

THE MCKNIGHT BRAIN INSTITUTE

**The University of Florida's  
Evelyn F. and William L. McKnight  
Brain Institute is dedicated to  
fostering discoveries about  
how the brain operates  
and how it can be healed.**

Evelyn F. & William L.  
McKnight Brain Institute





PROFESSOR AND CHAIRMAN  
**William A. Friedman, M.D.**

Quality is part of everything we do at the University of Florida Department of Neurosurgery. It's the thread that runs through our three-part mission to provide outstanding and compassionate care, to educate residents, fellows and practicing physicians in the art and science of neurosurgery, and to explore and develop new and better treatments for neurosurgical disorders.

In this annual report, we will share with you our excitement about progress in each of these areas. In particular, we will highlight our efforts to continually improve quality and patient safety.

In the UF Department of Neurosurgery, quality and patient safety are Job 1. As others have noted, medicine has much to learn from other industries that have achieved very high quality standards. Commercial aviation has one of the lowest error rates of any industry. But that was not always the case. Their transformation in quality resulted from two major innovations: checklists and crew resource management. The airlines have a checklist for every phase of normal flight and for every possible emergency. These checklists have been painstakingly prepared and revised, based on the best available evidence. Crew resource management refers to the airlines' insistence on "flattening of the environment" during flight. The captain, co-pilot, flight engineer and flight attendants are trained and required to function as a team.

Within our department, we have tried very hard to adapt these principles into our quality/safety structure. The department has two quality conferences per month. Residents and faculty are divided into multiple teams and currently are engaged in many additional quality improvement projects.

In this report, we highlight the overall quality of care our neurosurgeons provide as well as several key quality improvement initiatives.

Whether you are a physician, prospective resident or patient, we hope you will find the information in this report helpful.

For much more detail, please visit our website: [neurosurgery.ufl.edu](http://neurosurgery.ufl.edu).

**William A. Friedman, M.D.**  
 Professor and Chairman

#### UF Neurosurgery Quality Projects

- › **Ventriculostomy infection elimination**  
 Our checklist-driven process has eliminated ventriculostomy infection (no infections for 18 months).
- › **Surgical site infection reduction**  
 Since initiating a monthly infection control conference and a checklist approach in the OR, we have reduced SSIs by two-thirds.
- › **Hyponatremia protocol**  
 This evidence-based published protocol greatly reduced variation in care.
- › **Anticoagulation reversal protocol**  
 This evidence-based checklist improved the speed of coagulation correction, eliminated fluid overload and reduced unnecessary consultations.
- › **Mobility improvement**  
 This evidence-based checklist protocol improved mobility by 300 percent.

The 22 faculty members of the University of Florida Department of Neurosurgery are nationally and internationally renowned in the diagnosis and treatment of diseases of the brain and spine, as well as for their work in advancing neurosurgical care through clinical and basic science research. With expertise that encompasses virtually every clinical specialty in neurosurgery, they are dedicated to delivering advanced treatment in the most caring, accessible environment possible.

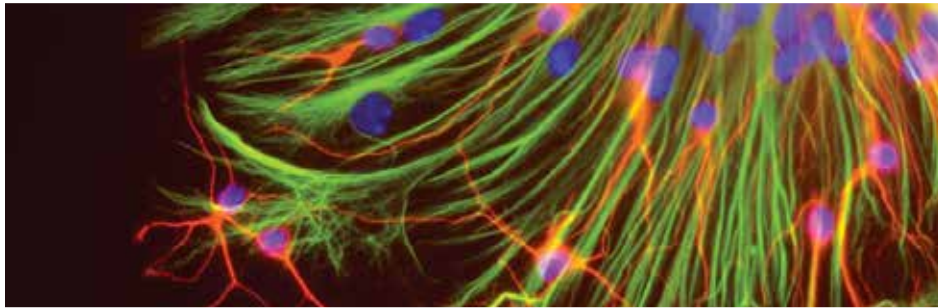


● = Faculty ● = Education Faculty ● = Research Faculty

- 1 William A. Friedman, M.D.  
Professor & Chairman
- 2 Spiros Blackburn, M.D.  
Assistant Professor
- 3 Erin M. Dunbar, M.D.  
Assistant Professor
- 4 Kelly D. Foote, M.D.  
Associate Professor
- 5 Brian L. Hoh, M.D.  
Associate Professor
- 6 Daniel J. Hoh, M.D.  
Assistant Professor
- 7 R. Patrick Jacob, M.D.  
Professor
- 8 J. Richard Lister, M.D., M.B.A.  
Professor & Associate Chairman
- 9 Gregory J. A. Murad, M.D.  
Assistant Professor
- 10 David W. Pincus, M.D., Ph.D.  
Professor
- 11 Albert L. Rhoton Jr., M.D.  
Professor & Chairman Emeritus
- 12 Steven N. Roper, M.D.  
Professor
- 13 Maryam Rahman, M.D.  
Clinical Lecturer
- 14 Gwen Lombard, R.N., Ph.D.  
Assistant Professor
- 15 Frank J. Bova, Ph.D.  
Professor
- 16 Didier A. Rajon, Ph.D.  
Assistant Scientist
- 17 Tong Zheng, Ph.D.  
Research Assistant Professor
- 18 Loic Deleyrolle, Ph.D.  
Research Assistant Professor
- 19 Brent A. Reynolds, Ph.D.  
Associate Professor
- 20 Florian Siebzehrubl, Ph.D.  
Research Assistant Professor
- 21 Dennis Steindler, Ph.D.  
Professor
- 22 Mu Yang, M.S.  
(not pictured)
- 23 Fuwen Zhou, Ph.D.  
(not pictured)

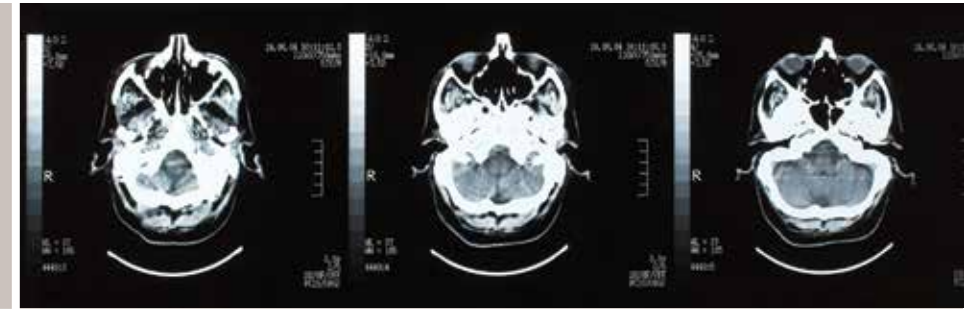


Our regional manager of physician relations, Kelly Flowers, increased the number of educational and promotional activities in the department, coordinated 43 UF physician visits with referring physicians and increased readership of the monthly neurosurgery e-newsletter. Patient transfer requests increased 11 percent over last year and transfer admissions went up 10 percent. Additionally, we expanded our strategic partnerships and affiliations with neurosurgeons and hospitals throughout the state.



*Kelly Flowers, regional manager of physician relations*

The Lillian S. Wells Foundation Inc. donated \$10 million to the University of Florida Department of Neurosurgery to help medical scientists better understand the causes of brain tumors, develop effective treatments and improve quality of life for patients. In recognition of this the department has been renamed the Lillian S. Wells Department of Neurosurgery.



UF neurosurgeons continue to advance the level of care and practice in their field through significant publications and notable papers in leading national and international journals. Some notable contributions and papers are mentioned throughout the report. For more information about these and all of our publications, go to [www.ncbi.nlm.gov/pubmed](http://www.ncbi.nlm.gov/pubmed) and search "University of Florida Neurosurgery."



The department celebrated the life's work of Albert L. Rhoton Jr., M.D., founder of the University of Florida Department of Neurosurgery and an expert in the field of microneurosurgery. "Dr. Rhoton took a relatively unknown division and turned it into one of the best neurosurgery departments in the world," said William Friedman, M.D., the Albert L. Rhoton Jr. professor and chairman of neurosurgery. "He is the reason I came to UF to train."



Faculty member Maryam Rahman, M.D., was awarded the Congress of Neurological Surgeons Award for residents, fellows or fully trained neurosurgeons interested in clinical, translational or basic science with a focus on tumor research.

