For every health need, there’s an expert for you. With four hospitals, ten community clinics and over 1,000 physicians, University of Utah Health Care offers award winning quality and value to keep your family healthy, no matter what age or need.
This simple quote by American author and political activist Helen Keller highlights the profound impact that an environment of cooperation and teamwork can provide.

With this in mind, it is with great pleasure that we present to you the 2013 edition of Convergence.

For this year’s issue we have chosen the theme of Collaboration, a notion shared by many, but one that we at the Clinical Neurosciences Center (CNC) feel uniquely positioned to practice.

Nearly 10 years ago, University of Utah Hospital officially created the CNC and combined the disciplines of Neurology, Neurosurgery and Neuroradiology. Since then, the CNC has thrived on a foundation of collaboration, working together with one goal in mind – to provide patients with exceptional quality care.

Today, that collaborative effort can be seen on a daily basis and in a variety of ways, whether it is in the classroom, the research lab or the hospital with patients.

In the following pages you will read stories and get a small sample of how physicians, nurses and staff at the CNC are crossing department and institutional lines to work together. For example:

- How physicians are teaming up to research new treatments for soldiers with post-traumatic headaches
- How a patient who suffered a stroke during a bike race from Logan, Utah, to Jackson Hole, Wy. (LOTOJA), benefited from University of Utah Hospital’s stroke team
- How CNC physicians are working on groundbreaking ways to improve Deep Brain Stimulation surgery using imaging techniques
- How a brain tumor patient was able to participate in the famed IRONMAN Triathlon just two weeks after chemotherapy

As leaders in the medical community, we have a commitment to find and implement better medical solutions for patients. Here at the CNC we understand that this pursuit cannot be accomplished alone, nor should it be. Rather, it takes a team of dedicated professionals across a variety of disciplines working toward a common goal because “Together, we can accomplish so much.”

On behalf of everyone at the Clinical Neurosciences Center, we hope you enjoy this year’s edition of Convergence.
2013 Clinical Neurosciences Center

Highlights

Completed and opened the world’s first 3T Intraoperative MRI suite catered to stroke patients

Planned and executed a number of regional and national neuroscience conferences

• 3rd Intensive Interactive Brain and Spine Imaging Conference
• 10th Annual Stroke Symposium
• Spring and Fall Western Intermountain Neurological Organization conferences (WINO)

Became the Intermountain West’s first and only Comprehensive Stroke Center

Creation of the region’s first Lewy Body Dementia Clinic

Implementation of an in-utero surgery program to treat spina bifida

Established Neurostream, a weekly live stream of Neurology and Neurosurgery Grand Rounds presentations

Featured in the 2013 Sundance Film The Crash Reel, a documentary film about traumatic brain injury and professional snowboarder Kevin Pearce

Expanded the Telestroke Network to 17 sites across 4 states

Added 6 new faculty members in a number of specialties

For the 5th year in a row, recognized by NeuStrategy Inc. as a national Neuroscience Center of Excellence

Became an official pipeline training site for brain aneurysm treatment

Recognized by Regence as a Blue Distinction Spine Center

Among the top 20 hospitals in the country in terms of the number of Deep Brain Stimulation (DBS) evaluations and implantations

Over 3,100 patients currently enrolled in various clinical trials

One of the few organizations in the country with NIH NeuroNext, StrokeNet, and CTSA designations

Neurology residency increased from four to six residents per year

Became an official endovascular stroke training site

Continued involvement with a variety of community events

• Artilepsy
• Be Well Utah Health Fair
• Cars for a Cure Golf Challenge
• Seize the Night 5K Walk/Run

Received the prestigious Quality Leadership Award from the University HealthSystem Consortium (University of Utah Health Care Recognition)

For the 4th year in a row, received the American Heart/American Stroke Association’s Gold Plus Award for Stroke Excellence

Top Ten

In Quality, Four Years in a Row.

TOP TEN

IN QUALITY, FOUR YEARS IN A ROW.

Received the prestigious Quality Leadership Award from the University HealthSystem Consortium (University of Utah Health Care Recognition)
As a consequence of the United States’ conflicts abroad, soldiers are coming back alive but they are often suffering. Advancements in armor and protective gear are saving them from the shrapnel and bullets that, in wars past, would have been deadly and debilitating. But as always, the flesh inside is still vulnerable.

“Everyone knows about PTSD or shell shock,” says University of Utah Health Care researcher Dr. K.C. Brennan. “But what people don’t realize is that there are many more injuries to the body and brain that aren’t easily seen. More than half our soldiers are coming back with post-traumatic headaches. These are like having a bad migraine every day and it really takes them out of commission. Others return with seizures or epilepsy.”

Dr. Brennan is the division chief of Translational Neuroscience in the University’s Department of Neurology. He is working on what has become known as Military Traumatic Brain Injury. It is a special designation that has arisen out of the large numbers of soldiers whose brains have been jarred, often multiple times, by concussive blasts and who are still suffering the consequences. Brennan has teamed up with Dr. Ed Dudek, vice-chair for research in the Department of Neurosurgery, who studies epilepsy – to examine the shared susceptibility to seizures and headaches after military TBI.

“The diseases we’re studying are very similar,” Dr. Brennan says. “They are excitable disorders of the brain. Epilepsy is likened to a storm in the brain; migraine is a different kind of storm.”

