Letters to the Editor:

• Presentations:


**Robert Miller, MD**  
*Chief Resident*

Robert Miller, MD, obtained a bachelors of science degree in biochemistry, a minor in chemistry and a minor in biomedical sciences from Colorado State University in 2004. He graduated summa cum laude from Sanford School of Medicine at the University of South Dakota in 2009. Dr. Miller is a native of Denver, Colo. After completing his residency training at the University of Pittsburgh in June of 2016, Dr. Miller accepted a position with New England Neurological Associates in Lawrence, Mass.

**Specialized Areas of Interest**  
Skull base surgery.

**Professional Organization Membership**  
- Alpha Omega Alpha Honor Society  
- American Association of Neurological Surgeons  
- Congress of Neurological Surgeons  
- North American Skull Base Society

**Honors and Awards**  
- Alma Carlson Scholarship, 2006  
- Faithe Family Scholarship, 2007 and 2008  
- Harry E. Settles, PhD, Memorial Scholarship, 2006  
- Karl H. Wegner, Award for Excellence in Pathology, 2007  
- UPMC Presbyterian Neurological Intensive Care Unit Resident of the Year, 2014

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**W. Christopher Newman, MD**  
*PGY-4 Resident*

W. Christopher Newman, MD, began his residency with the University of Pittsburgh Department of Neurosurgery in July of 2012. He graduated from Harvard University in 2008 with a degree in biomedical engineering and earned his medical degree from the University of Florida in 2012. During his medical school career, he started a faculty-student career mentorship program for medical students and was awarded the Senior Excellence in Neurosurgery Award at the University of Florida for his work on healthcare disparities in vascular neurosurgery. He also was awarded The University of Florida College of Medicine Anne L. Copeland Award for his contributions to health equity. Dr. Newman was born in Orlando, Fla.

**Specialized Areas of Interest**  
Neurosurgical oncology; healthcare socioeconomics; trauma.

**Professional Organization Membership**  
- American Association of Neurological Surgeons  
- Congress of Neurological Surgeons

**Honors and Awards**  
- Pittsburgh Foundation Copeland Award Recipient, 2015  
- University of Pittsburgh Department of Neurological Surgery Stuart Rowe Day Co-Runner-Up Award, 2014  
- University of Florida College of Medicine Anne L. Copeland Award, 2012  
- Maren Room Creativity Award and Grant, 2010
Resident Biographies

W. Christopher Newman, MD

Publications: 2015-16

• Refereed Articles:


• Presentations:


Enyinna Nwachuku, MD

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 2013. 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 at-risk youth in the public school systems of Pittsburgh. Dr. Nwachuku was born in Nigeria. Interests outside of neurosurgery include his cinema, traveling, and global/public health disparities.

Specialized Areas of Interest
Pediatric neurosurgery; functional and stereotactic neurosurgery; neurotrauma.

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

Honors and Awards
Career Education Enhancement for Health Care Diversity (CEED) Grant
Carolyn Carter Gateway Medical Society 4th Year Medical Student Scholarship
American Psychiatric Foundation “Helping Hands Grant”
National Institute of Mental Health R25 Grant
Pennsylvania Medical Society Medical Education Scholarship
Student National Medical Association-Physician Research Initiative Fellow
Gateway Medical Society Scholarship Recipient
National Medical Association Emerging Scholar Award

Publications: 2015-16
- Refereed Articles:

Alp Ozpinar, MD
PGY-1 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. He previously graduated with highest honors from University of California, Davis in 2009 with a degree in biomedical engineering. 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. During medical school Dr. Ozpinar studied the natural history and long-term outcomes of trigeminal neuralgia. He also conducted research on long-term outcomes for DREZ procedure for brachial plexus avulsion, role for simultaneous decompressive craniectomy for high grade SAH, and molecular marker analysis for primary and secondary GBMs. Dr. Ozpinar is an avid tennis player and occasionally competes in men’s open tennis tournaments. His other hobbies include fishing, running and home improvement.

Specialized Areas of Interest
Cerebrovascular neurosurgery; endoscopic endonasal and skull base neurosurgery; scoliosis and complex spinal deformity.

Professional Organization Membership
Alpha Omega Alpha
American Association of Neurological Surgeons
Congress of Neurological Surgeons
Turkish American Doctors Association of Midwest

Honors and Awards
Dean’s List, UC Davis
Junior Alpha Omega Alpha
McGraw-Hill/Lange Award, 2013
National Dean’s List, 2009
OHSU Annual Award for Excellence Scholarship
OHSU Outstanding Medical Student Scholarship, Class of 2015
OHSU School of Medicine Research Award
OHSU Student Educator Award
OHSU Student Service Award

Enyinna Nwachuku, MD
Resident Biographies

Alp Ozpinar, MD

Presidential Scholar, UC Davis
Turkish American Doctors Association of Midwest Research Scholarship

Publications: 2015-16
• Refereed Articles:


David Panczykowski, MD
PGY-5 Resident

David Panczykowski, MD received his bachelor’s degree from Clemson University in 2006 while concurrently employed as a fire fighter with the Clemson Fire Department. He matriculated to the University of Miami School of Medicine, where he had the opportunity to participate in research at the Miami Project to Cure Paralysis. Dr. Panczykowski was later selected for the Campagna Scholarship in Neurological Surgery at Oregon Health and Science University in 2008, completing research on cerebral vasospasm. In 2009, he performed a Doris Duke Clinical Research Fellowship at the University of Pittsburgh as well as a Traumatic Brain Injury Research Fellowship under David O. Okonkwo, MD, PhD. Dr. Panczykowski continues to participate in the study of cerebrovascular lesions and neurotrauma.

Specialized Areas of Interest
Cerebrovascular surgery; cranial and spinal trauma; skull base surgery.

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

Honors and Awards
American Cancer Society Research Scholarship, University of Miami, 2009
Matthew Pease, MD
PGY-1 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

Honors and Awards
American Association of Neurological Surgeons Medical Student Fellowship
Howard Hughes Medical Institute Research Fellowship
National Institutes of Health Research Fellowship
Christian Ricks, MD, entered the University of Pittsburgh Department of Neurological Surgery residency program in July of 2012 after receiving his medical degree from the Baylor College of Medicine. He also has both BS and MS degrees in genetics and biotechnology from Brigham Young University.

**Specialized Areas of Interest**
General neurosurgery, neuro-oncology.

**Honors and Awards**
Society of Neurological Surgeons RUNN award, 2014.

**Publications: 2015-16**
- **Refereed Articles:**

- **Presentations:**

David Salvetti, MD, began his residency with the University of Pittsburgh Department of Neurosurgery in July 2013. He graduated from Vanderbilt University in 2009 with a BE in biomedical engineering, and then attended the University of Virginia School of Medicine, graduating in 2013. During both undergraduate and medical school, Dr. Salvetti was involved in neurosurgery research ranging from software development to the clinical outcomes of Gamma Knife surgery. During residency his research has focused on the clinical outcomes of elective spine surgery. Dr. Salvetti was born in Willow Grove, Pa., and grew up in east Tennessee. Outside neurosurgery his interests include mechanics, hiking, fishing, and other outdoor pursuits.

**Honors and Awards**
Stuart Rowe Lectureship Best Presentation Award, 2015

**Publications: 2015-16**
- **Refereed Articles:**
Resident Biographies


• Presentations:

Jeremy Stone, MD
PGY-2 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 traumatic brain injury systems-based improvement, evaluation of surgical outcomes in spinal deformity, vascular neurosurgery and molecular mechanisms underlying neurodegenerative disease. Outside of the hospital and research lab, Dr. Stone enjoys spending time with his wife and three kids, hiking, playing sports, and surfing the Monongahela River.

Specialized Areas of Interest
Tumor; trauma; spine.

Professional Organization Membership
Alpha Omega Alpha
American Association of Neurological Surgeons
Congress of Neurological Surgeons
Phi Beta Kappa

Honors and Awards
Frank and Mary McDowell Award for Excellence in Surgery, 2014
Po’okela No‘i’i Award for Outstanding Research, 2014
Windsor and Mary Cutting Excellence in the Basic Sciences Award, 2014
American College of Physicians Bernard Yim, MD, Award for Top Performance in Internal Medicine, 2013

Publications: 2015-16
• Refereed Articles:

Zachery Tempel, MD
PGY-6 Resident

Zachary J. Tempel, MD, graduated summa cum laude from Miami University in 2006 with degrees in zoology and french. In 2010, he received his medical degree from the Indiana University School of Medicine. During medical school, Dr. Tempel was elected to Alpha Omega Alpha as a junior. Additionally, he was awarded the inaugural Julius M. Goodman scholarship for excellence in neurological surgery. As a senior medical student, Dr. Tempel was selected as a Pittman Surgical Scholar for academic achievement in surgery. During his PGY-5 and PGY-6 years, Dr. Tempel completed a two-year enfolded spine fellowship focusing on minimally invasive techniques and complex spinal deformity under the direction of D. Kojo Hamilton, MD, Adam S. Kanter, MD, and David O. Okonkwo, MD, PhD. Dr. Tempel—born and raised in Indianapolis, Ind.—is married to Claire Tempel, an audiologist at UPMC and enjoys traveling, scuba diving, soccer and other outdoor activities.