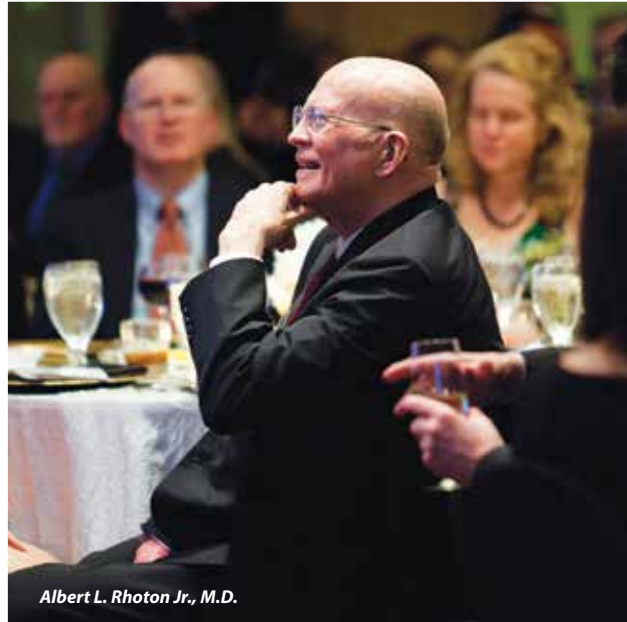


*Maryam Rahman, M.D.,*



William A. Friedman, M.D., attended the Institute for Healthcare Improvement (IHI) executive leadership program, which had a focus on quality and safety. Friedman has been a leader in implementing quality initiatives at Shands at UF for more than six years and was instrumental in being part of the UF&Shands team that helped establish 4-Star status for the institution in 2011, as recognized by the University Healthsystem Consortium.

*William A. Friedman, M.D.*



*Albert L. Rhoton Jr., M.D.*



*Randy Harmatz, M.B.A.*

Michael Waters, M.D., Ph.D., a UF neurologist and Shands at UF Stroke Program director, received the Gold Plus Quality Achievement Award from the American Heart/American Stroke Association. Shands at UF is the only AHCA-designated Comprehensive Stroke Center in north central Florida.

The department sponsored a quality retreat for residents and faculty. The program included keynote speaker Randy Harmatz, M.B.A., chief quality officer for UF&Shands, and several UF neurosurgeons who presented five recent quality initiatives, including: enhanced staff communication and reduced near-miss errors with a neurointerventional procedural checklist; management of anticoagulation; protocol for Halo management; parameters for extubation; and DVT prophylaxis post-craniotomy. Since 2006, UF neurosurgeons have chaired and sponsored more than 15 quality projects, many resulting in evidence-based protocols.



*Michael Waters, M.D., Ph.D.*

# A Year In Review

MAJOR EVENTS IN THE UF DEPARTMENT OF NEUROSURGERY



**“There’s not too many words that can really describe how much Austin has progressed...”**

— Colson Streitmatter, older brother

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Se: 4  
SN S141.80  
Im: 56+C

DFOV 18.0cm  
STD+

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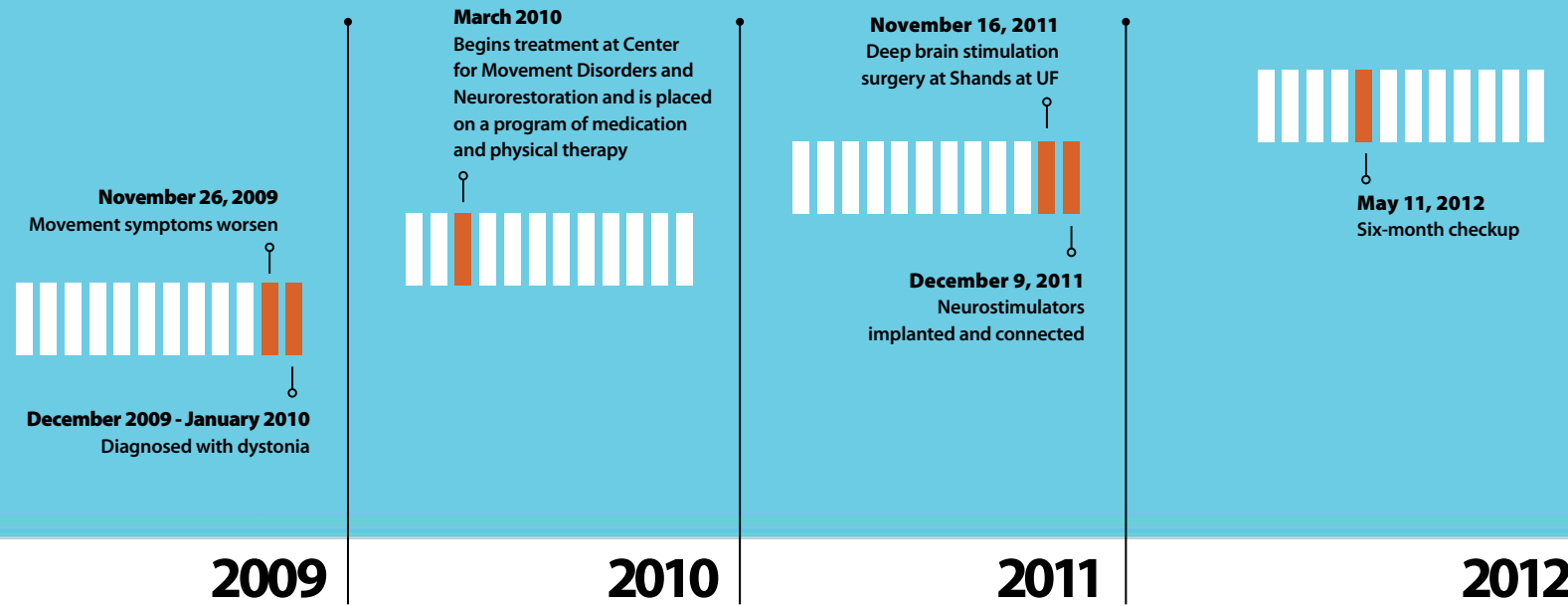
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**Patient: Austin Streitmatter | Age: 11 | Diagnosis: Dystonia**

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W:336 L:62

AUSTIN'S TIMELINE



**It seemed as if it would be a completely ordinary holiday, that Thanksgiving in 2009. John and Michele Streitmatter were at home near Tampa with their three young sons. Dinner was on the table and a family memory was in the making. But it was not the memory they expected.**

During the meal, their middle son, Austin, continually moved his leg and had trouble sitting. He wouldn't have been the first 8-year-old to ever fidget at the table, but this was different — his body was moving on its own.

Before the end of 2009, Austin had been diagnosed with dystonia, the third most common movement disorder behind Parkinson's disease and tremor. It pits a patient's muscles against one another in prolonged, involuntary contractions, making it impossible to walk or even sit in a chair.

After considering the medical options, the Streitmatters came to the Center for Movement Disorders and Neurorestoration at UF. In 2011, neurosurgeon Kelly Foote, M.D., implanted two tiny

electrodes in areas of Austin's brain that control movement as part of a procedure known as deep brain stimulation.

"I remember thinking, this is kind of cool, people putting wires in my head, this is interesting," Austin said. "At the same time, I was a little worried. I didn't know what to expect."

Foote, with neurologist Michael Okun, M.D., co-directs the Center for Movement Disorders and Neurorestoration and is a pioneer in the use of deep brain stimulation for dystonia, Parkinson's disease and even behavioral problems. The center is staffed by a complete range of specialists to provide patient-centered service and is allied with Tyler's Hope for a Cure, a fundraising enterprise devoted to

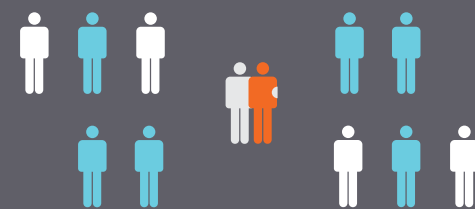
supporting clinical and laboratory dystonia research.

At 11, Austin is a new kid. When Tropical Storm Debby pelted Tampa with rain in 2012, this child, once too disabled to sit, lie down or even touch his fingertips together, was outside, running through raindrops, joyfully playing soccer with his brothers, Colson and Dalton. "There's not too many words that can really describe how much Austin has progressed," said older brother Colson. "His back is straighter, we were playing football and basketball earlier — he's progressed so much it's unbelievable."



Download an iBook with Austin's case study at [www.urlwillgohere.com](http://www.urlwillgohere.com)

AUSTIN'S TEAM



- ① Neurologists
- ② Neurosurgeon
- ③ Neuroscientists
- ④ Neuropsychologists
- ⑤ Physical therapists and rehabilitation experts
- ⑥ Nurses
- ⑦ Neuropathologists
- ⑧ Computer scientists