Dr. Brennan and Dr. Dudek are studying the effects of blast injury first in laboratory mice that undergo a comparable brain injury to what our soldiers are enduring. By working in the controlled laboratory situation to do work impossible on a chaotic battlefield, they are able to see how a brain reacts to a blast injury in real time.

“These are hot-off-the-presses, preliminary results,” Brennan says. “But we are seeing that the excitability of individual nerve cells has changed after brain injury. Such changes might be mechanisms of post-traumatic headache and epilepsy.”

Beyond studying the mechanisms, Dr. Brennan and Dr. Dudek want to develop practical treatments for military troops.

“We’re looking for treatments that are instantly deployable,” Dr. Brennan says. “We don’t want to wait for years of development work, so we’re trying to pick drugs that are already in our arsenal – drugs that we now use. If they are promising in the lab, they could move straight to trials in our soldiers.”

Brennan says his work is exciting because it can have a visible impact on the lives of combat troops and it is vital because it has been overlooked for so long.

“Epilepsy and headaches are diseases that have been stigmatized – shoved under the carpet. There is this terrible connotation that these people are wimping out.” he says. “Nothing could be further from the truth. These soldiers’ lives are wrecked because they can’t go back, they can’t do what they see as their duty. We need to do right by them.”

“We don’t want to wait for years of development work, so we’re trying to pick drugs that are already in our arsenal – drugs that we now use. If they are promising in the lab, they could move straight to trials in our soldiers.”

– Dr. K.C. Brennan
Deep Brain Stimulation (DBS) surgery offers relief to patients suffering from movement disorders such as Parkinson’s disease, dystonia, or tremor by blocking abnormal nerve signals that cause involuntary movement. “It’s a profound form of therapy,” says stereotactic and functional neurosurgeon Dr. Paul House. He explains that DBS enables the average Parkinson’s patient to cut his or her medications in half and gain an extra six-to-eight hours a day, during which they are no longer limited by very slow movements or medication side effects like dyskinesias. The average patient also sleeps more than an extra hour each night and can gain 10 to 15 pounds, which benefits some movement disorder patients.

Until recently, the process of implanting electrodes in the brain required the patient to be awake during part of the operation. This allows the team to conduct intraoperative testing to ensure correct electrode placement. As a result, patients fearful of being awake during surgery, or patients whose involuntary movements are so severe that they are unable to hold still in the head frame or on the operating table, were ineligible for the procedure. “Having an awake brain surgery while being in a head frame could particularly be very scary for children with dystonia, who can benefit greatly from DBS. This new method will be a very good option for them,” says movement disorders neurologist Dr. Lauren Schrock.

Thanks to a revolutionary intraoperative MRI suite, physicians at University of Utah’s Movement Disorders Center are able to offer DBS surgery to these patients while they are under general anesthesia by utilizing real-time image guidance, a futuristic feat made possible by a powerful 3T magnet. Dr. House notes that “intraoperative MRI has the advantage of allowing us to see the brain itself. I think this is the way the field will move in the next 10 to 20 years. It’s exciting for us to be able to be part of that in the early stages.”

Dr. Schrock points out that “the great hope is it will be easier on patients and reduce time in the operating room, which should further reduce the already small amount of complications.”

The benefit of this sophisticated surgical method is that physicians can precisely place the electrodes without having to wake the patient to perform intraoperative testing. One patient who benefited from this procedure is a deaf woman with Parkinson’s disease. Traditional DBS surgery was not available to her because she was unable to communicate with the team without her translator, who could not safely be in the surgical suite during the operation. “The only reason she was able to have DBS surgery was because of our ability to place the leads using the intraoperative MRI,” says Dr. Schrock. “She’s doing amazingly well with it and is enjoying a better quality of life.”

In addition to being on the cutting edge of technology, the Movement Disorders Center is also at the forefront of world-class patient care. Each patient coming to the clinic is seen by a team of specialists, including Dr. Schrock, Dr. House, physical therapist Dr. James Ballard, and neuropsychologist Dr. Thomas Schenkenberg. The physicians conduct thorough evaluations and screening tests, then meet as a team to determine each patient’s candidacy for surgery and to make individualized plans. “It’s clear that we’ve all on the same team, and we work together to evaluate and care for each patient. We want to make things go very well for all of our patients,” says Dr. Schrock. “They are receiving the best of the group’s expertise,” adds Dr. House. “I think there’s a lot of benefit to that.”
Experts estimate that up to two-thirds of the population will be affected by neck pain caused by degenerative cervical spine disease at some point in their lives. In addition to neck pain, other symptoms such as loss of mobility or numbness and weakness in the shoulders, arms and hands can greatly impact a patient’s quality of life.

Recognizing the debilitating impact this condition has on patients, neurosurgeon Dr. Erica Bisson, who specializes in treating spinal disorders, and neuroradiologist Dr. Lubdha M. Shah, the director of spine imaging, are working together to develop new magnetic resonance imaging (MRI) sequences that will help them better identify, monitor and treat spine diseases.

Dr. Bisson explains that traditional MRI techniques produce high-quality images of soft tissue architecture in the spine and gives physicians the ability to visualize the anatomy in three dimensions. The traditional sequences are based on free water content and the magnetic properties of the tissues, and enables physicians to visualize degenerative spinal conditions, tumors, traumatic injuries and infections. While current imaging is an essential tool in treating patients, the improved imaging may allow for the development of biomarkers associated with disease severity that can be used to track the progress of their patients.