Specialized Areas of Interest
Minimally invasive spine surgery; degenerative spine conditions, scoliosis and complex spinal deformity; outcome measures and cost-effectiveness in spine surgery; biomechanics and spinopelvic alignment; traumatic brain injury and concussions.

Professional Organization Membership
Alpha Omega Alpha
American Association of Neurological Surgeons
Congress of Neurological Surgeons
Society of Lateral Access Surgery

Honors and Awards
NuVasive Young Investigator Award, SOLAS Annual Research Meeting, 2016
Charlie Kuntz Scholar Award, CNS/AANS Joint Spine Section, 2016
Runner-up Presentation Award, Stuart Rowe Research Day, 2014
Inaugural Julius M. Goodman Award in Neurosurgery 2010
Pittmann Surgical Scholarship 2010
BT Maxam Scholarship, 2009
Joseph, Samuel and Donald Ferrara Scholarship, 2007
ED Johns Fellowship, 2007
Summa Cum Laude, Miami University, 2005
W.R. Krickenberger Memorial Scholarship, 2003
William Marion Miller French Scholarship, 2004
L.H. Skinner Memorial French Award, 2005
Culler Physics Award, 2005

Publications: 2015-16
• Refereed Articles:
Daniel Tonetti, MD

PGY-2 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 as president of his class and was elected to Alpha Omega Alpha as a junior. Dr. Tonetti is a native of Keedysville, Md.

Professional Organization Membership

Alpha Omega Alpha Medical Honor Society
American Association of Neurological Surgeons
Congress of Neurological Surgeons

**Honors and Awards**
Theodore Kurze Senior Prize for Excellence in Neurological Surgery and Clinical Neurosciences

**Publications: 2015-16**

• Presentations:

**Gregory M. Weiner, MD**
PGY-5 Resident

Gregory M. Weiner, MD, joined the department in July of 2011. He graduated with honors from the University of California, Berkeley with a degree in molecular neurobiology in 2006 and subsequently earned his medical degree from Tulane University in 2011. During his medical school career he was elected to the Alpha Omega Alpha as well as the Arnold P. Gold Humanism in Medicine Honor Society. Dr. Weiner was born and raised in Los Angeles, Calif.

**Specialized Areas of Interest**
Vascular neurosurgery.

**Professional Organization Membership**
Alpha Omega Alpha Honor Society
American Association of Neurological Surgeons
Arnold P. Gold Humanism in Medicine Honor Society
Congress of Neurological Surgeons
Neurocritical Care Society

**Honors and Awards**
National Collegiate Scholars Award, 2002
California Alumni Leadership Scholarship, 2002
Honors Award-Molecular and Cell Biology, UC Berkeley, 2006
Arnold P. Gold Humanism in Medicine Award, 2011
Outstanding Achievement Award in Internal Medicine Clerkship, 2011
Stuart Rowe Lectureship Runner-Up Presentation Award, 2015

**Publications: 2015-16**

• Refereed Articles:


Georgios A. Zenonos, MD
PGY-5 Resident

Georgios A. Zenonos, MD, joined the Department of Neurological Surgery in July of 2011. He was born and raised in the Mediterranean island of Cyprus. After high school, Dr. Zenonos served a 26-month military service as a military officer before matriculating in the University of Athens Medical School in Greece with a full scholarship from the Ministry of Education. Graduating as the valedictorian of his medical school class, he received the Alexander S. Onassis Distinguished Scholar Award, and then joined the Neuroapoptosis Laboratory at the Brigham and Women’s Hospital, Harvard Medical School, where he went on to study the molecular mechanisms of programmed cell death in the nervous system.

Specialized Areas of Interest
Skull base surgery; cerebrovascular surgery; complex spine, chordoma, pharmacologic neuroprotection.

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

Honors and Awards
Best score, ABNS written exam, 2014
Alexander S. Onassis Scholarship for Post-Graduate Studies, 2010
Valedictorian, Athens Medical School, 2008
Baronos Award for Excellence in Pharmacology, University of Athens Medical School, 2005
National Scholarship Foundation Award, 2002-08
Cyprus Scholarship Foundation Award, 2002-08
Top graduate, Military Officer Academy, Megalos Pełkos, Greece, 2001
National Physics Olympiad Prize, 2000

Publications: 2015-16
- Refereed Articles:
**Resident Biographies**

**Georgios A. Zenonos, MD**

- **Presentations:**
  

**Benjamin M. Zussman, MD**

*PGY-3 Resident*

Benjamin M. Zussman, MD studied medicine at Jefferson Medical College where he was managing editor of the Jefferson Hospital for Neuroscience Journal, co-founder and president of the Neurosurgery Student Interest Group, and a teaching assistant in neuroanatomy. At Jefferson he was elected to the Gold Humanism Honor Society and the Hobart Amory Hare Medical Honor Society, and he received the annual senior Student Clinical Research Award. Under the mentorship of Joseph Maroon, MD, he established the University of Pittsburgh Microneurosurgery Training & Research Laboratory within the Walter Copeland Laboratory. Ongoing efforts include deliberate microsurgical practice utilizing bench, cadaver, and live animal models, and retrospective analysis of videotaped longitudinal performance using quantitative assessment tools. Within UPMC, Dr. Zussman is the resident member of an interdisciplinary committee working with the UPMC Technology Development Center to create a Team Rounding and Communication (TRAC) physician sign-out mobile application. He is a member of the Compensation and Benefits Subcommittee of the Graduate Medical Education Committee. Dr. Zussman served as a 2015-2016 Socioeconomic Fellow of the Council of State Neurosurgical Societies (CSNS). He was raised in Wilmington, Del., graduated from Haverford College, and lives with his wife and four children.

**Media Appearances: 2015-16**


**Publications: 2015-16**

- **Refereed Articles:**
  
  
  
  
Resident Biographies

• Book Chapters:


Nathan Zwagerman, MD
PGY-6 Resident

Nathan T. Zwagerman, MD, graduated from Calvin College in 2006 with a degree in psychology. In 2010, he received his medical degree from Wayne State University School of Medicine. During medical school, Dr. Zwagerman was elected to Alpha Omega Alpha as a junior. Additionally, he was awarded the Student’s Golden Heart Award. Dr. Zwagerman—born and raised in Holland, Mich.—enjoys traveling, hiking, playing basketball, fishing and other outdoor activities.

Specialized Areas of Interest
Skull base surgery; craniovascular surgery; trauma.

Honors and Awards
Synthes Skull Base Award, Best Abstract Related to Skull Base Surgery, 2016 American Association of Neurological Surgery Annual Scientific Meeting.
Student’s Golden Heart Award, Wayne State University School of Medicine, 2010

Publications: 2015-16
• Refereed Articles:


• Presentations:
Nathan Zwagerman, MD

Chief Resident Graduation Dinner

Chief resident Ali Kooshkabadi with brother, mother and fiancée.

Chief resident Robert Miller with fiancée and parents.

Department chairman Robert Friedlander with wife Eugenia.

Amir Faraji with wife Dr. Haleh Ebrahimi.

William Ares with fiancée Abigail Yingling.

W. Christopher Newman with guest Dr. Nandini Govil.
June 18, 2016 • Pittsburgh Golf Club

Jeremy Stone with wife Stacy.

Graduating chief residents with fiancées.

Georgios A. Zenonos with wife Rafailia.

Dr. Friedlander with retiring executive administrator David Bissonette.

Graduating chiefs with Jeremy Stone, Daniel Tonetti and Nitin Agarwal.

Dr. Friedlander with residents.
Guests gather in dining room.

Dr. Friedlander toasts graduating chief residents.

Nate Zwagerman offer comments for 2017 chief residents.

2017 chiefs’ wives present gifts to 2016 graduating chiefs’ fiancées.

Paul Gardner presents John Chabot with fellowship certificate.

Gregory Bowden accepts fellowship certificate from Edward Monaco III.
June 18, 2016 • Pittsburgh Golf Club

Drs. Kooshkabadi and Miller after receiving resident teaching award.

Ray Sekula with Dr. Friedlander after receiving faculty teaching award.

Chris Deibert addresses guests after receiving fellowship certificate.

Zach Tempel with Adam Kanter after receiving spine fellowship certificate.

Dr. Kooshkabadi delivers speech after receiving diploma.

Dr. Miller jokes with audience during graduation speech.
The goal of the Department of Neurological Surgery at the University of Pittsburgh is to improve the care and treatment of patients with neurosurgical disease. This goal is being achieved partly though the conduct of state-of-the-art basic and translational research. The department, with more than 40 faculty members and investigators, seeks to be at the forefront of this endeavor; and numerous advances have already been achieved—research translated into practice.

Annually, the department has been highly ranked in National Institutes of Health funding, a direct result of the success and quality of our research and development. In the past fiscal year, our faculty and residents were involved in almost 130 research projects having a total budget award of more than $10 million. Total department research funding increased by more than 20% over fiscal year 2015. Since fiscal year 2010, the department’s total research funding has more than doubled.