**A COORDINATED APPROACH:**

- DIAGNOSIS
- TREATMENT OPTIONS
- REHABILITATION
- RESTORATION OF FUNCTION

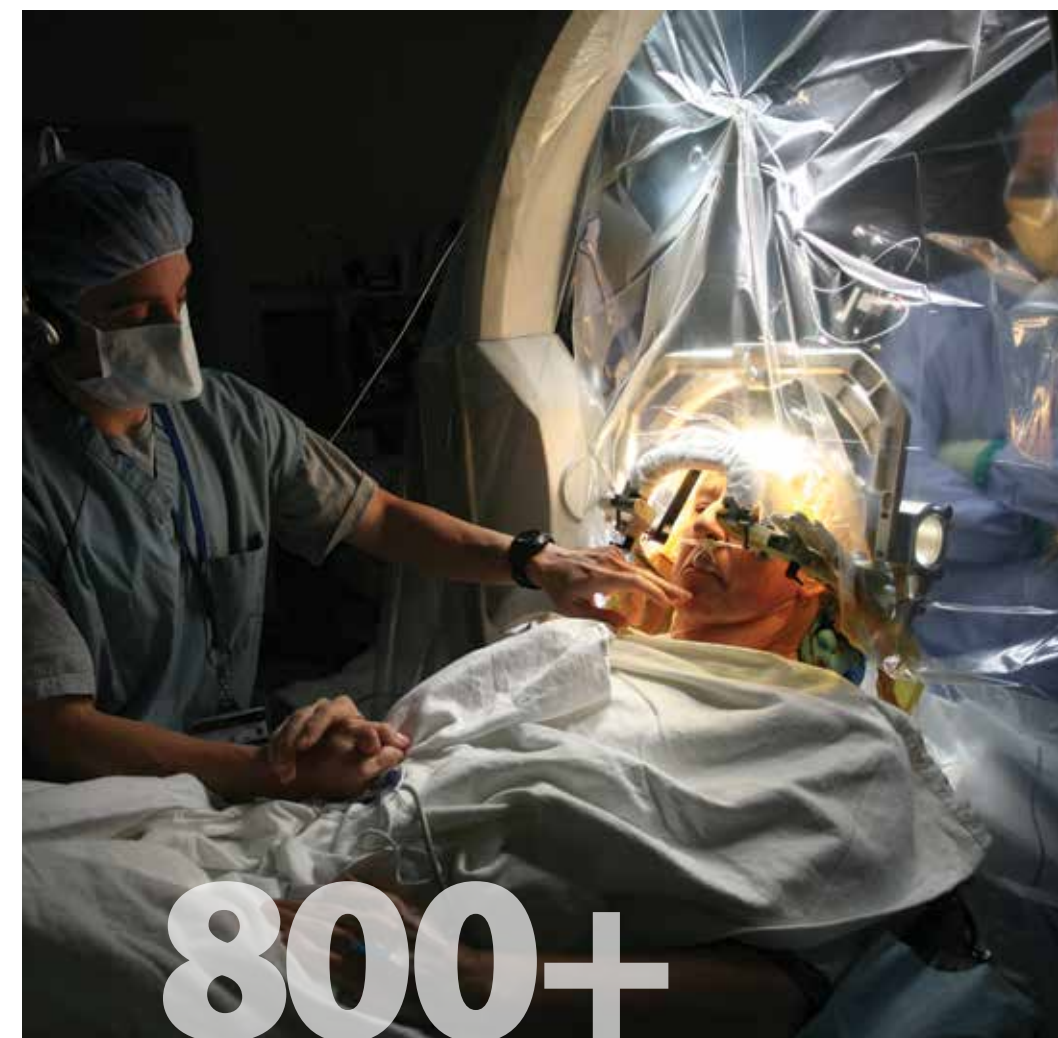
The University of Florida Center for Movement Disorders and Neurorestoration offers the highest level of integrated, interdisciplinary care for patients with movement and neuropsychiatric disorders. At this unique center, University of Florida faculty and researchers from 14 different specialty and subspecialty areas provide motor, cognitive and behavioral diagnosis and treatment to patients at one central location. The result is a truly coordinated approach that addresses the full spectrum of patient needs, from diagnosis and treatment options to rehabilitation and restoration of function.

**What We Do**

**Conditions we treat**

- Parkinson's disease
- Parkinsonism
- Tremor disorders
- Dystonia
- Chorea
- Tic disorders
- Myoclonus
- Ataxias
- Neuropsychiatric disorders

More than 800 deep brain stimulation procedures have been performed at the center. Since its creation less than a decade ago, the center has treated more than 5,000 patients.



**800+**

**| deep brain stimulation procedures |**  
**have been performed at the center**



*During deep brain stimulation, UF experts record and identify in the brain the abnormal oscillation leading to tremor. This series of photos shows drawings a patient made before and after activation of the DBS device.*



**WHO WE ARE:**

**SHANDS REHABILITATION  
CENTER FOR MOVEMENT DISORDERS AND NEURORESTORATION  
TYLER'S HOPE CENTER  
CLINICAL TRIALS CENTER  
NATIONAL PARKINSON FOUNDATION CENTER OF EXCELLENCE  
TOURETTE SYNDROME AND TIC CLINIC**

Co-directors Kelly Foote, M.D., a UF neurosurgeon, and Michael Okun, M.D., a UF neurologist, lead a team of UF physicians from multiple specialties: Shands rehabilitation specialists; physical, occupational and speech therapists; social workers; and neuropsychologists. Ramon L. Rodriguez, M.D., directs the clinical operations of the Center for Movement Disorders and Neurorestoration, the Tyler's Hope Center for Comprehensive Dystonia Care and the clinical trials center, which includes more than 30 active research studies. Irene Malaty, M.D., directs our National Parkinson Foundation Center of Excellence and the Tourette syndrome interdisciplinary clinic.

**OUR DISCOVERIES: a selection of recent publications**

1. "Subthalamic deep brain stimulation with a constant-current device in Parkinson's disease: An open-label randomised controlled trial." *The Lancet Neurology*, 2012 Feb;11(2):140-9. Erratum in: *The Lancet Neurology*, 2012. Authors: Okun MS, Gallo BV, Mandybur G, Jagid J, Foote KD, Revilla FJ, Alterman R, Jankovic J, Simpson R, Junn F, Verhagen L, Arle JE, Ford B, Goodman RR, Stewart RM, Horn S, Baltuch GH, Kopell BH, Marshall F, Peichel D, Pahwa R, Lyons KE, Tröster AI, Vitek JL, Tagliati M, and the SJM DBS Study Group
2. "Parkinson's disease DBS: What, when, who and why? The time has come to tailor DBS targets." *Expert Review of Neurotherapeutics*, 2010. Authors: Okun MS and Foote KD
3. "Deep brain stimulation for intractable obsessive compulsive disorder: Pilot study using a blinded, staggered-onset design." *Biological Psychiatry*, 2010. Authors: Goodman WK, Foote KD, Greenberg BD, Ricciuti N, Bauer R, Ward H, Shapira NA, Wu SS, Hill CL, Rasmussen SA, Okun MS
4. "A high resolution and high contrast MRI for differentiation of subcortical structures for DBS targeting: The Fast Gray Matter Acquisition T1 Inversion Recovery (FGATIR)." *Neuroimage*, 2009. Authors: Sudhyadhom A, Haq IU, Foote KD, Okun MS, Bova FJ
5. "Cognition and mood in Parkinson's disease in subthalamic nucleus versus globus pallidus interna deep brain stimulation: The COMPARE trial." *Annals of Neurology*, 2009. Authors: Okun MS, Fernandez HH, Wu SS, Kirsch-Darrow L, Bowers D, Bova F, Suelter M, Jacobson CE 4th, Wang X, Gordon CW Jr, Zeilman P, Romrell J, Martin P, Ward H, Rodriguez RL, Foote KD



**WHO WE ARE:**

The 22 faculty members of the University of Florida Department of Neurosurgery are nationally and internationally renowned in the diagnosis and treatment of diseases of the brain and spine, as well as for their work in advancing neurosurgical care through clinical and basic science research. With expertise that encompasses virtually every clinical specialty in neurosurgery, they are dedicated to delivering advanced treatment in the most caring, accessible environment possible. More than 4,000 procedures are performed at UF every year.

**4,000+**  
procedures performed at UF | every year |

**Education and training:** Education for residents and practicing neurosurgeons is a key part of our mission. Our residency training program recently celebrated its 50th anniversary. We currently accept three trainees each year for seven years of training. In addition, our faculty members give lectures at many national and international neurosurgical meetings.



O-Arm technology

Trilogy radiosurgery system

Biplane fluoro rooms

Thirty-bed Neuro Intensive Care Unit

New Shands Cancer Hospital at UF

HD video recording system

Advanced endoscopic equipment

Shands Critical Care Center







“Quality is

| doing the right thing | at the right time |  
for the right patient, every time.”

— William A. Friedman, M.D.

**Epilepsy**

The University of Florida Comprehensive Epilepsy Program brings together a multidisciplinary team, including neurosurgeons, neurologists, neuropsychologists, neuropathologists and nurse practitioners. Together they provide a full spectrum of care, from monitoring to advanced surgical procedures to caring for patients who have epilepsy and other paroxysmal neurological disorders. More than 7,500 patients have been treated and more than 1,400 procedures

performed since the program began in 1992 — more than any other program in Florida. UF neurosurgeon Steven N. Roper, M.D., in collaboration with UF neurologists Jean Cibula, M.D., Stephan Eisenschenk, M.D., Ian Goldsmith, M.D., and Holly Skinner, D.O., performs all diagnostic and therapeutic epilepsy surgeries on adults. UF neurosurgeon David W. Pincus, M.D., Ph.D., performs epilepsy procedures on children.

**Neurovascular Surgery**

The UF neurovascular program is one of the premier programs in the nation for comprehensive cerebrovascular and endovascular neurosurgery. The team treats a wide range of neurovascular conditions, including cerebral aneurysms, arteriovenous malformations, carotid and intracranial atherosclerosis, stroke, cavernous malformations and Moya Moya disease. Led by Brian L. Hoh, M.D., the team performs more than 1,000 endovascular cases each year.