Additionally, the new MRI sequences will enable physicians to look in more detail at the micro architecture and functional integrity of the spine and spinal cord, specifically in relation to chronic spinal cord injuries seen in degenerative cervical disease. “The search for better imaging techniques is, for the most part, to identify new parameters that will help us specify not only severity of disease, but how we may intervene in the disease process to better treat our patients,” says Dr. Bisson. “The hope is that these new techniques will help us guide patient treatment down the road.”

Dr. Bisson and Dr. Shah’s collaboration demonstrates the passion and dedication of the staff at University of Utah’s Clinical Neurosciences Center, where physicians and researchers routinely collaborate to develop innovative techniques and better treatments for their patients. Dr. Bisson and Dr. Shah note that their team collaborates with neurosurgery, neuroradiology, and neurology, as well as with other academic medical centers. “Interdepartmental collaboration allows us to brainstorm novel ideas and techniques with input from the varying disciplines,” says Dr. Shah. “This ensures that our aims are directed at translational research that will result in improvements and be pivotal in the continued care of our patients.”

“We make a great team,” remarks Dr. Bisson, who attributes their successful collaboration to the combination of her clinical acumen and Dr. Shah’s mastery of MRI techniques. “Here at the university we have an incredible team of collaborators, and the work we do together allows us to be on the cutting edge of research in this field,” says Dr. Bisson. “It’s an exciting prospect to be able to identify imaging techniques and new avenues of treatment that can help us provide better care for our patients.”

“Interdepartmental collaboration allows us to brainstorm novel ideas and techniques with input from the varying disciplines.”

- Dr. Lubdha M. Shah
Brian Hultman had raced the grueling 206-mile LOTOJA course (from Logan, Utah, to Jackson Hole, Wyo.) nine times prior to what was to be his tenth and final outing on Sept. 7, 2013. Hultman loved competitive cycling but it was time to give it up. He wanted to spend more time with his growing children, ages 3, 8, and 11, and get off the training treadmill and into another stage of life. On that day in September, he was feeling good. He’d completed all three of the course’s toughest climbs. The worst behind him, all that was left was a comparatively easy 70-mile cruise through some of the most scenic parts of Wyoming.

“My vision went really loose on the left side,” Hultman says of the moments before his memory fades to black. “Then my hands were stuck on my bars and my right leg was really stiff. I had to stop. The highway patrol guy was telling me it was going to be OK and that an ambulance was on its way. I don’t remember much after that.”

Found on the side of the course by a Wyoming State Trooper, the then-45-year-old had suffered a major stroke caused by a blood clot in his brain. And, were it not for a high level of medical collaboration, Hultman would not be able to tell his tale. The process began in Afton, Wyo., and ended on an operating table at University of Utah Medical Center.

“This is cutting-edge stuff, only offered at a few centers,” says Hultman’s interventional neurologist, Dr. Michael Wilder. “There were a lot of things that went right for him. We got him attention at the first hospital very fast and had him brought down to University of Utah Hospital quickly, where we had a team assembled and waiting.”

Wilder consulted with the hospital in Wyoming and was able to quickly ask the doctors there to administer intravenous “clot-busting medicine,” which helped mitigate brain damage. Once Hultman was in Salt Lake City, the medical team used advanced imaging technology to determine his candidacy for a surgical option. Then they employed a cutting-edge and minimally invasive X-ray-guided procedure to extract the remaining clot from his brain.

“Being able to consult with hospitals in areas that may not have the training or equipment to handle a stroke allows us to streamline the treatment and opens up a lot more options,” Wilder says. “In Brian’s case, the clot busters we ordered bought us time and we were then able to remove much of the clot from the clogged vessel in his brain. It led us to a much more successful outcome.”

Calling Hultman’s recovery “dramatic,” the neurologist ultimately gives credit to the cyclist’s athletic and competitive nature for how far he’s come.

“Brian is a very determined and motivated guy,” Wilder says. “He is expressing frustration that he’s not getting better faster while everybody on our team is blown away at his recovery pace. He’s a fighter.”

And, although Hultman knows he has a long way to go, he says he’s just taking it one pedal stroke, one climb at a time.

“I promised myself early on in this that each day is going to be a new day,” he says. “I don’t want to think about how much better everybody says I am. I want to prove to them that I am truly better.”
It is 4 p.m. on Monday – a time when most people begin to wind down on what many consider to be the toughest day of the week.

For a select group of physicians at the Clinical Neurosciences Center (CNC), however, 4 p.m. on Monday signifies the beginning of one of the newest collaborative efforts in patient care at University of Utah Hospital – the weekly Neurovascular Conference.

First introduced in spring of 2013, the CNC’s weekly Neurovascular Conference is a structured time when neurologists, neurosurgeons, neuroradiologists, vascular surgeons and cardiothoracic surgeons come together to openly discuss and debate current patient cases, as well as options for treatment.

The concept originated because of the high volume of complex neurovascular cases coming in to University of Utah Hospital, and is based on similar conferences held at some of the nation’s top academic medical centers.

The unique assembly of CNC physicians is moderated each week by the division director of Neurocritical Care Dr. Safdar Ansari, and has resulted in a fresh approach to patient care.

“Providing the best patient care, especially for complex conditions like stroke, brain hemorrhage or vascular malformations, is never a one-person job,” says Dr. Ansari. “There has always been a great deal of teamwork and collaboration among departments at the CNC and this conference is proving to be one more layer of collaborative expertise that is making a big difference.”