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 neurooncology, 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. More than $2 million has been granted for various research projects. In November 2001, the neurosurgical space on the ninth floor of Scaife Hall were dedicated as the Walter L. Copeland Laboratory for Neurosurgical Research.
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 and core facilities which provide resources and services for a wide range of neurosurgery faculty, residents, visiting fellows, and students. Core services in the areas of biochemistry, histology, and immunohistochemistry are offered in this facility. Neurotrauma, brain tumor, 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 of The Pittsburgh Foundation, a fund that has provided resources for research at the University of Pittsburgh since 1961.

The laboratory for Clinical Neurotrauma Research Team is located in the Copeland Laboratory. Led by David O. Okonkwo, MD, PhD, the team conducts innovative clinical research on brain monitoring methods and biomarkers as well as the evaluation of neurotherapeutics for traumatic brain injury.

The Surgical Neuroanatomy Laboratory and the Fiber Tractography Laboratory are also located in the Copeland Laboratory. Both of these laboratories are under the direction of Juan C. Fernandez-Miranda MD. 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.

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

C. Edward Dixon, PhD, directs the Department of Neurological Surgery’s Brain Trauma Research Center (BTRC) at the University of Pittsburgh. The BTRC is a multidisciplinary, multidepartmental 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.

David O. Okonkwo, MD, PhD, leads the department’s efforts in clinical neurotrauma research. The clinical brain injury research is wide spanning and includes the conduct of clinical trials funded by the federal agencies and industry to study new therapies, novel brain monitoring, neuroimaging and biomarkers. 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.
Research
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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 serves as an associate director of the Safar Center. This facility includes basic science laboratories directed by Dr. Dixon. 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
Our brain tumor 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, and the development of preclinical animal 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 targeted therapies. This commitment begins in the operating room, where a portion of most tumor samples is retrieved for laboratory investigation. These specimens are critical to the development of translational targets for brain tumor therapy. This initiative has led to the banking and study of hundreds of unique tumor samples, facilitating personalization of brain tumor care for future generations of 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.

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.

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. These preclinical studies are coupled with a robust clinical trials effort in association with the Adult Brain Tumor Consortium and the Pediatric Brain Tumor Consortium (PBTC), which are examining novel molecularly targeted agents in the treatment of these tumors.

The clinical research branch of our Brain Tumor Program currently runs “personalized” clinical studies based on patients’ gene markers, such as human leukocyte antigen (HLA)-A2 (for immunotherapy studies), epidermal growth factor receptor (EGFR) variant III and chro-
Research

Overview

mosome 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. AZD6244) for children with BRAF-altered low-grade gliomas, which are being conducted by the PBTC.

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. In addition, our surgeons and pathologists have identified a molecular panel that can help predict chordoma clinical behavior and prognosis.

Currently, management of 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 28 years, the Center for Image Guided Neurosurgery has provided care to more than 10,000 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 and CyberKnife and True beam technologies at UPMC Shadyside, methods to enhance the efficacy and safety of radiation delivery have been pioneered. The International Gamma Knife 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 is rapidly replacing conventional radiation therapy as the initial procedure.

Another exciting area of research in our department involves the development of genetically engineered oncolytic herpes-simplex viruses 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. Further safety testing in preclinical models is warranted to move this strategy into clinical trials. Other elements of this work involve studying improvements to virus delivery and intratumoral viral spread.

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 surgery.

These basic and translational research efforts are also coupled with active clinical programs in radiosurgery and minimally invasive neurosurgery, discussed elsewhere in this report.

Pediatric Neurotrauma Center

The Pediatric Neurotrauma Center (PNTC), under the leadership of Michael J. Bell, MD, (Critical Care Medicine) and Mandeep Tamber, MD, PhD, has both basic science and clinical research programs aimed at understanding the pediatric response to neural injury as well as the unique elements of recovery that are specific to traumatic central nervous system inju-
Research
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ries in children. This section coordinates services for injured children at Children's Hospital of Pittsburgh, which operates the region’s only Level 1 pediatric trauma center. The goal of the center is to provide optimal care between the time of injury and discharge. Subspecialists in all pediatric medical and surgical disciplines are readily available to provide definitive care. As one of the most established and comprehensive programs in the country, the PNTC has been at the forefront of pediatric neurotrauma research not only locally but also nationally and internationally, serving as an important resource for collaborative programs such as multi-institutional clinical trials designed to improve outcomes as well as efforts aimed at developing consensus clinical guidelines for the care of children with traumatic neurological injury. Research is progressing at a vigorous pace, with the completion of the “Cool Kids” trial, the implementation of several new phase I/II clinical trials, the start of a comparative effectiveness study to discern barriers to implementation of evidenced-based guidelines and the continuing support of a T32-training grant in pediatric neurocritical care.

The “Approaches and Decisions for Acute Pediatric TBI (ADAPT) Trial led by Dr. Bell and Stephen Wisniewski, PhD, (Epidemiology), is the largest study of children with severe traumatic brain injury and intends to develop at least 12 new evidenced-based guidelines related to first-line intracranial hypertension therapies, secondary injury detection/treatments and metabolic support. Several ancillary studies have been initiated, including determining the role of TBI on the body’s microbiome, understanding the role of vasopressors on cerebral autoregulation and identifying unique MRI-based biomarkers. Forty-eight clinical centers in eight countries are contributing subjects to this study and the full cohort (1,000 children) is expected to be recruited by the end of summer 2016. As follow-up assessments are ongoing, researchers are preparing an application to enroll an additional cohort of subjects to more fully understand the utility of second-tier intracranial hypertension therapies and how the effectiveness of therapies within important sub-populations of children with severe TBI.

Neurophysiology Research
Research focus at the Center for Clinical Neurophysiology is aimed at analyzing the utility of intraoperative neurophysiological monitoring (IOM) to predict and prevent post operative neurological complications during adult and pediatric neurosurgical, orthopedic, ENT, cardio-thoracic, vascular and interventional neuroradiology procedures.

This research is achieved by reviewing electrophysiological data collected during surgical procedures by 1) critically evaluating the current modalities utilized in IOM, 2) developing and validating new techniques to reduce post operative complications, and 3) evaluating the use of modalities during various surgical procedures.

The research team at the CCN works closely with surgeons and researchers in the departments of orthopedic, ENT, cardiothoracic, and vascular surgery on various research projects.

Bioengineering research, under the direction of Mingui Sun, PhD, is developing a novel skin-surface EEG electrode that requires no electrolyte application, is self-adhearing to the unshaved scalp, and has low and stable impedance.

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.

It has also been a banner year for funded MEG research in Pittsburgh. The MEG center is set to contribute over $16 million in federally funded research over the next five years, approximately half of which is attributable to awards that were funded just in the past year.

**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 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 Amyotrophic Lateral Sclerosis (ALS) as well as Huntington's Disease (HD). 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 ICE 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 ICE, as well as the post-ICE activation pathways involved in cell death. The role of Interleukin-1β in apoptosis continues to be a focus of research. Researchers are also continuing to evaluate the basic mechanisms of cell death, and especially as they relate to neurologic diseases.

**Brain Modulation Laboratory**

The Brain Modulation Laboratory, directed by R. Mark Richardson, MD, PhD, studies human brain electrophysiology, imaging, histopathology and cognition in patients undergoing surgery for epilepsy and movement disorders. A primary focus of the lab is to understand the neurophysiological basis of different brain functions via invasive recording of brain activity in awake patients performing behavioral tasks. The goal of these studies is to improve our
Research
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understanding of potential targets for therapeutic modulation. A related focus of the lab is the development of nonhuman primate models to test novel hypotheses related to the treatment of these disorders. In the past academic year, the lab’s research has been published in Journal of Neurophysiology, Human Brain Mapping, PNAS, and Brain.

Current projects include the following:

• Basal Ganglia-Cortical Dynamics in Human Behavior
Intraoperatively, the Brain Modulation Lab collects task-based, simultaneously recorded cortical ECoG and subcortical MER/LFP data to study interactions between the cortex and basal ganglia that code for specific components of motor action.

• Cortical Effects of DBS Studied with Magnetoencephalography
The lab is one of the few research programs in the world using magnetoencephalography (MEG) to study the effects of deep brain stimulation (DBS) on cortical function.

• Brain Stimulation for Epilepsy
The Brain Modulation Lab is studying the effects of stimulation on idopathic epilepsy in a NHP implanted with a sensing enabled DBS device, as well as studying data generated from epilepsy patients implanted with the RNS device.

• GABAergic Innervation of Human Epileptic Hippocampus
The lab has built a large brain bank of en bloc hippocampal specimens resected during epilepsy surgery. Current studies are focused on defining bouton-level alterations in GABAergic innervation of dentate granule cell neurons.

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 translation 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.

Surgical Neuroanatomy Laboratory
The Surgical Neuroanatomy Lab (SNL)—under the direction of Juan C. Fernandez-Miranda, MD—has a dual educational and research role aiming to improve surgical techniques and outcomes by mastering knowledge of relevant surgical neuroanatomy.

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: meticulous and exquisite anatomical microdissections to better understand the intricacies of the complex anatomy of the human brain and skull base.