**Our procedures**

- Diagnostic angiography
- Balloon angioplasty
- Coiling of aneurysms
- Embolization of arteriovenous malformations
- Endovascular treatment of acute strokes
- Embolization of tumors
- Intracranial and extracranial angioplasty and stent placement
- Obliteration of arteriovenous fistulae
- Vein of Galen embolizations



UF neurologist Jean Cibula, M.D., UF neurosurgeon Steven Roper, M.D., UF neurologists Stephan Eisenschenk, M.D., and Ian Goldsmith, M.D., in the Epilepsy Monitoring Unit at Shands at UF.

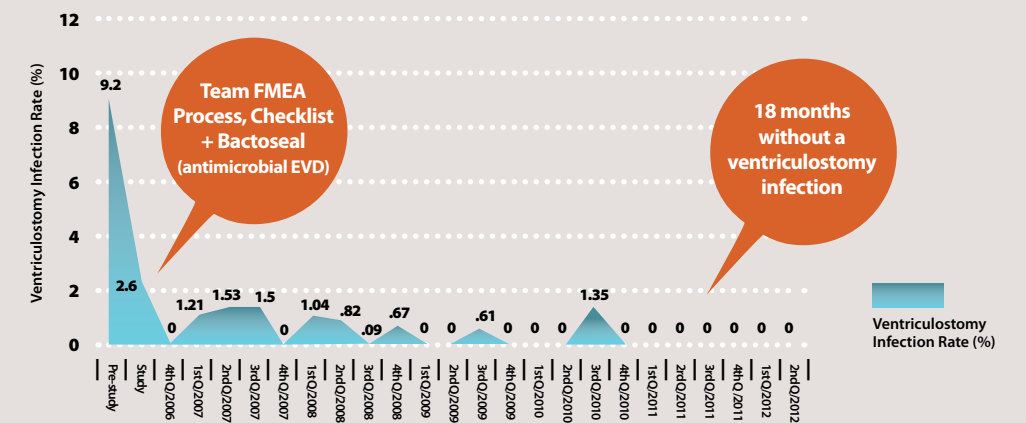


Brian L. Hoh, M.D., is the principal investigator in a number of clinical trials including the SAMMPRIS (Stenting and Aggressive Medical Management for Preventing Recurrent stroke in Intracranial Stenosis) trial.

**QUALITY INITIATIVE**  
**Developing Protocols**

William A. Friedman, M.D., led a task force to identify areas of improvement that could lead to a decrease in external ventricular drain-related infection. This report was used to develop a protocol that was implemented as the ELVIS program. As a result, the EVD infection rate at Shands at UF decreased to less than 1 percent between 2008 and 2011. The corresponding study by Maryam Rahman, M.D., “Eliminating Ventriculostomy Infection Study (ELVIS),” will appear in the *The Joint Commission Journal on Quality and Patient Safety*.

**Ventriculostomy Rate (%) Trending: Pre-study to 2012**





**Improving care through discovery:** At the Evelyn F. and William L. McKnight Brain Institute of the University of Florida, UF neurosurgeons collaborate with scientists from a broad spectrum of disciplines. Our researchers are focused on making discoveries that will lead to innovation and advances in neurosurgical treatment, with a clear goal of enhancing patient care.

**Conditions we treat**

- Non-hormonal macroadenoma tumors
- Hormone-secreting tumors
- Acromegaly
- Cushing's disease
- Prolactinoma

**Pituitary Surgery**

The Pituitary Tumor Center offers patients comprehensive care that includes advanced neurosurgical treatment. Because of the impact of the pituitary gland on the entire body, patients at the center also receive care from a variety of other medical specialists, including endocrinologists, radiologists and others, to enhance outcomes and quality of life. UF neurosurgeon Steven N. Roper, M.D., specializes in pituitary tumor surgery and has performed more than 650 procedures.



UF neurosurgeon Steven N. Roper, M.D.



David Pincus (left), M.D., Ph.D., leads the pediatric neurosurgery team.

**Pediatric Neurosurgery**

The University of Florida pediatric neurosurgery team, under the leadership of David W. Pincus, M.D., Ph.D., performs more than 300 procedures annually on patients, ranging in age from newborn to 21. The division is a regional center for the treatment of pediatric brain tumors and a variety of congenital disorders.

**Conditions we treat**

- Brain and spinal cord tumors
- Craniosynostosis
- Congenital anomalies and malformations (such as Chiari malformation, Moya Moya disease and Vein of Galen malformation)
- Spina bifida
- Spasticity
- Epilepsy
- Trauma
- Hydrocephalus

**QUALITY INITIATIVE**  
**Improving Mobility**

William Friedman, M.D., and Kati Harlan, R.N., M.S.N., a senior quality improvement specialist, led a task force to provide a multidisciplinary approach to patient mobility at the bedside. The Shands nursing team and rehabilitation services took lead roles in this initiative. Support techs were hired for every floor, and guidelines were implemented for referring patients to physical and occupational therapists. The task force increased mobility among Neuro ICU patients by 300 percent, and improvements have been linked to reductions in lengths of ICU and hospital stays, hospital-acquired infections and more.

**300%** increase in mobility  
| reductions in length of stay |  
| no increase in adverse events |

**Conditions we treat**

- Cervical, thoracic and lumbar disc disease
- Degenerative spinal disorders
- Spinal trauma
- Spinal and spinal cord tumors

**Spine and Spinal Cord Surgery**

UF neurosurgeons R. Patrick Jacob, M.D., and Daniel J. Hoh, M.D., are experts in complex spinal reconstruction and instrumentation. The UF spine team performs more than 750 procedures each year. As leaders in the development and application of image-guided and microscope-assisted minimally invasive spine surgery, UF neurosurgeons routinely use these techniques to perform laminectomy, discectomy, and spinal instrumentation and fusion surgery. In addition, the team uses sophisticated new real-time spinal navigation for the placement of percutaneous screws. This involves stereotactic guidance directed by intraoperative CT imaging and allows for the use of multiple small incisions rather than one large incision.

UF neurosurgeons R. Patrick Jacob, M.D., and Daniel J. Hoh, M.D.



William A. Friedman, M.D.



**Trigeminal Neuralgia**

The primary treatment for trigeminal neuralgia is medical. But when medicine fails, surgery is very effective. UF neurosurgeon and department chair William A. Friedman, M.D., is an expert in all surgical approaches for treating trigeminal neuralgia. Every year we operate on more than 150 patients suffering from the excruciating pain of trigeminal neuralgia.

**Our approach**

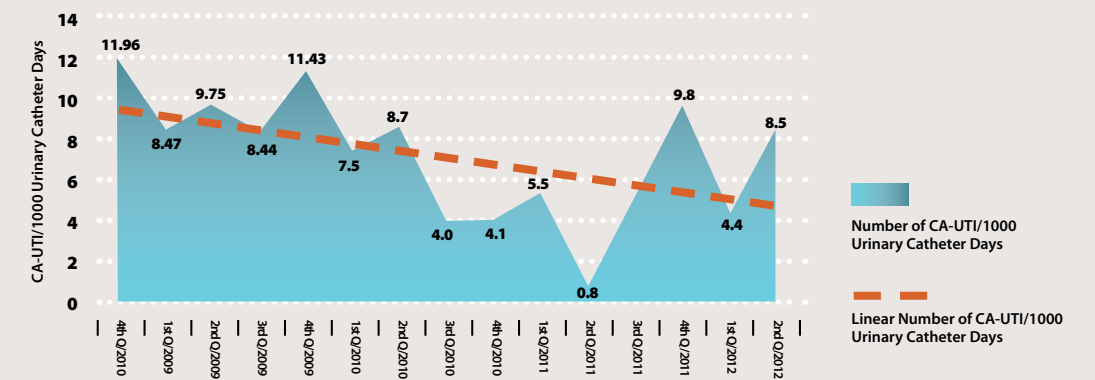
We offer three different surgical approaches for the treatment of trigeminal neuralgia:

- **Microvascular decompression** — This 45-minute procedure identifies and moves arterial compression away from the trigeminal nerve, resulting in pain relief without facial numbness.
- **Radiofrequency lesion** — This 10-minute outpatient procedure eliminates pain by burning the trigeminal ganglion, leading to facial numbness.
- **Radiosurgery** — This outpatient procedure produces pain relief by focusing hundreds of small beams of radiation on the nerve.

**QUALITY INITIATIVE**  
**Reducing Infections**

In April 2012, the *Journal of Neurosurgery* published results from a UF quality initiative called “Reduction of Catheter-associated Urinary Tract Infections Among Patients in a Neurological Intensive Care Unit: A Single Institution’s Success.” This study concluded that a comprehensive urinary tract infection prevention bundle, along with a continuous quality improvement program, can significantly reduce the duration of urinary catheterization and rate of catheter-associated UTI in a neuro ICU.