Prior to every Neurovascular Conference, Dr. Ansari invites all neuroscience physicians to submit current patient cases they would like presented. Dr. Ansari then screens every case, prepares a formal case list, and moderates the discussion to ensure each condition is covered adequately and that all clinical and diagnostic questions are addressed.

“Getting so many physicians together at one time to discuss cases is a rare opportunity, but each physician has different specialties and backgrounds, and we all have a common focus and interest in cerebrovascular disease,” says Dr. Ansari. “To think that there wouldn’t be disagreements from time to time would be unrealistic. The important thing is that the entire discussion is done in an academic and professional manner, and it’s all accomplished with one goal in mind – to devise the best possible diagnostic and treatment plan for very rare, complex and complicated brain disease.”

Once the conference begins, the patient’s attending physician presents the case, including any treatment up to that point, and reviews any tests that have been conducted, such as CT scans, MRI scans or cerebral angiograms. From there, the discussion unfolds, a roadmap for future diagnostic tests is determined and, with the consensus of the assembled group, a plan for intervention and treatment is designed. The summary of the week’s decisions is then distributed to all members.

“What makes this work is the fact that each of us understands we have valuable experience and a unique expertise to bring to the table, and that we can also learn a great deal from each other. That’s what this conference is all about – to provide a proactive and interactive environment where discussion is encouraged, opinion is appreciated, and complex patient care plans are formulated,” said Dr. Ansari.

In the short time the conference has taken place, the feedback has been extremely positive. As a result, additional Neurovascular Conferences are being considered, based upon the frequency of cases needing to be discussed.

“What we’re learning is that the Neurovascular Conference provides a truly collaborative environment in which physicians can address patient needs,” says Dr. Ansari. “With that goal in mind, this model is one we plan to adopt long-term.”

“Providing the best patient care, especially for complex conditions like stroke, brain hemorrhage or vascular malformations, is never a one-person job.”

- Dr. Safdar Ansari
Iron Dean

Triathlete perseveres with dream to compete in the world’s toughest race

On the dry side of the Big Island of Hawaii, the sun beats down upon the stark expanses of lava that run into the churning ocean. Heat waves rise from the pavement cutting across the lava fields and the men and women who earn the right to run, bike and swim in the IRONMAN World Championship at Kailua-Kona suffer through every mile of the world’s most famous triathlon. Only one of them, however, just came off of two brain surgeries and a summer full of experimental chemotherapy, with the last treatment taking place two days before the race.

Dean Bullock doesn’t quit.

“He just has that kind of an attitude,” says his wife, Kris Bullock. “You can moan about it or you can get on with your life and just do what you’re going to do.”

Nearly a year before the 2013 IRONMAN, Dean was out on a training run with friends and “just didn’t feel right,” he says. “So I went home and I guess I was acting funny.”

As you might imagine, the modest-to-a-fault, 59-year-old label salesman from Orem, Utah, isn’t the type to run to the doctor. But after his family finally got him to the local clinic it was apparent that something was not, in fact, “right.” After an ambulance ride to Provo Hospital and emergency surgery, Bullock woke up to a new world, in which the father of nine, devoted husband and aspiring IRONMAN had brain cancer.

Bullock was then evaluated by Dr. Howard Colman, Dr. Randy Jensen, and Dr. Dennis Shrieve – physicians at the Brain Tumor Clinic at University of Utah Hospital and the Huntsman Cancer Institute. Because of an integrated clinical trials program, Bullock qualified for cutting-edge treatments for this aggressive tumor. The program, explains Dr. Colman, is not unique to Utah but it is one of the most effective he has seen.

“We have very little friction getting things done here,” Dr. Colman says. “Our clinical trials office and clinical research team are outstanding and allow us to offer our patients access to cutting-edge therapies.”

Bullock’s tumor was tested for a specific mutation in the EGFR gene, which made him eligible to receive an experimental vaccine to prime the body’s immune system to target this mutation in the cancer cells, along with standard radiation and chemotherapy.

He did well for about a year on this treatment, but then an MRI showed a recurrence of the tumor. The surgical team, led by Dr. Jensen, removed the tennis-ball-sized tumor and Bullock enrolled in another clinical trial using a novel combination of drugs.

It was this treatment that helped earn Dean a green light to compete in the IRONMAN, and the training gave him something to fight for, Kris says.

“After the doctors cleared him he was like, ‘what’s next, let’s go,’” she says. “So our kids agreed to train with him and helped make sure that there was a carrot out there to chase. Dean thrives under those circumstances and it was a great way to spend time with his children.”

So, after two brain surgeries and a host of traditional and experimental chemotherapies, including receiving his most recent dose just days before the race, Dean competed in the 2013 IRONMAN.

He completed the swim but was forced to drop out in the final five miles of the 107-mile cycling leg after missing a mandatory cutoff time. But the experience gave him more time with his children and a memory-laden family trip to Hawaii.

The following day, after the course was cleared and the pageantry of the IRONMAN had been swept away, he ran the last leg anyway, the IRONMAN marathon course, with his family by his side.

Because Dean Bullock doesn’t quit.
Over a two-day period in October 2013, approximately 10 experienced and nationally respected endovascular neurosurgeons and neuroradiologists arrived at University of Utah Hospital. They had been invited to take part in a new course that would give them advanced learning and insight related to the Pipeline procedure, a new minimally invasive technique that completely eliminates complex open brain surgery for brain aneurysms.