The lab has three main research/educational areas: endoscopic skull base anatomy, microsurgical neuroanatomy, 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 maximally effective for the treatment of a wide variety of 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.

• 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 intraxial 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.

Fiber Tractography Laboratory
High-Definition Fiber Tractography (HDFT) 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 Juan C. Fernandez-Miranda, MD, and recently funded with a major NIH award—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. Dr. Fernandez-Miranda’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.

These are the main areas of research:

• Neuroanatomy of Fiber Tracts
Nearly two decades ago, Sir Francis Crick, neuroscientist, discoverer of the DNA molecule and 1962 Nobel Prize for Medicine, wrote: “to interpret the activity of living human brains, their neuroanatomy must be known in detail. New techniques to do this are urgently needed, since most of the methods now used on monkeys cannot be used on humans.” Nowadays, HDFT allows doctors and scientists to investigate the intrinsic structure of the brain with unprecedented detail, which will invariably facilitate a better understanding of brain functioning.

Studies in the Fiber Tractography Lab have contributed to elucidate the structure, connectivity, and potential functional role of the Middle Longitudinal Fascicle, Superior Longitudinal Fascicle and Arcuate Tract. We have also completed studies on the superior fronto-occipital fascicle, the claustro-cortical connections, and the dentate-rubro-thalamic tract.
Innovative studies using data from the Human Connectome Project are being completed to further elucidate the complex anatomy of the brainstem pathways, inferior longitudinal fascicle, and cingulum.

- **Presurgical Assessment of Fiber Tracts and Surgical Planning**
  HDFT 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 HDFT has been reported in *Neurosurgery, Journal of Neurosurgery,* and *Neuro-oncology* among others; we are 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.

  The latest innovation in the lab is HDFT reconstruction of cranial nerves for presurgical evaluation in skull base surgery, with very promising results. The ultimate goal is to facilitate brain function preservation and recovery in patients undergoing complex brain surgery.

- **Fiber Tract Integrity and Damage Progression in Neurodegenerative Disorders**
  Researchers are currently studying patients with ALS and Huntington 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.

- **Language Connectivity Pathways and Neuroplasticity in Aphasic Stroke Patients**
  This research project is funded by NIH-NIDCD. Researchers are correlating specific white matter tract disconnections evidenced by HDFT with phonological and semantic deficits aiming to improve our understanding of language related pathways. Researchers are also investigating the neuroplasticity in this stroke population by determining whether targeted intensive behavioral therapy induces structural neuroplastic changes in perilesional and/or contralateral fiber tracts of aphasic patients and whether any observed neuroplastic changes are correlated with behavioral improvements and predict the potential for speech recovery.
Investigator Research Summaries

Nduka Amankulor, MD
Assistant Professor
Associate Director, Adult Neurosurgical Oncology

Dr. Amankulor is the primary investigator of a Phase II surgical trial (UPCI 13-154) comparing the efficacy of Bevacizumab with a heat-shock protein vaccine plus Bevacizumab in surgically resected recurrent gliomas. In addition, he is co-investigator on multiple clinical trials for gliomas at the University of Pittsburgh Cancer Institute (UPCI).

Dr. Amankulor’s research has performed groundbreaking tumor immunology research, including elucidating the basis for innate immune escape in low-grade gliomas.

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

In collaboration with colleagues from the Physical Activity and Weight Management Research Center, Dr. Balzer has been investigating and developing feasible strategies to decrease the burden of cardiovascular disease. He is currently investigating the novel health benefits of using a sit-stand desk. Dr. Balzer is quantifying the effects of using a sit-stand desk on blood pressure (the most common modifiable risk factor for heart disease), arterial stiffness measured by pulse-wave velocity (a global measure of cardiovascular health), and cerebrovascular blood flow velocity (blood flow in the brain that is related to cognitive function and brain health). This research will greatly contribute to the understanding of potential health benefits of sit-stand desks. The clinical implications of these acute health benefits, if confirmed, are significant. Firstly, patients with cardiovascular disease risk factors (hypertension, arterial stiffness, high risk for stroke or cognitive decline) could have therapeutic benefit from being ‘prescribed’ a sit-stand desk with a transitioning routine. Moreover from a public health perspective and among healthy working adults, decreasing the daily exposure to high blood pressure, arterial stiffness, and reduced cerebrovascular blood flow caused by prolonged sitting at work, could reduce the development of cardiovascular disease in the working population.

Diane L. Carlisle, PhD
Assistant Professor

In the past year, Dr. Carlisle has characterized a new protocol for differentiation of pluripotent stem cells into organoid tissues for the purpose of studying development in vitro. She has tested a number of methods and optimized a method for deriving lung tissues, including epithelium, fibroblasts, and smooth muscle, in concert. Dr. Carlisle has found that they lose expression of pluripotency markers and first express markers consistent with germ lineage commitment, followed by specific lung cell types. She has also found that the method can be used to investigate the effects of knockdown of specific genes and also to determine the effects of chemical exposures such as nicotine. In 2016, Dr. Carlisle obtained additional funding to implement a similar protocol that will enable the development of neural organoids for the study of neurological diseases, such as ALS.
Donald J. Crammond, PhD
Associate Professor
Associate Director, Movement Disorder Surgery

Dr. Crammond’s major clinical research interest is the study of basal ganglia and cerebral cortical interactions related to the control of movement in Parkinson’s disease, Dystonia and Essential Tremor. This is accomplished by recording neurophysiological data from micro-electrode recording (MER) in the basal ganglia and Electrocorticography (ECoG/LFP) from sensorimotor cortex, to examine the physiological relationship between basal ganglia and cortical structures. This research examines how these cortical and subcortical neural structures are involved in different aspects of movement planning and movement execution by having human subjects perform controlled behavioral choice-reaction time or speech tasks. The novel aspects are the study of how neural structures contribute to the evaluation of risk and motivation of rewarded task performance and the encoding of several aspects of speech production. As we understand more about basal ganglia physiology and cortical-basal ganglia interactions, we hope this will also help us to improve the targeting for optimal DBS placement within the basal ganglia to treat movement disorder patients and decrease the incidence of post-operative speech deficits. We are also examining how DBS placement affects post-operative DBS programming parameters and the therapeutic efficacy of DBS. We have recently discovered that subcortical neurophysiological mapping is not beneficial to DBS placement in Essential Tremor patients.

Dr. Crammond is also the principal investigator of a Copeland Foundation funded translational research project investigating the optimal graft environment for peripheral nerve regeneration in a rodent model of sciatic nerve regeneration, and is a co-investigator in a US-AMRAA/AFIRM II funded translational research project investigating the rate of peripheral nerve regeneration in a non-human primate model of long median nerve gaps. These studies apply electrophysiological techniques of using Compound Muscle Action Potential (CMAP) nerve conduction studies, Somatosensory Evoked Potentials (SSEPs) and trans-cranial Motor Evoked Potentials (Tc-MEPs) in order to research the differential effect of various nerve growth factors on sensory versus motor nerves axonal regeneration.

Dr. Crammond’s ongoing clinical research interest is to review clinical outcome data to determine the impact of various modalities of Intra-Operative Neurophysiological Monitoring (IONM) to prevent and/or reduce iatrogenic injury and to use neurophysiological mapping of the basal ganglia and cerebral cortex to map motor and language functions in various neurosurgical procedures. For example, in order to map and locate eloquent cortical areas in tumor resection, epilepsy and movement disorder surgeries.

C. Edward Dixon, PhD
Professor
The Neurotrauma Chair in Neurosurgery
Vice Chair, Research
Director, Brain Trauma Research Center
Research Health Scientist at the Geriatric Research, Education and Clinical Center in the Veteran’s Affairs Pittsburgh Health Care System

Dr. Dixon’s current studies involve exploring the role of synaptic vesicles on neurotransmitter release deficits chronically after TBI. Neurotransmitter release at the synapse requires fusion of synaptic vesicles with the presynaptic plasma membrane. A crucial step in this process involves the assembly of a soluble N-ethylmaleimide-sensitive factor attachment protein receptor (SNARE) complex, a highly stable, parallel four-helix bundle formed between
the synaptic vesicle SNARE synaptobrevin 2 (SYB2) and the plasma membrane SNAREs syntaxin 1 and synaptosome-associated protein of 25 kDa (SNAP-25). The pathology of SNARE proteins may play an important role in TBI. Dr. Dixon has reported at the National Neurotrauma Society meeting that administration of lithium improves neurotransmission & increases vesicular docking proteins in the striatum after TBI. Another important finding this year is that treatment with DHA attenuated the loss of wildtype alpha synuclein abundance in the hippocampus after TBI. As part of the U.S. Army-funded Operation Brain Trauma Therapy consortium, Dr. Dixon’s lab screened three drugs in the controlled cortical impact model of TBI: Amantadine and Minocycline.

**Johnathan Engh, MD**  
Associate Professor  
Director, *Neuroenlaport* Surgery Program  
Director, Adult Neurosurgical Oncology

Dr. Engh’s current research efforts have been focused on the development of dilatable brain access ports for tumor surgery. Over the spring and summer of 2016, with the backing of the innovative practice committee of the University of Pittsburgh, Dr. Engh has implemented a dilatable balloon catheter to achieve access for minimally invasive endoscopic port surgery in a select number of patients. This human research is paired with animal research investigating the effects of various methods of access into the brain.