**Number of 2 NS Catheter-Associated Urinary Tract Infections Rate 2008-2012**





**“Everything good that could have happened, happened, all the right doctors were there.”**

— Barbie Diaz, patient

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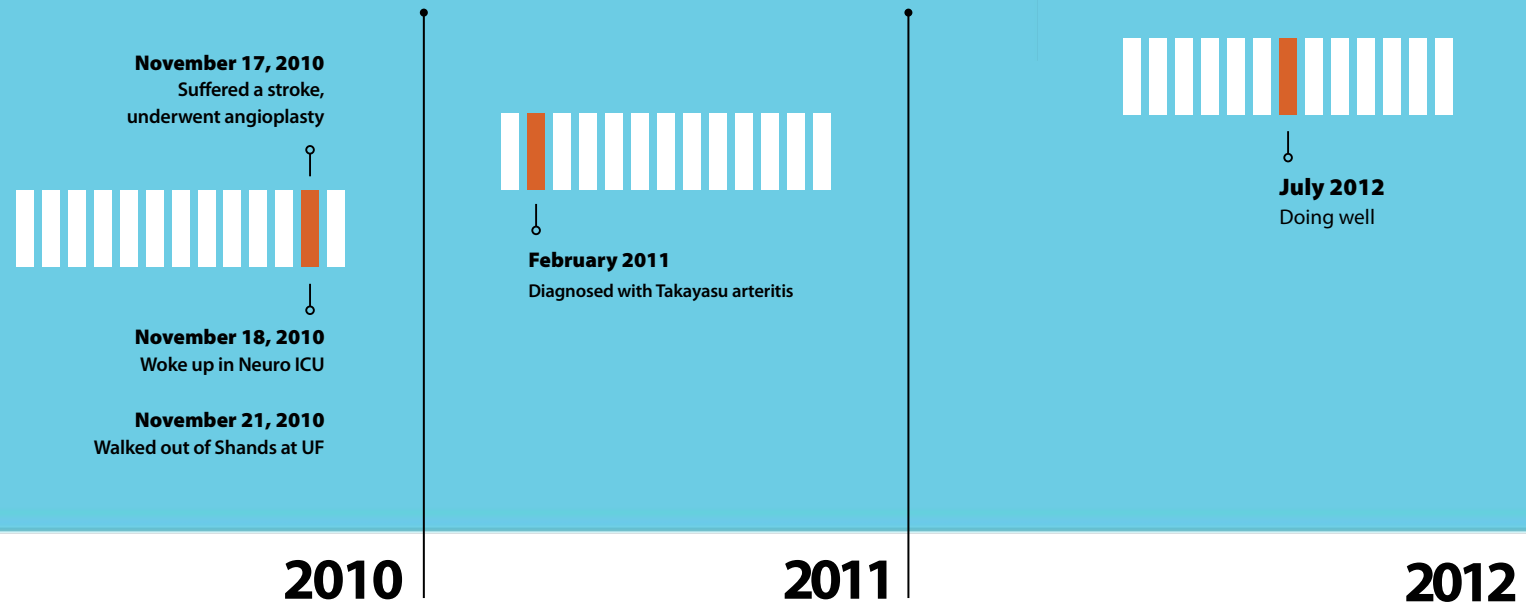
FSE-XL/90  
TR:5100  
TE:102/Ef  
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**Patient: Barbie Diaz | Age:18 | Diagnosis: Stroke**

HEAD  
FOV:22x22  
3.0thk/1.0sp  
40/04:10  
256X224/2 NEX  
St:I/VB

= 782 L = 444

BARBIE'S TIMELINE



**She'd spent the afternoon at the mall, shopping for a birthday present for a friend. But as she was driving back to her dormitory on the University of Florida campus, Barbie Diaz felt something on her face, a crawling sensation, like a spider inching across her cheek. She slapped it away, realizing as she did, that she was slapping away her own left hand. At age 18, Barbie, then a UF freshman, was having a stroke.**

"I ended up running into the median and hitting another car, not head on. I hit their bumper, but it stopped the car," Barbie remembered. "I was thinking, 'Would they be mad if I just fell asleep right now?'"

She was unable to move the left side of her body, and that side of her face drooped. Having studied health extensively in high school, Barbie quickly recognized the signs of a stroke and was able to tell emergency responders, who brought her to Shands at the University of Florida.

After an angiogram revealed a blood clot obstructing her right carotid artery and right middle

cerebral artery, endovascular surgeon Brian Hoh, M.D., performed balloon angioplasty to open the right internal carotid artery. He then used a Penumbra clot aspiration catheter to remove the clot. Afterward, function was almost fully restored to her left side, which had been paralyzed during the stroke.

As it turned out, Barbie's unusual stroke stemmed from a rare autoimmune disease called Takayasu arteritis, which causes inflammation in the arteries. She now takes medication and visits the hospital once a month for infusions to keep the inflammation at bay. Hoh

and Barbie's stroke neurologist, Michael Waters, M.D., director of the Shands at UF Stroke Program, also monitor her closely to ensure she does not suffer another stroke.

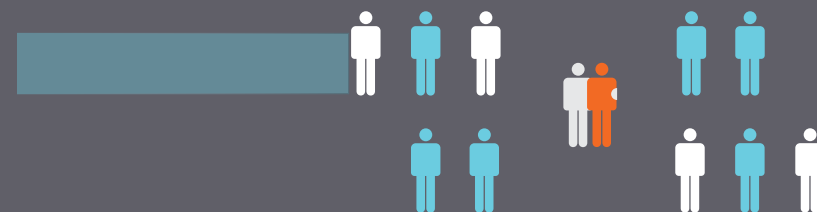
Two years have passed, and luckily, Barbie has few physical effects from the stroke. She's on track to go to nursing school at UF and hopes to conduct research on her disease.

"Everything good that could have happened, happened," Barbie said. "All the right doctors were there."



Download an iBook with Barbie's case study at [www.urlwillgohere.com](http://www.urlwillgohere.com)

BARBIE'S TEAM



- ① Endovascular neurosurgeon
- ② Stroke neurologist
- ③ Nurses
- ④ Technicians
- ⑤ Pediatric immunologist



**WHO WE ARE:**

24/7 AVAILABILITY OF  
STROKE NEUROLOGISTS  
AND ENDOVASCULAR NEUROSURGEONS

The Shands at the University of Florida Stroke Program is dedicated to the prevention, diagnosis and treatment of strokes. Our experts provide the latest technology and medications and care for the stroke patient's entire needs. The optimal treatment for ischemic stroke requires 24/7 availability of stroke neurologists and endovascular neurosurgeons. The goal is to take the stroke patient, as rapidly as possible, for diagnostic imaging. Advanced treatments, including intravenous tissue plasminogen activator and—most importantly—intravascular mechanical retrieval of clots from major brain arteries, can lead to previously unachievable patient outcomes. Surgical intervention for stroke is directed by Brian L. Hoh, M.D., who works with stroke neurologist Michael Waters, M.D. Dr. Hoh provides neurosurgical evaluations of hemorrhagic stroke patients and performs endovascular procedures, including the removal of artery-blocking blood clots, coiling of cerebral aneurysms and carotid artery stenting, as well as open cerebrovascular surgical procedures, such as aneurysm clipping, carotid endarterectomy and removal of arteriovenous malformations. UF treats the third largest number of subarachnoid hemorrhage patients in the country and is the only comprehensive stroke program in north central florida.

- 1 Left MCA stenosis pre-op
- 2 Left MCA stent and angioplasty post-op



## | 24/7 availability | of stroke neurologists and endovascular neurosurgeons.

The Shands at UF Stroke Program has been recognized by these health care industry leaders:

For the third year in a row, the **American Heart Association/American Stroke Association** honored the Shands at the University of Florida Stroke Program with its Get With The Guidelines Stroke Gold Performance Award. The Stroke Program also received the **Target: Stroke Honor Role**

this year, an elevated distinction. Only current Get with the Guidelines Stroke Achievement Award-winning hospitals are eligible for this honor. The Agency for Health Care Administration has accredited Shands at UF as a **Primary Stroke Center**, meeting the criteria of the Joint Commission.

The UF Department of Neurosurgery is home to one of just two neurosurgical endovascular fellowships approved by the **Accreditation Council for Graduate Medical Education** in the country.

**WHO WE ARE:****BRIAN HOH, M.D.****MICHAEL WATERS, M.D., PH.D.**

Brian Hoh, M.D., is a board-certified neurosurgeon who specializes in all aspects of cerebrovascular and endovascular neurosurgery. In addition to his work with the Shands at UF Stroke Program, Dr. Hoh is program director of neurosurgery, leads the neuroendovascular fellowship program, and is the chief principal investigator of an international multicenter trial for patients with large and giant intracranial aneurysms. He has published more than 120 scientific papers in leading journals, and his research is funded by the National Institutes of Health. Dr. Hoh serves as treasurer for the Joint Association of American Neurological Surgeons/Congress of Neurological Surgeons Cerebrovascular Section. He also is on the editorial board of the *Journal of Neurosurgery*.