Sitting at the head of this course, and the one tasked with teaching the impressive group, was Dr. Phil Taussky, a young neurosurgeon who completed his fellowship training at the Mayo Clinic under Dr. Ricardo Hanel just 15 months earlier.

The Pipeline procedure involves placing a stent across the neck of an aneurysm by a minimally invasive approach through a puncture in an artery in the leg, resulting in occlusion of the brain aneurysm over time.

The technique, while offering patients a true cure of their aneurysm, remains challenging to execute, and only a few physicians in the country are certified to perform the procedure. The certification process is complex and requires doctors to complete a minimum of 10 successful procedures. Dr. Taussky has performed over 100 Pipeline procedures and is now recognized as an expert in the field.

Dr. Taussky’s experience and expertise with Pipeline is the catalyst behind a collaborative effort between Covidien, manufacturer of the Pipeline device, University of Utah Health Care, and the Departments of Radiology and Neurosurgery. Together, they have established an Advanced Pipeline Course designed to give certified neurosurgeons throughout the world valuable insight and experience to become Pipeline experts and treat their patients according to the best standards of care.

The Advanced Pipeline Course is held over the course of two days. The first day consists of the group reviewing dozens of previous cases and openly discussing the results, what technical issues were presented and best practices for future success. Dr. Taussky has also performed a live pipeline procedure as part of the course, with the attending physicians watching to enhance their learning experience.

The second day is dedicated to using custom-made simulators to create anatomy for unique live surgery situations. The attending doctors can then simulate the procedures in near real live settings under the coaching of Dr. Taussky and his course co-director, Dr. Hanel.

“When Pipeline first became an option for patients, the primary goal was to get physicians certified. This approach has been successful but we’ve also learned that there is a steep learning curve to this procedure. It became clear that an advanced course focused on physicians with 20, 30 or 40 completed procedures was necessary. It provides an open dialogue to review dozens of cases and to learn from others’ experiences, which ultimately leads to better care for patients throughout the world,” says Taussky.

Because of the success of the inaugural course, and based on feedback from initial participants, Covidien, University of Utah Hospital and Dr. Taussky have all committed to hosting the course at least two times a year for the foreseeable future.

“My hope is that the Pipeline procedure eventually becomes a treatment option for any patient diagnosed with a brain aneurysm, no matter where they live,” says Dr. Taussky. “That’s why being part of a system that invites and encourages this kind of collaborative approach is truly incredible. The knowledge and expertise we have here is something we want to share and, with the Pipeline procedure, we hope to do that on a long-term basis.”
In addition to participating in frequent interdepartmental collaborations, Clinical Neurosciences Center physicians collaborate with other neurosciences centers from around the country. Neurologist Dana DeWitt, medical director for the Inpatient Neurology Service at University of Utah Hospital, is embarking on two clinical trial collaborations. She’s hopeful they will lead to better treatments that help improve the lives of her patients.

Her first study, in conjunction with the Network for Excellence in Neuroscience Clinical Trials, seeks to evaluate a drug treatment for patients with less common forms of multiple sclerosis (MS). Most MS patients have the Relapsing-Remitting form of the disease, but approximately 10 percent of them suffer from the Primary-Progressive form, and some later develop Secondary-Progressive MS. Unfortunately, there are not many treatment options available for patients with more progressive forms of the disease. Dr. DeWitt notes, “For Primary-Progressive disease, sometimes insurance companies won’t approve any MS treatments because there’s not yet good proof that they work.”

This study will evaluate the drug Ibudilast, an anti-inflammatory, neuroprotective oral agent that has been used in other countries for over 20 years to treat asthma, chronic pain and certain drug addictions. The 96-week trial will evaluate the activity of Ibudilast and evaluate the safety and tolerability of the drug versus placebo. Physicians will also look at the drug’s effect on neuropathic pain, quality of life, disability and inflammatory disease as measured on MRI. “The main thing we want to show is there’s a drug that can decrease progression of disease in patients with these more progressive forms of MS,” says Dr. DeWitt.

Dr. DeWitt’s second study is with cardiologist Dr. Rodney Badger, director of the Cardiac Cath Lab and chief of Interventional Cardiology at University of Utah Hospital. The study seeks to determine if patients with patent foramen ovale (PFO) are at an increased risk for stroke.

Everyone is born with a PFO, which is an opening between the right and left sides of the heart. Although 75 percent of PFOs naturally close by the age of 2, approximately 25 percent of the adult population has an open PFO. “It’s not an uncommon entity, but there has been an interest in whether PFOs carry an independent stroke risk and whether closing the PFO can decrease that risk,” says Dr. DeWitt. “The thought is that this may be a cause of stroke in the young, so we’ll be enrolling younger patients in the study.”

Patients eligible for the study have a PFO that was discovered because he or she experienced a transient ischemic event or stroke documented by MRI. The study will randomize patients, and for every three patients, two will have their PFOs closed using a device called the GORE HELEX septal occluder and one will not have the PFO closed. Patients will be followed for five years post closure by a stroke neurologist.