In addition, numerous clinical trials for patients with brain tumors are overseen by Dr. Engh at the Hillman Cancer Center. Exciting initiatives include a retroviral vector for tumor treatment, fluorescent dye for maximizing brain tumor resection, and a complex tumor banking initiative for the development of patient-specific therapies for both primary and metastatic brain tumors.

**Juan C. Fernandez-Miranda, MD**  
Associate Professor  
Associate Director, Center for Skull Base Surgery  
Director, Surgical Neuroanatomy Lab  
Director, Fiber Tractography (HDFT) Lab

- **Surgical Neuroanatomy Lab:**  

  Dr. Fernandez-Miranda’s lab investigated the surgical anatomy and technical nuances for endonasally increasing the surgical corridor at the FM region both laterally and inferiorly. Unique to the report, the lab’s researchers quantified the amount of required medial condyle resection to obtain exposure of the lateral aspects of the FM.

  2) Endoscopic Endonasal Interdural Middle Fossa approach to the Maxillary Nerve: Anatomical Considerations and Surgical Relevance.

  The Surgical Anatomy Lab delineated the anatomy of the V2 and its specific segments with respect to the endonasal landmarks. Here, lab researchers presented the endoscopic endonasal interdural middle fossa approach to V2 and its potential application for the treatment of perineural spread in sinonasal/skull base tumors.
3) Cavernous Sinus Compartments from the Endoscopic Endonasal Approach: Anatomical Considerations and Surgical Relevance.

In this study, the Surgical Anatomy Lab aims to develop a surgical anatomy based classification of the CS and to establish its utility for preoperative surgical planning and intraoperative guidance.

4) Live Cadaver Model for Internal Carotid Artery Injury Simulation in Endoscopic Endonasal Skull Base Surgery.

The live cadaveric model presented here provides real life experience of major vessel injury in laboratory settings. This model could significantly improve current training for management of intraoperative endoscopic endonasal carotid rupture, and can potentially be used for developing novel methods to treat vascular problems, including vessel reconstruction techniques.

• Fiber Tractography Lab:
  1) Visualization of Cranial Nerves Using High-Definition Fiber Tractography.

Using high-angular-resolution fiber tracking and atlas-based fiber tracking, lab researchers were able to identify all CNs in unprecedented detail. This implies its potential in localization of CNs during surgical planning.

  2) Human Connectome-Based Tractographic Atlas of the Brainstem Connections and Surgical Approaches.

The Fiber Tractography Lab acquired the tractography of the major brainstem pathways and validated them with histological analysis. The pathways included the cerebellar peduncles, corticospinal tract, corticopontine tracts, medial lemniscus, lateral lemniscus, spinothalamic tract, rubrospinal tract, central tegmental tract, medial longitudinal fasciculus, and dorsal longitudinal fasciculus. Then, the reconstructed 3-dimensional brainstem structure was sectioned at the level of classic surgical approaches, namely supracollicular, infracollicular, lateral mesencephalic, perioculomotor, peritrigeminal, anterolateral (to the medulla), and retro-olivary approaches.


Lab researchers applied advanced deterministic fiber tractography to a template of 488 subjects from the Human Connectome Project. The connections of the dentate nucleus with the red nucleus and thalamus are bilateral, not ipsilateral only.


The imaging results showed that previous reconstructions of the SFOF were generated by two false continuations, namely between superior thalamic peduncle (STP) and stria terminalis (ST), and ST and posterior thalamic peduncle. The anatomical microdissection confirmed this finding. No other fiber tracts in the previously described location of the SFOF were identified. Hence, data suggest that the SFOF does not exist in the human brain.
Research
Investigator Research Summaries

Robert M. Friedlander, MD, MA
Chair, Walter E. Dandy Professor
Head of Cerebrovascular Neurosurgery

Dr. Friedlander is intricately involved in basic and translational neuroscience research initiatives. He divides his time between clinical work in cerebrovascular neurosurgery, basic scientific pursuit in the study of mechanisms of neuronal cell death, and in a leadership role in several national neurosurgical organizations.

Dr. Friedlander demonstrated that the commonly used antibiotic minocycline is protective in animal models of HD, ALS, brain trauma, and spinal cord injury. Based on the data, as well as confirmatory data from other laboratories, clinical trials of minocycline in humans have either been performed or are currently underway for HD, ALS, stroke, and spinal cord injury.

Paul A. Gardner, MD
Associate Professor
Executive Vice Chair, Surgical Services
Neurosurgical Director, Center for Skull Base Surgery

Dr. Gardner’s recent projects include completion of a molecular prognostication panel evaluation for clival chordoma. Ninety-two tumors were evaluated for genetic alterations using FISH, LOH and IHC studies. Six markers were found which predicted progression following surgery and three which predicted progression following radiation.

Dr. Gardner was principal investigator of a study evaluating five chordoma specimens for tumor mutations using exome sequencing of tumor and comparing it to germline and the known human genome. This has led to development of a hypothetical pattern for progression of chordoma from notochord as well as holding the potential to provide greater understanding of the genetic derangements of chordoma, potentially providing targets for treatment.

Dr. Gardner continues evaluation of clinical cohorts of patients with skull base tumors to show impact and outcomes of treatment, largely endoscopic endonasal surgery. He also maintains his role as investigator for NeuroGel, an extracellular matrix-derived product for nerve repair. Completed experiments show improved nerve recovery in rat model compared to standard of care (conduit or nerve allograft) following gap repair.

Avniel Singh Ghuman, PhD
Assistant Professor
Director, MEG Research

Dr. Ghuman current studies are exploring the neural basis of high level visual processing to help answer the question of how our brain turns what falls upon our eyes into meaning. In the past year, his work has helped address a debate that has been raging for over 150 years regarding the neural basis of reading. Specifically, some of the most important neuroscientists and neurologists of the 19th century, including Jules Dejerine, Jean-Martin Charcot, and Carl Wernicke, debated about whether or not the brain contained a visual center for words. This debate has persisted until today, recently centering around a part of the brain called the left mid-fusiform gyrus, that some have labeled the “visual word form area.” Using a set of methods that a Laurent Cohen called a methodological “tour de force” in his commentary on the work in the Proceedings of the National Academy of Sciences, work from Dr. Ghu-
man’s lab demonstrated some of the strongest evidence to date that this area is in fact the visual center for words. As part of this study, Dr. Ghuman’s team was able to show that what word a person is reading at a particular moment can be decoded from the activity in this area and that disrupting its activity causes a profound disturbance in a person’s ability to read.

In other research, Dr. Ghuman’s team discovered that stimulation to the left ventromedial temporal cortex caused associative visual phenomena, reminiscent of complex visual hallucinations. This area has been linked to visual hallucinations in a host of disorders, including Parkinson’s disease, stroke, and epilepsy. This discovery provides a potential link between disruptions in the associative visual processing this area is responsible for and visual hallucinations.

Stephanie Greene, MD
Assistant Professor

Dr. Greene is engaged in clinical research projects studying myelomeningocele (spina bifida), arteriovenous malformations, and moyamoya syndrome. She is working with a maternal-fetal medicine specialist and a bioengineer to develop a ventriculo-amniotic shunt to treat fetal aqueductal stenosis percutaneously; a pilot study is underway in fetal sheep. The goal is to translate this technology to human fetuses. She is also investigating the use of transcranial Doppler ultrasound technology to diagnose hydrocephalus and shunt malfunction, with the goal of clarifying the diagnosis in children with slit ventricle syndrome. This test has the advantages of being non-invasive, carrying no risk of radiation, and requiring no sedation to perform.

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

Dr. Hamilton is a principal investigator on a Phase 2b, multicenter, parallel-group, placebo-controlled, randomized, double-blind study to evaluate Staphylococcus Aureus-4 antigen (SA4Ag) vaccine safety and efficacy in the prevention of postoperative Staphylococcus aureus disease in adults ages 18 to <86 years who are undergoing elective posterior instrumented lumbar spinal fusion. Approximately 2600 subjects are expected to be enrolled internationally. Dr. Hamilton has currently reached 50% enrollment for the University of Pittsburgh site. The national average is 15%.

Dr. Hamilton is also a principal investigator on a study involving neurophysiological and imaging markers of iatrogenic spinal cord injury (SCI) and recovery. The working hypothesis is that changes in intraoperative neurophysiological monitoring and functional anisotropy (measured via diffusion tensor imaging (DTI) are sensitive and specific to spinal cord injury. The working hypothesis, based on previously published studies, is that improvement in somatosensory evoked potentials and FA scores (measured via DTI) correlate closely with the functional recovery in SCI.