Michael Waters, M.D., Ph.D., is a board-certified vascular neurologist and director of the Shands at UF Stroke Program. He leads the acute stroke team, helping to ensure that UF&Shands remains at the forefront of acute stroke care. With other members of the stroke team, Dr. Waters directs the implementation of the American Stroke Association's Get with the Guidelines national stroke database and quality assurance program and serves as site principal investigator for clinical trials designed to improve clinical outcomes in stroke. Dr. Waters' research is funded by the National Institutes of Health.

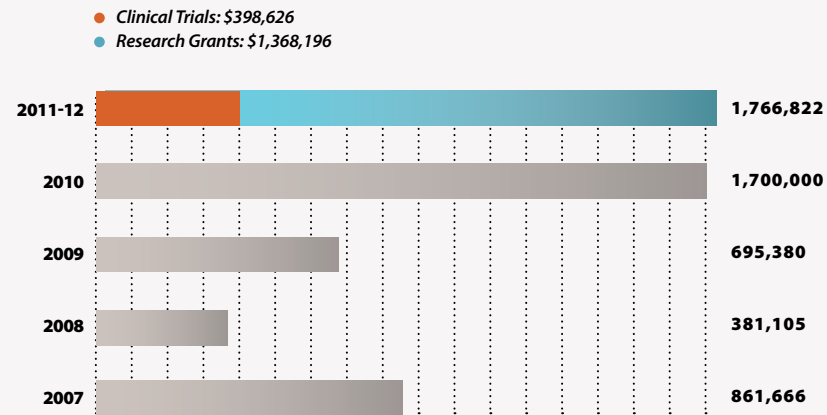
Other members of the Shands at UF Stroke Program team include UF neurosurgeon Spiros Blackburn, M.D., and UF neurologists Anna Khanna, M.D., Vishnumuthy Shushrutha Hedna, M.D., and Bayard Miller, M.D.

**OUR DISCOVERIES: a selection of recent publications**

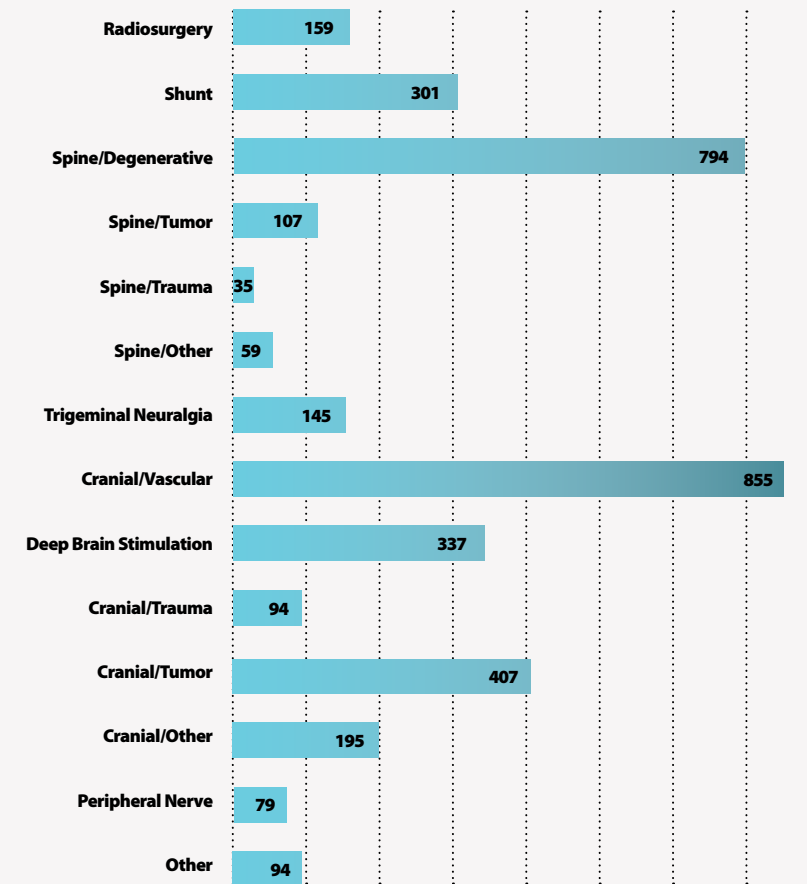
1. "Effect of Weekend Compared to Weekday Stroke Admission on Thrombolytic Use, In-Hospital Mortality, Discharge Disposition, Hospital Charges, and Length of Stay in the Nationwide Inpatient Sample Database: 2002-2007." *Stroke*, 2010. Authors: Hoh BL, Chi YY, Waters MF, Mocco J, Barker FG II
2. "Monocyte Chemoattractant Protein-1 Promotes Inflammatory Vascular Repair of Murine Carotid Aneurysms via a Macrophage Inflammatory Protein-1 $\alpha$  and Macrophage Inflammatory Protein-2-Dependent Pathway." *Circulation*, 2011. Authors: Hoh BL, Hosaka K, Downes DP, Nowicki KW, Fernandez CE, Batich CD, Scott EW
3. "Stenting versus aggressive medical therapy for intracranial arterial stenosis." *The New England Journal of Medicine* 365(11): 993-1003, 2011. Authors: Chimowitz MI, Lynn MJ, Derdeyn CP, Turan TN, Fiorella D, Lane BF, Janis LS, Lutsep HL, Barnwell SL, Waters MF, Hoh BL, Hourihane JM, Levy EI, Alexandrov AV, Harrigan MR, Chiu D, Klucznik RP, Clark JM, McDougall CG, Johnson MD, Pride GL Jr, Torbey MT, Zaidat OO, Rumboldt Z, Cloft HJ, and the SAMMPRIS Trial Investigators
4. "Guidelines for the Management of Aneurysmal Subarachnoid Hemorrhage: A Guideline for the Management of Aneurysmal Subarachnoid Hemorrhage: A Guideline for Healthcare Professionals from the American Heart Association/American Stroke Association." *Stroke*, 2012. Authors: Connolly ES Jr, Rabinstein AA, Carhuapoma JR, Derdeyn CP, Dion J, Higashida RT, Hoh BL, Kirkness CJ, Naidech AM, Ogilvy CS, Patel AB, Thompson BG, Vespa P



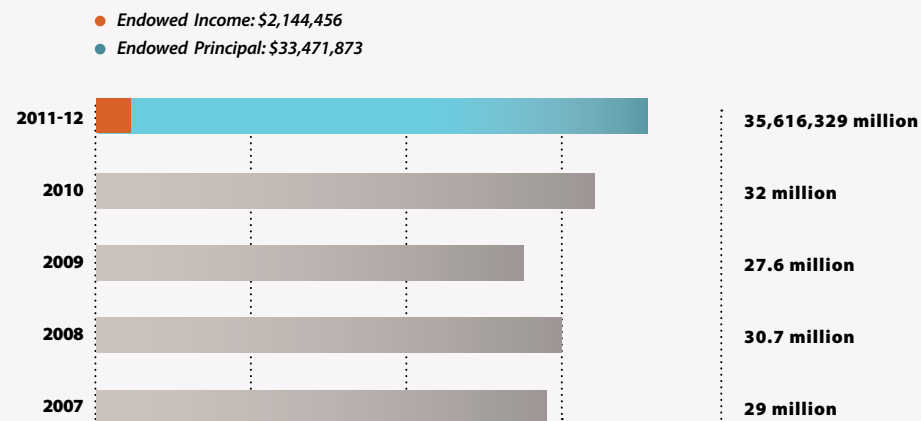
**Extramural Funding**  
(excluding Shands and  
VA housestaff and  
Foundation funding)  
2007-2012



**Number of Procedures 2011**  
includes adult and pediatric cases  
performed at Shands at UF and  
the Malcom Randall Veterans  
Affairs Medical Center