Studies like these help the physicians at the University of Utah’s Clinical Neurosciences Center stay at the forefront of medical advances. “It’s nice to feel like you’re on the cutting edge of science,” says Dr. DeWitt. “And when studies have good outcomes, then it’s even that much more rewarding.”
Neurology

About the Numbers

Data throughout this report contain comparisons of the University of Utah Health Care Clinical Neurosciences Center’s performance to the “UHC National Compare Group,” which consists of all hospitals in the University HealthSystem Consortium database. This includes 116 academic medical centers across the United States and 260 affiliated hospitals, representing approximately 90 percent of the nation’s non-profit academic medical centers.

For Length of Stay (LOS) and Mortality indexes, a score of less than one indicates better than expected outcomes for the patient population compared to the 376 UHC hospitals.

## RELATED READMISSIONS

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## NEUROLOGY: MORTALITY INDEX

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<td>0.92</td>
<td>0.92</td>
<td>0.87</td>
<td>0.85</td>
<td>0.81</td>
<td>0.79</td>
<td>0.95</td>
<td>0.90</td>
<td>0.85</td>
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</tbody>
</table>
**About the Numbers**

Data throughout this report contain comparisons of the University of Utah Health Care Clinical Neurosciences Center's performance to the "UHC National Compare Group," which consists of all hospitals in the University HealthSystem Consortium database. This includes 116 academic medical centers across the United States and 260 affiliated hospitals, representing approximately 90 percent of the nation's non-profit academic medical centers.

For Length of Stay (LOS) and Mortality indexes, a score of less than one indicates better than expected outcomes for the patient population compared to the 376 UHC hospitals.

---

**INPATIENT OUTCOMES**

**Mean LOS Observed**

<table>
<thead>
<tr>
<th></th>
<th>University of Utah</th>
<th>UHC Comp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean LOS</td>
<td>5.44</td>
<td>6.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7.34</td>
</tr>
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</table>

**Mean LOS Expected**

<table>
<thead>
<tr>
<th></th>
<th>University of Utah</th>
<th>UHC Comp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean LOS</td>
<td>6.75</td>
<td>6.71</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6.71</td>
</tr>
</tbody>
</table>

**LOS Index (O/E)**

<table>
<thead>
<tr>
<th></th>
<th>University of Utah</th>
<th>UHC Comp</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOS Index</td>
<td>0.74</td>
<td>1.01</td>
</tr>
</tbody>
</table>

**% of Deaths Observed**

<table>
<thead>
<tr>
<th></th>
<th>University of Utah</th>
<th>UHC Comp</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Deaths</td>
<td>9.44%</td>
<td>8.62%</td>
</tr>
</tbody>
</table>

**% of Deaths Expected**

<table>
<thead>
<tr>
<th></th>
<th>University of Utah</th>
<th>UHC Comp</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Deaths</td>
<td>11.18%</td>
<td>10.15%</td>
</tr>
</tbody>
</table>

**Mortality Index (O/E)**

<table>
<thead>
<tr>
<th></th>
<th>University of Utah</th>
<th>UHC Comp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality Index</td>
<td>0.84</td>
<td>0.85</td>
</tr>
</tbody>
</table>

---

**STROKE: MORTALITY INDEX**

Excludes: chemotherapy, rehabilitation, dialysis, delivery/birth, and mental diseases/alcohol and drug use encounters.

Excludes: chemotherapy, rehabilitation, dialysis, delivery/birth, and mental diseases/alcohol and drug use encounters.

---

**STROKE: LENGTH OF STAY INDEX**

Excludes: chemotherapy, rehabilitation, dialysis, delivery/birth, and mental diseases/alcohol and drug use encounters.

---

**PERFORMANCE MEASURES**

**Ischemic Only**

- PT operated within 2 hour of arrival: 96.3%

**Ischemic & TIA**

- Early Antithrombotics: 100%

**Antithrombotics at discharge**

- 100%

**Statin at discharge**

- 99.6%

**Anticoag for AFl/Flutter at discharge**

- 100%

**Ischemic & Hemorrhagic**

- Dysphagia Screen: 89.4%

- VTE Prophylaxis: 99.3%

**Rehab Considered**

- 100%

**Ischemic, Hemorrhagic & TIA**

- Stroke Education: 95.8%

- Smoking Cessation: 96.3%
About the Numbers

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For Length of Stay (LOS) and Mortality indexes, a score of less than one indicates better than expected outcomes for the patient population compared to the 376 UHC hospitals.

BY THE NUMBERS

Neurosurgery

ALL CAUSE READMISSIONS

<table>
<thead>
<tr>
<th>% 7 DAY READMIT</th>
<th>% 14 DAY READMIT</th>
<th>% 30 DAY READMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIVERSITY OF UTAH</td>
<td>UHC COMP</td>
<td>UNIVERSITY OF UTAH</td>
</tr>
<tr>
<td>2.29%</td>
<td>4.73%</td>
<td>6.18%</td>
</tr>
</tbody>
</table>

Includes: chemotherapy, rehabilitation, dialysis, delivery/birth, and mental diseases/alcohol and drug use encounters

RELATED READMISSIONS

<table>
<thead>
<tr>
<th>% 7 DAY READMIT</th>
<th>% 14 DAY READMIT</th>
<th>% 30 DAY READMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIVERSITY OF UTAH</td>
<td>UHC COMP</td>
<td>UNIVERSITY OF UTAH</td>
</tr>
<tr>
<td>1.52%</td>
<td>2.29%</td>
<td>4.27%</td>
</tr>
</tbody>
</table>