Esther Jane, PhD
Research Assistant Professor

The immediate goal of our research is to understand the signaling pathways involved in the apoptotic pathways in glioma cancer cells when using anticancer drugs. In the long term, we will attempt to use this knowledge to identify novel molecular targets and treatment strategies to improve glioma cancer chemotherapy.
**Wenyan Jia, PhD**  
*Research Assistant Professor*  

Dr. Jia is working with Mingui Sun, PhD, mainly on two research projects funded by NIH. One project focuses on developing a novel leadless EEG system for point-of-care applications. Efforts to commercialize our prototype have been made and one company has shown interest in licensing our patent. The other project is to improve the hardware design and software algorithm of a wearable device, called eButton, for objective evaluation of diet, physical activity and lifestyle. We have collaborated with Baylor College of Medicine for a dietary study with children, which shows that eButton is a promising tool to minimize memory error related to child diet assessment, although other problems needs to be solved.

**L. Dade Lunsford, MD**  
*Lars Leksell Distinguished Professor*  
*Director, Center for Image-Guided Neurosurgery*  
*Director, Residency Training Program*

The Center for Image Guided Neurosurgery is currently involved in multiple outcome analyses of the clinical results of radiosurgery for both benign and malignant brain tumors, vascular malformations, and trigeminal neuralgia. In addition it is the coordinating center of the International Gamma Knife Research Foundation, a consortium of 28 medical centers involved in both prospective and retrospective clinical outcomes research. Together both programs publish 10-20 articles in peer reviewed articles each year, in addition to several book chapters.

**Ajay Niranjan, MD, MBA**  
*Professor*  
*Director, UPMC-Brain Mapping Center (MEG)*  
*Associate Director, Center for Image-Guided Neurosurgery*  
*Director, Radiosurgery Research*

1) Phase II Study of Border Zone SRS with Bevacizumab in Patients with Recurrent or Progressive Glioblastoma (GBM). Dr. Niranjan is the principal investigator on this clinical trial evaluating the concept of border zone radiosurgery in association with Bevacizumab. This study is currently open for recruitment.

2) A Safety and Feasibility Study of Minocycline Therapy for Management of ARE after Brain Metastases Radiosurgery. Dr. Niranjan is the principal investigator on this clinical trial evaluating the safety and feasibility of minocycline in improving adverse radiation effects after radiosurgery in patients with brain metastases. This study is currently open for recruitment.

**David O. Okonkwo, MD, PhD**  
*Professor*  
*Executive Vice Chair, Clinical Operations*  
*Clinical Director, Brain Trauma Research Center*

1) Transforming Research and Clinical Knowledge in Traumatic Brain Injury (TRACK-TBI)

TRACK-TBI is an 11-site consortium that is recruiting 3000 acute TBI subjects. TRACK-TBI will directly impact the public health by creating an open-access Information Commons of integrated clinical, imaging, proteomic, genomic, and outcome biomarkers, that will permit more precise TBI diagnosis, prognosis, and treatment. Dr. Okonkwo is Principal Investigator of the Clinical Core.
2) Targeted Evaluation, Action, and Monitoring of Traumatic Brain Injury (TEAM-TBI)

TEAM-TBI is a monitored multiple intervention clinical trial for TBI patients designed to address the heterogeneity of TBI and identify evidence-based therapies for participating subjects. In TEAM-TBI, small groups of TBI patients undergo a comprehensive intake evaluation, complemented by advanced neuroimaging, biomarker analysis and an innovative sleep study analysis. A multi-disciplinary panel reviews all data, stratifies subjects into clinical TBI subtypes (trajectories) and recommends targeted therapeutic interventions. Each participant departs Pittsburgh with a customized TEAM-TBI Toolkit containing necessary materials for targeted therapies.

3) In Vivo Neuroimaging Biomarker Panel for Chronic Traumatic Encephalopathy

This project develops and tests an in vivo neuroimaging biomarker panel for chronic traumatic encephalopathy, consisting of use high-resolution positron emission tomography (PET) imaging combined with white matter damage using MR-based High Definition Fiber Tracking (HDFT) and cerebrospinal fluid analyses for detecting pathological changes in total tau, phosphorylated tau, and Aβ peptides. The goal is to provide quantitative early non-invasive assessment of CTE disease to identify targets for CTE therapy.

4) High Definition Fiber Tracking Biological Diagnosis of TBI Providing Actionable Clinical Report of Quantified Damage

The goal of this project is to test and deploy a technology that will provide a biological diagnosis of acute traumatic brain injury (TBI) based on a new MRI diffusion method called High Definition Fiber Tracking (HDFT).

Ian F. Pollack, MD
A. Leland Albright Distinguished Professor
Vice Chair, Academic Affairs
Chief, Pediatric Neurosurgery
Co-Director, Neurosurgical Oncology

1) Molecular Markers of Prognosis in Childhood Gliomas

Malignant astrocytomas are among the most common and deadly brain tumors of childhood. Our previous studies demonstrated an association between outcome and several molecular features in large multi-institutional cohorts, including MGMT expression status, independent of clinical or histological factors; identified significant differences between molecular features of childhood and adult gliomas; and generated a sizeable resource of tumor tissue for further analyses. Our ongoing studies are examining tumors derived from children in the most recent Children’s Oncology Group high-grade glioma studies, to define the association between a series of new mutational targets and outcome. We hypothesize that categorization of these tumors by their genomic alterations and drug resistance phenotype will improve accuracy of diagnostic and prognostic assessments, and provide insights into novel therapeutic targets. We will be combining results derived from conventional mutational analysis with immunohistochemical assessments, and single nucleotide polymorphism analyses, which will be evaluated in the context of the clinical outcome data. Taken together, these studies will incorporate a unique resource of childhood malignant brain tumor samples to provide new insights into the molecular categorization of pediatric high-grade gliomas. This work will establish a foundation for risk-adapted stratification and treatment planning, and the design of future therapeutic strategies for children with these tumors.
2) Molecularly Targeted Therapies for Malignant Gliomas

The limited response of malignant gliomas to conventional therapy reflects resistance to undergoing apoptosis in response to DNA damage or mitogen depletion, resulting from tumor suppressor gene mutations and aberrant activation of growth factor signaling. However, our previous studies indicated that despite the limitation in apoptotic triggering, effector pathways of apoptosis may remain intact and can be activated by inhibiting growth factor-mediated signaling or stimulating death receptor pathways. These studies also demonstrated that although a subset of gliomas were responsive to modulation of individual signaling pathways, many showed incomplete growth inhibition, reflecting activation of parallel pathways or intrinsic resistance mechanisms. This led us to examine the efficacy of combinatorial strategies for signaling inhibition, using agents targeting distinct pathways. Based on our findings, we hypothesized that therapeutic approaches that block rationally selected combinations of growth signaling pathways or that enhance apoptosis signaling will provide a novel strategy for inducing glioma cytotoxicity. To test this hypothesis, we are examining the effects on glioma growth and viability of inhibiting combinations of parallel pathways that transmit proliferative signals from aberrantly activated upstream receptors. These studies incorporate a panel of cell lines with defined genetic alterations to assess whether genotypic features influence efficacy, and establish biological surrogates of response. Second, we are determining whether signaling mediators that promote caspase expression can enhance apoptosis induction, and evaluating biological factors that predict efficacy. Third, we are beginning collaborations with the Drug Discovery Institute to pursue more unbiased screening strategies to identify combinations of agents that may be able to potentiate tumor cell killing. These studies will provide a basis for the translation of novel signal transduction modulatory strategies as therapeutic approaches for gliomas, and indicate ways in which these strategies can be used to enhance efficacy of other therapies.

3) Vaccine Therapy for Pediatric Gliomas

Diffuse brainstem gliomas, other malignant astrocytomas, and recurrent low-grade gliomas and ependymoma carry a poor prognosis, and new therapies are needed. Having gained experience with immunotherapy for adult gliomas, we extended these insights to childhood gliomas, based on our observations regarding their profiles of glioma-associated antigen (GAA) expression. We initiated a pilot trial of subcutaneous vaccinations with peptides for GAA epitopes emulsified in Montanide-ISA-51 given every 3 weeks for 8 courses along with intramuscular injections of poly-ICLC in HLA-A2+ children with newly diagnosed brainstem gliomas (BSG), high-grade gliomas (HGG), or recurrent gliomas. GAAAs were EphA2, IL13Rα2, and survivin. Over 50 children have been treated to date in various pilot study cohorts. The primary objectives of this study were to assess immunologic response and safety, given that this was the first such trial in the pediatric age group. Principal toxicities have included local injection site reactions and low grade fevers and flu-like symptoms in almost all patients, referable to the poly-ICLC, which have been generally mild and controlled with acetaminophen or ibuprofen. To date, there have been 8 cases of at least possible immunologically-mediated pseudoprogression, and analysis of advanced imaging features that correlate with this finding have been published. Results in the initial pilot cohort of brainstem and high-grade gliomas were published last year, and our observations in children with recurrent low-grade gliomas have been accepted for publication this year. Objective radiological responses have been observed in each of the cohorts, with a particularly high rate in the recurrent low-grade glioma stratum, and approximately 65% of children have demonstrated an immune response against at least one of the vaccine antigens based on ELISPOT analysis.
More extensive analyses of efficacy will be obtained in a phase 2 expansion of our low-grade glioma cohort, which was recently awarded 5 years of R01 funding by the NCI, and has just launched. NIH funding has also been obtained for a study of this vaccine strategy in children with recurrent ependymomas, which is in progress.