**Foundation Funding**  
Invested value of donations to  
UF Neurosurgery as of Feb. 1, 2012

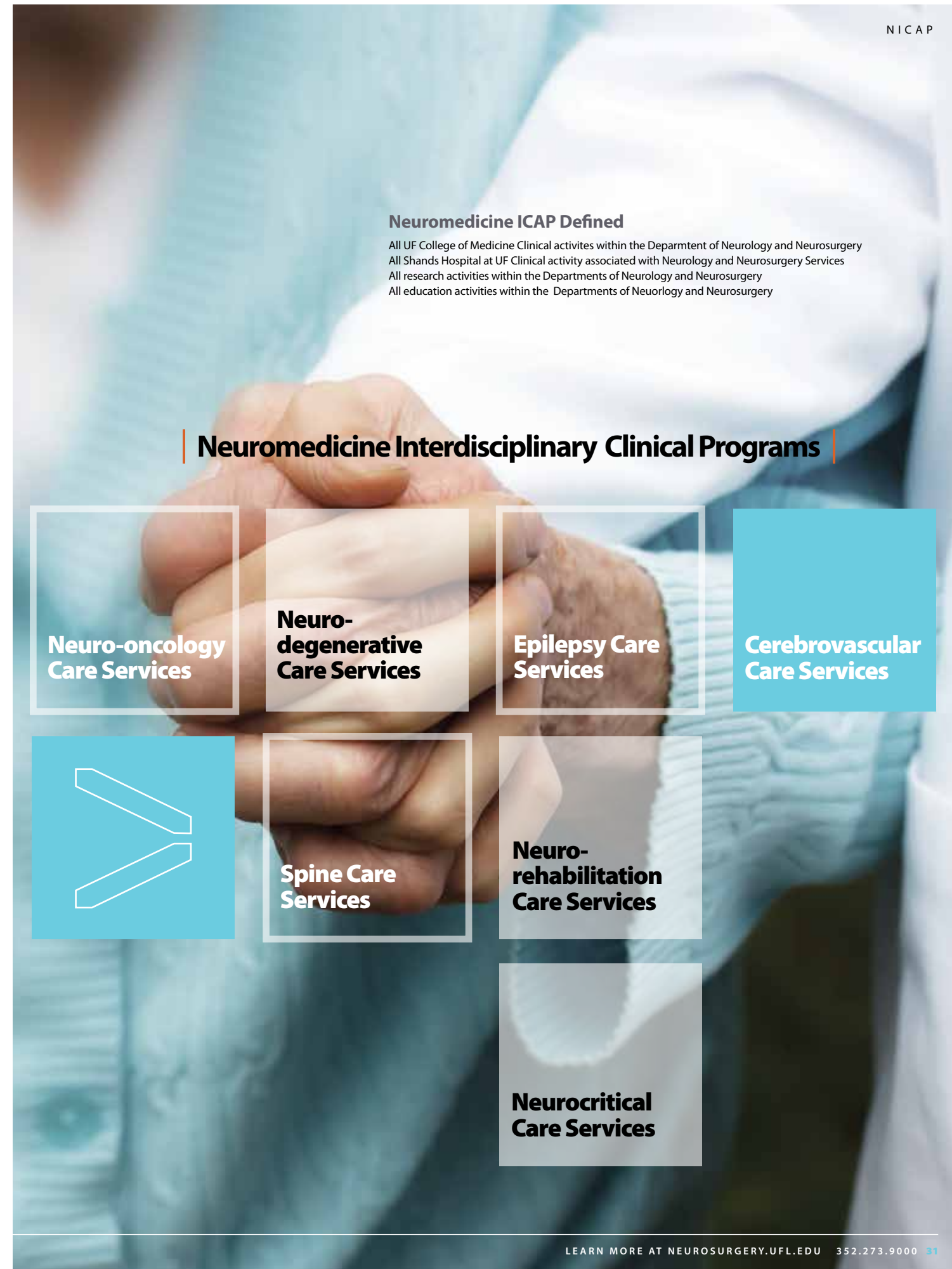


**NICAP: EXCELLENCE THROUGH COLLABORATION**

The **Neuromedicine Interdisciplinary Clinical and Academic Program, or NICAP**, is a unique program developed to improve the patient experience throughout the continuum of care by focusing on safety and quality concerns. It creates a team of faculty and hospital staff members who are charged with allocating faculty and hospital resources to deliver the greatest improvement in terms of quality, operations and finances. Led by **William A. Friedman, M.D.**, chair of the Department of Neurosurgery, NICAP brings together experts from:

- Neurosurgery
- Neurology
- Neuroradiology
- Neuroanesthesiology
- Critical care
- Resident programs
- Nursing
- Rehabilitation
- Shands administration

The **NICAP Mission is to achieve**  
**| the perfect patient experience |**



**Neuromedicine ICAP Defined**

All UF College of Medicine Clinical activities within the Department of Neurology and Neurosurgery  
 All Shands Hospital at UF Clinical activity associated with Neurology and Neurosurgery Services  
 All research activities within the Departments of Neurology and Neurosurgery  
 All education activities within the Departments of Neurology and Neurosurgery

**| Neuromedicine Interdisciplinary Clinical Programs |**

**Neuro-oncology  
Care Services**

**Neuro-  
degenerative  
Care Services**

**Epilepsy Care  
Services**

**Cerebrovascular  
Care Services**

**Spine Care  
Services**

**Neuro-  
rehabilitation  
Care Services**

**Neurocritical  
Care Services**



**“Life is short. I just feel we all have to work hard to have joy in our lives.”**

— Judi Rembert, patient

Signa 1.5T SYS#crm  
Ex: 30675  
Se: 4  
Im: 14  
OAx I28.8

ET:10

R  
104

FSE-XL/90  
TR:5100  
TE:102/Ef

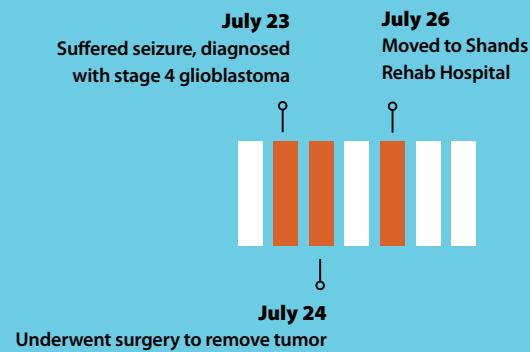
HEAD  
FOV:22x22  
3.0thk/1.0sp  
40/04:10  
256X224/2 NEX  
St:I/YB

782 L = 444

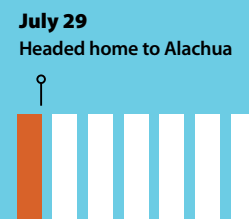
**Patient: Judi Rembert | Age: 69 | Diagnosis: Glioblastoma**

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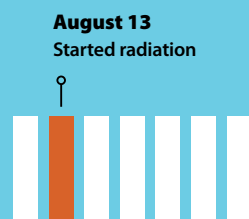
AS



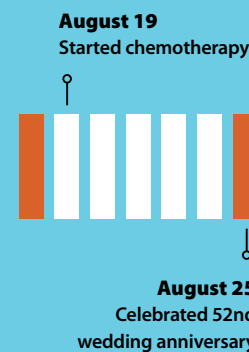
Fourth week  
July 2012



Fifth week  
July 2012



Third week  
August 2012



Fourth week  
August 2012

JUDI'S TIMELINE

**In the days leading up to her summer vacation in the mountains of North Carolina, Judi Rembert started forgetting how to walk. She veered to the left side and began to drag her left leg. Once, on a walk with a friend, the other woman had to remind her how to move, urging her forward saying, "Heel, toe ... heel, toe... heel, toe." Judi visited a neurologist but put off further testing until after her vacation. But in North Carolina, things grew worse.**

"I kept walking more to the left. I kept walking into people. I would be driving down the road and look up and see a car coming at me. I know the Lord was watching out for me," she said. "It got to the point where I could not even button my clothes. I knew I was really in trouble. I said, "We have to go home."

Thirty minutes after arriving home at their farm in Alachua, she had a seizure.

Judi was rushed to Shands at UF, where testing revealed she had a stage 4 glioblastoma, a plum-sized tumor affecting the left side of her brain. The diagnosis came just five years after the Remberts led efforts to raise money for construction of

the new Shands Cancer Hospital at UF and donated \$5 million to the cause themselves.

After her diagnosis, the Remberts met with UF neuro-oncologist Erin Dunbar, M.D., who co-directs the Preston Wells Jr. Center for Brain Tumor Therapy with neurosurgeon William A. Friedman, M.D. Together, they developed a plan of attack. After Friedman operated to remove the tumor, Judi went to Shands Rehab Hospital, where therapists helped her recover some of the function she lost in her left side. In August, she started chemotherapy and radiation.

Just two months after her diagnosis, she has regained much

of her function in her left side. With cancer, the road ahead is always uncertain, but a born giver, she's already making plans for how she can help people. She wants to volunteer at Shands Rehab Hospital and bring people fuzzy blankets like the one her daughter, Mary, gave her when she was in the hospital.

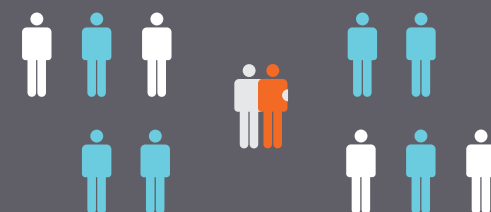
Other than that, she is just enjoying life with her family. She and husband Davis just celebrated their 52nd wedding anniversary in August.

"Life is short," Judi said. "I just feel we all have to work hard to have joy in our lives. That is what I am going to do as long as I can."



Download an ebook with Judi's case study at [www.urlwillgohere.com](http://www.urlwillgohere.com)

JUDI'S TEAM

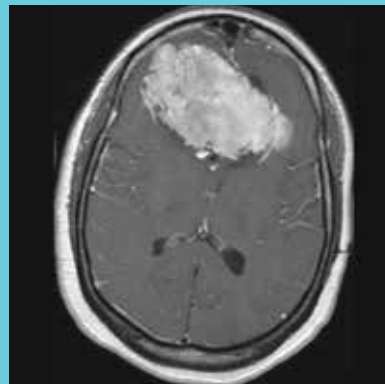


- ① Neurosurgeon
- ② Neuro-oncologist
- ③ Neurologist
- ④ Dedicated nurse navigator
- ⑤ Nurses
- ⑥ Radiation oncologist
- ⑦ Speech therapist
- ⑧ Occupational therapist



**COMPREHENSIVE CARE**

The physicians in the University of Florida Department of Neurosurgery treat every type of brain tumor using novel techniques and devising comprehensive treatment plans to tackle each patient's complex case. The neurosurgical team performs more than 500 brain tumor procedures annually. In addition to these renowned neurosurgeons, the Brain Tumor Board also includes medical oncologists, radiation oncologists and other specialists to provide complete treatment for each patient.