Includes: chemotherapy, rehabilitation, dialysis, delivery/birth, and mental diseases/alcohol and drug use encounters

INPATIENT OUTCOMES

<table>
<thead>
<tr>
<th>MEAN LOS OBSERVED</th>
<th>MEAN LOS EXPECTED</th>
<th>LOS INDEX (O/E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIVERSITY OF UTAH</td>
<td>UHC COMP</td>
<td>UNIVERSITY OF UTAH</td>
</tr>
<tr>
<td>5.76</td>
<td>6.67</td>
<td>0.86</td>
</tr>
</tbody>
</table>

% OF DEATHS OBSERVED

<table>
<thead>
<tr>
<th>UNIVERSITY OF UTAH</th>
<th>UHC COMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.23%</td>
<td>4.97%</td>
</tr>
</tbody>
</table>

Excludes: chemotherapy, rehabilitation, dialysis, delivery/birth, and mental diseases/alcohol and drug use encounters

FRIENDLINESS & COURTESY CARE

96.4%

PATIENT CONFIDENCE IN CARE PROVIDER

96.6%
By the Numbers

Spine Surgery

About the Numbers

Data throughout this report contain comparisons of the University of Utah Health Care Clinical Neurosciences Center’s performance to the “UHC National Compare Group,” which consists of all hospitals in the University HealthSystem Consortium database. This includes 116 academic medical centers across the United States and 260 affiliated hospitals, representing approximately 90 percent of the nation’s non-profit academic medical centers. For Length of Stay (LOS) and Mortality indexes, a score of less than one indicates better than expected outcomes for the patient population compared to the 376 UHC hospitals.

## Spine Surgery: Mortality Index

<table>
<thead>
<tr>
<th></th>
<th>University of Utah</th>
<th>UHC National Compare Group</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean LOS</strong></td>
<td>0.99</td>
<td>1.01</td>
</tr>
<tr>
<td><strong>Mortality</strong></td>
<td>0.00</td>
<td>0.00</td>
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</table>

### Related Readmissions

<table>
<thead>
<tr>
<th></th>
<th>University of Utah</th>
<th>UHC National Compare Group</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean LOS</strong></td>
<td>0.99</td>
<td>1.01</td>
</tr>
<tr>
<td><strong>Mortality</strong></td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### Inpatient Outcomes

- **Mean LOS**
  - University of Utah: 3.39 (3.46 UHC COMP)
  - UHC National Compare Group: 3.41 (3.58 UHC COMP)

- **Mortality Index**
  - University of Utah: 0.00% (0.11% UHC COMP)
  - UHC National Compare Group: 0.15% (0.16% UHC COMP)

For Length of Stay (LOS) and Mortality indexes, a score of less than one indicates better than expected outcomes for the patient population compared to the 376 UHC hospitals.

### Effective Dates

- **Spine Surgery**
  - University of Utah: 0.47%
  - UHC National Compare Group: 2.03%

- **All Cause Readmissions**
  - University of Utah: 0.94%
  - UHC National Compare Group: 2.33%

- **July 2012-June 2013**
  - University of Utah: 1.25%
  - UHC National Compare Group: 2.19%

- **July 2012-June 2013**
  - University of Utah: 1.16%
  - UHC National Compare Group: 2.07%

- **July 2012-June 2013**
  - University of Utah: 3.34%
  - UHC National Compare Group: 3.44%

- **July 2012-June 2013**
  - University of Utah: 0.99%
  - UHC National Compare Group: 0.97%

- **July 2012-June 2013**
  - University of Utah: 0.00%
  - UHC National Compare Group: 0.69%

## Related Readmissions

- **All Cause Readmissions**
  - University of Utah: 0.47%
  - UHC National Compare Group: 1.25%

- **July 2012-June 2013**
  - University of Utah: 1.16%
  - UHC National Compare Group: 2.07%

- **July 2012-June 2013**
  - University of Utah: 3.34%
  - UHC National Compare Group: 3.44%

- **July 2012-June 2013**
  - University of Utah: 0.99%
  - UHC National Compare Group: 0.97%

- **July 2012-June 2013**
  - University of Utah: 0.00%
  - UHC National Compare Group: 0.69%

### Excludes

- chemotherapy, rehabilitation, dialysis, delivery/birth, and mental diseases/alcohol and drug use encounters

- University of Utah UHC National Compare Group

## References

MSDRG List: 028, 029, 030, 453, 454, 455, 456, 457, 458, 459, 460, 471, 472, 473, 480, 489 Other Notes: *2012 UHC Risk Models Used for Spinal Surgery Risk-Adjusted Outcome Datasets **Spinal Surgery inpatient outcomes, mortality index, and length of stay datasets include elective admission cases only

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**CLINICAL NEUROSCIENCES CENTER | UNIVERSITY OF UTAH**

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**CONVERGENCE 2013**
## Neuroradiology