**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 dose-escalation study of the neuroprotective agent NNZ-2566 in patients with moderate to severe TBI (GCS 4-12) and also progesterone, SyNAPSE trial on severe TBI patients. 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 examination of our internal biomarker samples for progesterone in cerebrospinal fluid and serum of patients enrolled in the SyNAPSE clinical trial, resulted in very low bioavailability within the CSF, a suggestion that the drug may not have achieved it’s full target organ for mechanism of action. More studies need to be performed prior to the design of the next pharmaceutical trial in TBI.

Additional clinical studies include, 1) the prospective collection of demographics, blood and cerebrospinal fluid and neurological outcomes for the Neurotrauma Clinical Trials Center and genetic repositories, 2) collaborative research with the University of Cincinnati examining the impact of brain seizure-like activity (spreading depressions) on recovery from TBI, and 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 to explore novel approaches for classification of the initial injury severity and outcome after TBI, making use of emerging technology, and 3) collaborative translational research with industry to validate a commercial handheld hematoma detector for detection of an intracranial blood clot in the acute setting.

**Daniel R. Premkumar, PhD**  
Research Assistant Professor

Brain tumors are the most common malignant solid tumors in children and adults responsible for the highest mortality and pose significant scientific challenges. Recent genome-wide sequencing approaches have identified a large number of novel alterations in pediatric and adult brain tumors. Several major signaling cascades have been implicated in the development of gliomas, which include over-expression and activation of growth factors and their receptors and activation of intracellular signaling. For example, during malignant transformation, deregulation of cell cycle control pathways, p53 pathways, receptor tyrosine kinase function, and phosphoinositide 3-kinase, phosphatase and tensin homolog (PTEN) pathways are very common. Because genetic heterogeneity and a complex molecular pathology contribute to this lack of success, which highlights the need for novel therapies that target signaling pathways that underlie abnormal cellular growth, Dr. Premkumar’s ongoing studies have focused on counteracting this aberrant signaling as a therapeutic strategy and identifying logical combinatorial therapy for gliomas.
Jeremy Stone, MD  
PGY-2 Resident

Dr. Stone’s research interests involve the subspecialties of neuro-oncology tumor surgery, spine surgery, and neurotrauma. Current projects include:

1) Copeland Grant Funded project involving development of novel surgical instrument which utilizes real-time neurophysiology feedback to make tumor surgery around cranial nerves safer. Animal research with rat tumor model will commence during the summer of 2016.

2) Assessment of safety and cost-effectiveness of avoiding ICU stay for post-operative supratentorial brain tumor patients.

3) Implementation of novel evidence-based protocols for external ventricular drain placement and cerebrospinal fluid sampling in the neurological cerebrovascular intensive care unit. This ongoing project involves a prospective quality improvement initiative evaluating the impact of implementing a standardized protocol in the neurological cerebrovascular intensive care unit for external ventricular drain placement and cerebrospinal fluid sampling. By standardizing parameters such as use of peri-procedural antibiotics, head shave, wash, and prep, we hope to improve external ventricular drain-associated infection rates. Additionally, standardizing cerebrospinal fluid collection techniques and limiting routine sampling of cerebrospinal fluid are included as systems-based changes to limit infections in our vulnerable cerebrovascular patient population.

4) Comparison of minimally invasive spine surgery modalities to more invasive techniques in terms of outcomes, recovery time prior to return to work, and complications. Minimally invasive techniques of interest include extreme lateral interbody fusion, MIS microdiscectomy, and percutaneous pedicle screw fusion. Minimally invasive techniques are to be compared to more invasive techniques such as transforaminal lumbar interbody fusion, traditional microdiscectomy, and open posterior pedicle screw fusion respectively.

5) Case report introducing novel technique for posterior cervical fusion in the setting of trauma utilizing placement of bilateral interfacet anterior cervical fusion grafts.

6) Systems based retrospective analysis of traumatic brain injury transfers to highest level trauma center before and after implementation of transfer guidelines in the State of Hawaii. This ongoing large retrospective study is evaluating the safety, efficacy, and cost effectiveness of more restrictive transfer guidelines to the highest level state trauma center for traumatic brain injury patients.

Mingui Sun, PhD  
Professor

1) Wearable eButton for Evaluation of Energy Balance with Environmental Context and Behavior

In this study, Dr. Sun proposes the refinement of eButton, an electronic device that was developed under the NIH GEI diet and physical activity research program. This button-like device can be attached to clothing and worn on the chest using a pair of magnets or a pin. The new eButton will contain numerous innovative designs, including a motion sensor to detect physical activity, an optical eating detector to monitor eating/drinking/smoking, two minia-
ture cameras that produce a stereo vision to measure food portion size without depending on a reference card. The eButton will store the multimedia data acquired by these advanced miniature sensors in a flash memory within the device. It will also have a wireless link to a smart phone which will allow researchers to monitor the operating status of eButton and communicate with subjects remotely in real time. During the first year of this research, the new eButton and associated algorithms/software is being designed and constructed in Dr. Sun’s laboratory by an experienced team of electronic/software engineers based on its early version developed under the NIH GEI diet and physical activity research program. Once eButton is constructed, we will implement a thorough validation process using human subjects to evaluate its accuracy in diet and physical activity assessment.

2) Biomimetic Self-Adhesive Dry EEG Electrodes

This biomedical engineering project aims to develop a novel skin-surface electroencephalogram (EEG) electrode. This new electrode does not require application of electrolyte; is able to penetrate scalp hair easily during electrode placement; can be quickly applied and removed; has low and stable electrode impedance; and has an extraordinary ability to self-adhere to the scalp without glue or tape. Its unconventional design is inspired from a biological system (the toe of geckos) which has shown clear effectiveness in the natural environment. In the current stage, design and construction of the electrode is being conducted and a test bed is being constructed to evaluate its performance.