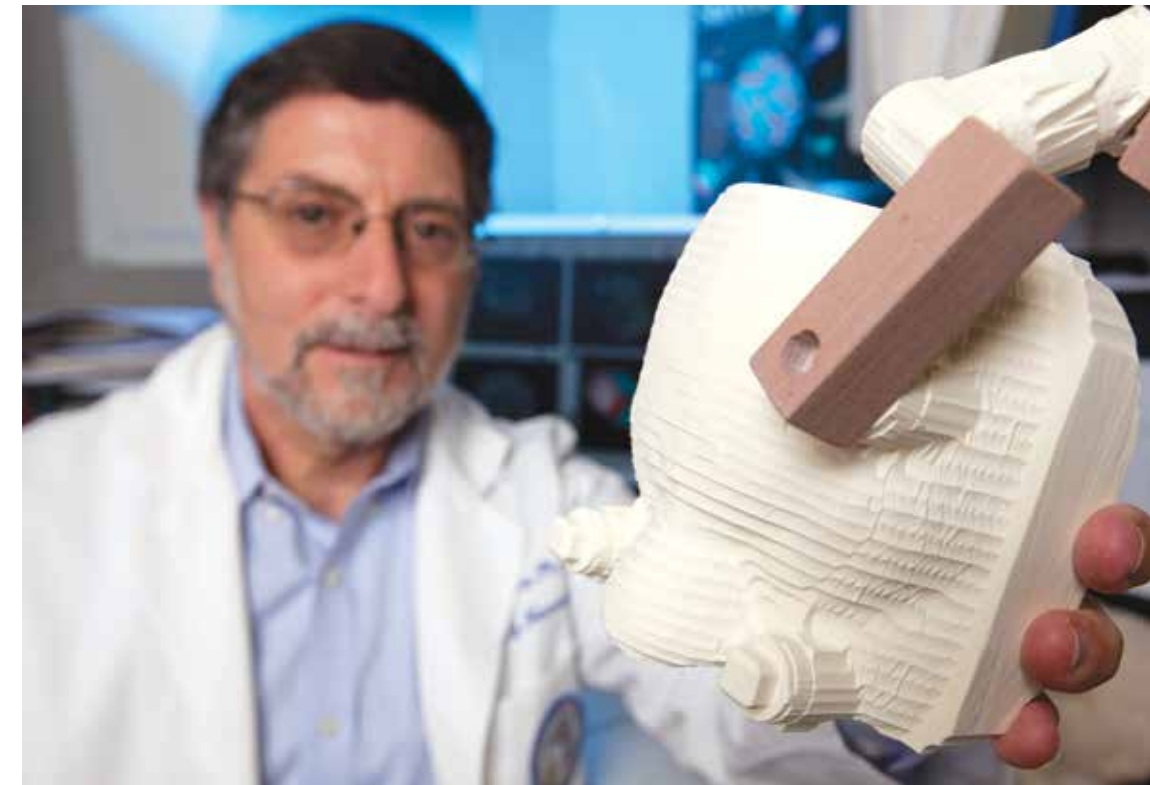
Pre-op Meningioma



Post-op Meningioma

**Conditions we treat**

- Brain and spinal cord tumors
- Craniosynostosis
- Congenital anomalies and malformations (such as Chiari malformation, Moya Moya disease and Vein of Galen malformation)
- Spina bifida
- Spasticity
- Epilepsy
- Trauma
- Hydrocephalus



Frank Bova, Ph.D., holds a custom patient surgical guide, which provides surgeons with the precise location of an intracranial target. The mold is designed from a CT or MR scan and provides surgical guidance at a fraction of the cost of other techniques.

**Measures Of Excellence**

As established leaders in the use of radiosurgery for the treatment of neurological disorders, faculty members in the UF Department of Neurosurgery have achieved a high level of quality patient outcomes in terms of cure and complication rates.

Pathology:	Cure Rate:	Complication Rate:
Arteriovenous Malformations	85%	2%
Vestibular Schwannoma	90%	1%
Meningioma	95%	2%
Metastatic Tumor	85%	5%



A linear accelerator-based radiosurgical system developed at the University of Florida Department of Neurosurgery has become one of the most popular commercial radiosurgery systems worldwide. The system, known as the LINAC Scalpel, assists with localizing, planning and treating intracranial tumors using computer software and a specially designed linear accelerator. Frank J. Bova, Ph.D., and William A. Friedman, M.D., created the system, which has improved the accuracy of high-dose radiation delivered to brain tumors with very little of the dose reaching normal brain structures.

**LINAC SCALPEL**

**WHO WE ARE:****WILLIAM A. FRIEDMAN, M.D.****FRANK J. BOVA, PH.D.****ERIN M. DUNBAR, M.D.**

UF neurosurgeon and department chair William A. Friedman, M.D., and UF professor of neurosurgery Frank J. Bova, Ph.D., pioneered the development of many of the computer-guided surgical devices used worldwide to make brain tumor surgery less invasive, including the patented UF radiosurgery system.

UF neurosurgeon Brian L. Hoh, M.D., provides preoperative endovascular treatment to reduce bleeding risk in select brain tumor patients.

Friedman, together with UF otolaryngologists Patrick J. Antonelli, M.D., and John W. Werning, M.D., offers skull base surgical options and endoscopic approaches for brain tumor patients.

UF medical neuro-oncologist Erin M. Dunbar, M.D., leads a team that provides comprehensive care for all brain tumor patients as part of the Preston Wells Jr. Center for Brain Tumor Therapy. In 2012, the Lillian Wells Foundation donated an additional \$10 million to the center, which combined with other funding sources, launched a \$20 million initiative to help speed new brain tumor therapies to patients.

On the research front, renowned scientists Brent Reynolds, Ph.D., is known for his pioneering work studying stem cell approaches to brain tumor therapy.

**OUR DISCOVERIES: a selection of recent publications**

1. "Radiographic response of brain metastasis after linear accelerator radiosurgery." *Stereotactic Functional Neurosurgery*, 2012. Authors: Rahman M, Cox JF, Chi YY, Carter JH, Friedman WA.
2. "Radiosurgery for Malignant Brain Tumors." *Youman's Neurological Surgery, Sixth Edition*, 2011. Authors: Murad GJA, Friedman WA; Editors: Winn HR, Saunders.
3. "Can standard magnetic resonance imaging reliably distinguish recurrent tumor from radiation necrosis after radiosurgery for brain metastases?" *Neurosurgery*, 2008. Authors: Dequesada IM, Quisling RG, Yachnis A, Friedman WA.
4. "Radiosurgery for metastatic brain tumors: The University of Florida experience." *Neurosurgery*, 2008. Authors: Swinson B, Friedman WA.
5. "Linear accelerator radiosurgery for vestibular schwannomas." *Journal of Neurosurgery*, 2006. Authors: Friedman WA, Bradshaw P, Myers A, Bova FJ.



## **UF&Shands, the University of Florida Academic Health Center**

UF&Shands, the University of Florida Academic Health Center, is the most comprehensive center of its kind in the Southeast. It comprises the colleges of Dentistry, Public Health and Health Professions, Medicine, Nursing, Pharmacy and Veterinary Medicine, and an academic campus in Jacksonville that offers graduate education programs in medicine, nursing and pharmacy. Patient care activities, under the banner UF&Shands, are provided through teaching hospitals and a network of physician practices in Gainesville and Jacksonville. The Academic Health Center also has a statewide presence through satellite medical, dental and nursing clinics staffed by UF health professionals; and affiliations with community-based health-care facilities stretching from Hialeah and Miami to the Florida Panhandle.

## **Shands at the University of Florida**

Shands at UF is one of the Southeast's premier teaching hospitals and the state's leading medical referral center. More than 900 expert UF College of Medicine and community physicians along with 7,297 skilled Shands nursing and support staff provide comprehensive high-quality patient care, from primary care and family medicine to subspecialty tertiary and quaternary services for patients with highly complex medical conditions. Shands at UF includes Shands Hospital for Children, the Shands Pediatric Emergency Room, Shands Cancer Hospital and Shands Critical Care Center. Shands at UF also operates the health system's two specialty hospitals, Shands Rehab Hospital and Shands Vista, both located in Gainesville.

## **National Acclaim**

Shands at UF consistently earns top-50 rankings in multiple medical specialties in the annual listing of America's Best Hospitals, published by *U.S. News & World Report*. Shands Hospital for Children at the University of Florida has been recognized among the nation's best in seven medical specialties in the 2012-2013 U.S. News Best Children's Hospitals rankings. Neurosurgery was ranked 32nd in 2012, the highest in the state of Florida. Our hospitals and programs have earned "Magnet" designation by the American Nurses Credentialing Center, the nursing profession's most prestigious honor.