3) Development and Evaluation of a Novel Wireless EEG Monitoring Sensor

This study, which has been approved for funding by the Center for Medical Innovation (CMI) at the University of Pittsburgh, aims to develop a wireless EEG system to provide critical point-of-care information about brain electrical activity. A novel dry electrode, which can be installed rapidly, is used to acquire EEG from the scalp. A wireless data link between the electrode and a data port (i.e., a smartphone) is established based on Bluetooth technology. A prototype of this system has been implemented and its performance in acquiring EEG has been evaluated. Dr. Sun’s current interest is to further improve the performance of this system while minimizing its physical dimension.
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<td>Importance of Mitochondrial Protein Import in Neurite Degeneration in Neurodegenerative Diseases</td>
<td>$5,000</td>
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<td>Pittsburgh Foundation</td>
<td>Stephanie Greene</td>
<td>The Use of Transcranial Doppler in the Diagnosis of Hydrocephalus and Associated Conditions</td>
<td>$6,227</td>
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<td>Svitlan Yablonska</td>
<td>Modulation of Mutant Huntingtin Mitochondrial Toxicity by N-terminal Phosphorylation</td>
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<td>Pittsburgh Foundation</td>
<td>Wendy Fellows-Mayle</td>
<td>Developing Exceptional Microneurosurgical Technical Skill</td>
<td>$2,191</td>
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<td>Pittsburgh Foundation</td>
<td>Yuan Yuan Jiao</td>
<td>Live Like Lou</td>
<td>$10,479</td>
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<td>SooNS</td>
<td>Nduka Amankulor</td>
<td>PTEN Status as a Predictor of NK Cytotoxicity and Decitabine Response Mediated Through NKG2D</td>
<td>$5,000</td>
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<td>Solving</td>
<td>Ian Pollack</td>
<td>Peptide Based Vaccination for Recurrent Ependymomas</td>
<td>$19,153</td>
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<td>St. Jude</td>
<td>Ian Pollack</td>
<td>Pediatric Brain Tumor Consortium</td>
<td>$32,541</td>
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<tr>
<td>UCSF</td>
<td>David O. Okonkwo</td>
<td>TBI Endpoints Development (TED)</td>
<td>$24,620</td>
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<tr>
<td>Source</td>
<td>Investigator</td>
<td>Title</td>
<td>Total Budget Award</td>
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<td>UCSF</td>
<td>David O. Okonkwo</td>
<td>Research Supplements to Promote Diversity in Health-Related (Admin Supplement to U01-NS086590 TRACK II-TBI)</td>
<td>$51,182</td>
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<tr>
<td>UCSF</td>
<td>David O. Okonkwo</td>
<td>TRACK II-Clinical (Transforming Research and Clinical Knowledge in TBI)</td>
<td>$238,524</td>
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<tr>
<td>UCSF</td>
<td>David O. Okonkwo</td>
<td>TRACK II-Committee (Transforming Research and Clinical Knowledge in TBI)</td>
<td>$32,226</td>
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<tr>
<td>UCSF</td>
<td>Ajay Niranjan</td>
<td>Randomized Controlled Study of Neurocognitive Outcomes in Patients with Five or More Brain Metastases Treated with Radiosurgery or Whole-Brain Radiotherapy</td>
<td>$1,722</td>
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<td>UMB</td>
<td>Ava Puccio</td>
<td>A Randomized Clinical Trial of Glyburide (RP-1127) for TBI</td>
<td>$31,391</td>
</tr>
<tr>
<td>UMB</td>
<td>David O. Okonkwo</td>
<td>A Randomized Clinical Trial of Glyburide (RP-1127) for TBI</td>
<td>$31,391</td>
</tr>
<tr>
<td>UPBI</td>
<td>Robert Friedlander</td>
<td>Innovator Research Award - Live Like Lou Center for ALS Research (UPBI)</td>
<td>$100,822</td>
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<tr>
<td>USAMR</td>
<td>Ava Puccio</td>
<td>HDFT Biological Diagnosis of TBI Providing Actionable Clinical Report of Quantified Damage</td>
<td>$5,535</td>
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<tr>
<td>USAMR</td>
<td>C. Edward Dixon</td>
<td>Operation Brain Trauma Therapy</td>
<td>$91,774</td>
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<tr>
<td>USAMR</td>
<td>C. Edward Dixon</td>
<td>Operation Brain Trauma Therapy Extended Studies</td>
<td>$135,947</td>
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<tr>
<td>USAMR</td>
<td>David O. Okonkwo</td>
<td>HDFT Biological Diagnosis of TBI Providing Actionable Clinical Report of Quantified Damage: Enrollment</td>
<td>$1,540</td>
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<tr>
<td>USAMR</td>
<td>David O. Okonkwo</td>
<td>HDFT Biological Diagnosis of TBI Providing Actionable Clinical Report of Quantified Damage</td>
<td>$698,166</td>
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<td>USAMR</td>
<td>David O. Okonkwo</td>
<td>HDFT Biological Diagnosis of TBI Providing Actionable Clinical Report of Quantified Damage: Option 1</td>
<td>$334,169</td>
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<td>USAMR</td>
<td>David O. Okonkwo</td>
<td>HDFT Biological Diagnosis of TBI Providing Actionable Clinical Report of Quantified Damage: Option 2</td>
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<td>David O. Okonkwo</td>
<td>HDFT Biological Diagnosis of TBI Providing Actionable Clinical Report of Quantified Damage: Option 3</td>
<td>$176,586</td>
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<td>USAMR</td>
<td>David O. Okonkwo</td>
<td>HDFT Biological Diagnosis of TBI Providing Actionable Clinical Report of Quantified Damage: Option 5</td>
<td>$176,586</td>
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<tr>
<td>Utah</td>
<td>Mandeep Tamber</td>
<td>Phase II Clinical Study In Children Presenting with New Diagnoses of Hydrocephalus, in Ventrical Size Associated with Neuropsych Outcomes at 6 mons.</td>
<td>$342</td>
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<td>Voyager</td>
<td>R. Mark Richardson</td>
<td>An Open-Label Safety and Efficacy Study of Escalating Doses of AAV2-hAADC Administered by MRI-Guided Convective Infusion into the Putamen of Participants with Parkinsons Disease with Fluctuating Responses to Levodopa</td>
<td>$666,716</td>
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<td>University of Washington</td>
<td>Mandeep Tamber</td>
<td>Park Reeves Syringomyelia Research Consortium</td>
<td>$185</td>
</tr>
</tbody>
</table>
Past Residents

**Class of 2015**
Kimberly Foster, MD  
University of New Mexico  
Department of Neurological Surgery  
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Phillip V. Parry, MD  
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**Class of 2013**
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Class of 1979
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(Deceased)

Class of 1978
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Tadashi Kudo, MD
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Omitama-shi Ibaraki-Ken 311-3434

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Class of 1976
Munir Abbasy, MD
(Deceased)

Bruce Wilder, MD
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Class of 1975
Eric Holm, MD
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Reading, PA 19611

Albert Camma
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San Mateo, CA 94401

Victor Bazzone, MD
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Class of 1973
Charles Kalko, MD
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Class of 1972
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Corpus Christi, TX 78413

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William DeWeese, MD
Neurological Surgery
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Tampa, FL 33613

Class of 1971
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Neurosurgical Associates Inc.
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Stamatis Stavropoulos, MD
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Los Angeles, CA 90022

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Spokane, WA 99203

Patrick Houston, MD

Class of 1970
Augusto Delerme, MD

Harry Stephens, MD
Past Residents

Class of 1969
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Warwick, RI 02886

Class of 1968
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Pittsburgh, PA 15213

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
Ayuntamiento #93
Coyoacan, C.P. 0400
Mexico D.F.

Taghy Tirgary, MD

Class of 1962
Joseph Arditti, MD
113 Horsler Dr.
St. John, NB E2M-4B4
Canada

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
1616 Covington St.
Youngstown, OH 44510

James Davis, MD

Class of 1957
Morris Sanders, MD

Class of 1956
Norman Uddstrom, MD

Class of 1955
Robert L. Baker, Sr., MD
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Pittsburgh, PA 15238-4102

Class of 1952
Robert Wright, MD

Note: If you would like to update information listed in this section, contact Melissa Lukehart at (412) 647-6777 or lukehartml@upmc.edu. You can also send the information to:

Melissa Lukehart
Department of Neurological Surgery
UPMC Presbyterian
200 Lothrop Street, Suite B-400
Pittsburgh, PA 15213
ATTN: Annual Report Alumni
Donations
(July 1, 2015 through June 30, 2016)

**Albright Chair in Childrens Neurosurgery**
- **$1,000 - $4,999:**
  United Way of Allegheny County

**Brain Cancer Research**
- **$25,000 - $49,999:**
  Brain Cancer Awareness 5K, Limited
- **$5,000 - $9,999:**
  Anonymous Donors
- **$500 - $999:**
  Aon Foundation
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  Mr. & Mrs. John Machota
  Mr. & Mrs. James C. Polacheck
  Mr. & Mrs. Herbert S. Shear
  Mr. & Mrs. Joel J. Sigal
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  Mr. & Mrs. Sanford S. Berman
  Dennis Boodman
  Mr. & Mrs. Mike Davidoff
  Colleen M. Donoghue
  Cynthia A. Freas
  Katherine Gorski
  Roger L. Hansen
  Paul Haurilesko
  Ruth W. Hayes
  Jonathan A. Hayes
  Diane Higgins
  Cindy Hildenbrand
  Elizabeth K. Hudak
  Mark P. Hurley
  Yvonne Kanner
  Joan Kerns
  Lindsay Lesofsky
  Mr. & Mrs. Dave Mabon
  Mr. & Mrs. Robert Madeja
  Mr. & Mrs. Thomas S. Marshall
  Mr. & Mrs. Thomas Perry
  Joe M. Pugar
  Mr. & Mrs. Frank B. Robinson
  Ann M. Samler
  James Shambo
  Christopher J. Sidoni
  Adam Silverblatt
  Mr. & Mrs. Robert J. Weis

- **Up to $99:**
  Anna F. Adler
  Christiana Agrotis
  Ron Almagor
  Nancy C. Arnold
  Heather Baker
  William Barth
  Matthew Bask
  Tess Biller
  Kathy Bojtos
  Kofi O. Bonsra
  Jeffrey Boodman
  Alicia Breighner
  Roberta Lebow Brody
  Rick Burke
  Terri Burner
  Sue Ellen Byrne
  Cheryl Chotiner
  Mr. & Mrs. James Cohen
  Marjorie Cormas
  Marilyn Davidoff
  Marilyn J. Donoghue
  Heidi S. Donovan, PhD
  Dale Dudik
  Dr. & Mrs. Martin E. Eichner
  Leah Fani
  Heather S. Finke
  Matthew J. Galando
  Susan Gefsky
  Josephine George
  David M. Ginsberg
  Mr. & Mrs. David E. Goldberg
  Mr. & Mrs. Alan R. Green
  Susan L. Gross
  Dr. & Mrs. Samuel I. Hammerman
  Mr. & Mrs. Richard H. Helfer
  Lyndsey Hildenbrand
  Mr. & Mrs. David Stuart Horvitz
  Nancy J. Hudak
  Casey Imler
  Jenny Jones
  Shea Juergens
  Michelle Kaminsky
  Mr. & Mrs. Robert Karpuszka
  Angela Kendera
  Michael Kerns
  Mr. & Mrs. Steve Kline
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  Kathleen Krisko
  Dr. & Mrs. Philip Meyers Landau
  Edithanne Lauer
  Mr. & Mrs. Stanley Bruce Lederman
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(July 1, 2015 through June 30, 2016)

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Dana Marozzi
Glenn Mauney
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Mr. & Mrs. Kevin K. McDade
Tom Michael
Elaine Miller
Kay Montgomery
Robert Mooney
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Marcia J. Murray
Norbert Ndamira
Kenneth Nearhoof
Cynthia P. Neel
Amy L. Newcamp
Pamela Novicki
Lisetta A. Novicki
Todd O’Leary
Laura O’Steen
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Gina Petrillo
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Lucas Ray
Jessica Rindt
Mr. & Mrs. Bruce Rosen
Janice G. Rosenberg
Mr. & Mrs. James L. Ross
Rivka Rudolph
Jane Rudov
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