### Publication List

#### NEURORADIOLOGY: TURNAROUND TIMES

<table>
<thead>
<tr>
<th>Date</th>
<th>1: Totally Agree</th>
<th>2: Mostly Agree</th>
<th>3: Minor Miss</th>
<th>4: Major Miss</th>
<th>Clinically Significant</th>
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<td>77.06%</td>
<td>18.88%</td>
<td>3.15%</td>
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<td>4.05%</td>
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<tr>
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<td>18.63%</td>
<td>1.66%</td>
<td>0.47%</td>
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<td>2.80%</td>
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<tr>
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<td>7.70%</td>
<td>3.86%</td>
<td>0.00%</td>
<td>3.85%</td>
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<tr>
<td>January (N=33)</td>
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<td>2.46%</td>
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<td>0.00%</td>
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<tr>
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<td>21.68%</td>
<td>2.51%</td>
<td>0.53%</td>
<td>3.04%</td>
</tr>
<tr>
<td>March (N=33)</td>
<td>75.28%</td>
<td>21.68%</td>
<td>2.51%</td>
<td>0.53%</td>
<td>3.04%</td>
</tr>
<tr>
<td>April (N=33)</td>
<td>75.28%</td>
<td>21.68%</td>
<td>2.51%</td>
<td>0.53%</td>
<td>3.04%</td>
</tr>
<tr>
<td>May (N=33)</td>
<td>75.28%</td>
<td>21.68%</td>
<td>2.51%</td>
<td>0.53%</td>
<td>3.04%</td>
</tr>
<tr>
<td>June (N=33)</td>
<td>75.28%</td>
<td>21.68%</td>
<td>2.51%</td>
<td>0.53%</td>
<td>3.04%</td>
</tr>
</tbody>
</table>

*Percent of Total Studies Completed for Fiscal Year 2013

### Department of Neurology

#### K.C. BRENNAN, MD


#### MARK B. BROMBERG, MD, PhD


#### GORDON J. CHELUNE, PhD

Publication List


KATHLEEN B. DIGRE, MD


KEVIN DUFF, PHD


Publication List


Smith AG, Singleton JR. (2013). Obesity and hyperlipidemia are risk factors for early diabetic neuropathy. [Diabetes complications, 2(7), 413-42].

A. GORDON SMITH, MD


CONVERGENCE 2013 Research
Publication List


MEIC, H. SCHMIDT, MD, MDA, FACS, MBA


Department of Neuroradiology

JEFFREY S. ANDERSON, MD, PHD


RICHARD H. WIGGINS III, MD, CIIP, FSIIM


LUBHRA M. SHAH, MD

STEFAN M. PULST, MD, DR MED
In medical and pediatric research, Dr. Pulst focuses on inherited diseases of the nervous system with an emphasis on spinocerebellar ataxias and Parkinson’s disease. In addition to molecular and cellular approaches in the laboratory, he also sees patients at the Utah Parkinson’s Disease Center. The database to examine the genetic epidemiology of neurodegenerative diseases. Dr. Pulst is past editor of the international Journal Current Genetics and is on the editorial board of several international journals, including Nature Reviews of Neuroscience. He serves on the American Academy of Neurology (AAN) Board of Directors and is former chair of the AAN’s Science Committee.

SPECIALTIES: Spinocerebellar Ataxia, Parkinson’s Disease, Neurogenetics, Ion Channels, Translational Neuroscience

PEGAH AFRA, MD
focuses her practice on the diagnosis and treatment of seizures and epilepsy. Her specific interests include diagnosis and management of intractable epilepsy, including pre-surgical evaluation and surgical treatment of intractable medication-resistant epilepsy, invasive intracranial electroencephalography (EEG) monitoring and magnetoencephalography (MEG). She also participates in intraoperative monitoring. Dr. Afra is currently investigating the role of new antiepileptic drugs in the treatment of epilepsy, as well as neuroplasticity of EEG. She has had the honor of receiving the award of Fellow of the Year from the Epilepsy Association of Utah.

SPECIALTIES: Epilepsy, Clinical Neurophysiology, EEG, MEG, Intraoperative Monitoring

JULIAN W. ALLRED, MD
specializes in general neurology, including the treatment of patients with multiple sclerosis, movement disorders, migraine/cluster headache, stroke and cognitive dysfunction. He also has an interest in neurometabolism and adult patients with neurodegeneration.

Dr. Allred enjoys teaching medical students and residents and is dedicated to education.

SPECIALTY: General Neurology

SAFODA A. ANSARI, MD
is the director of the Division of Neurocritical Care at the University of Utah Hospital. His clinical activities involve providing critical care consultation to severely brain injured patients in the hospital's state-of-the-art Neurocritical Care Unit. He also serves as a member of the stroke team and is an active member of the Telestroke Network. He is currently the site investigator for two large multinational clinical trials investigating new and emerging therapies for intracranial hemorrhage. His other research interests include the use of therapeutic hypothermia for different brain diseases. He plays an active role in neurocritical care education for fellows, residents and medical students.

SPECIALTY: Neurocritical Care

SUSAN K. BAGGALEY, MSN, FNP-C
is a certified nurse practitioner, seeing patients with complex headache disorders including migraine, cluster and chronic daily headache. Susan has over 20 years of specialty headache experience and has been involved in numerous research and clinical drug trials. She also directs all neurology resident clinics at the University of Utah.

SPECIALTTY: Headache

JAMES M. BAILE, JR., MD
is chief for education in the Department of Pediatrics, the program director for the Categorical Pediatrics Residency, and a member of the Board of Trustees for Primary Children’s Medical Center. Dr. Baile has published extensively regarding clinical child neurology, cytogenetics and neurologic infections. With colleagues at the University of Utah and National Institutes of Health, he recently published Pediatric Neurology: A Color Handbook. Dr. Baile served as president of the Child Neurology Society from 2003-2005 and as chair of the Council of Pediatric Subspecialties from 2013-2014.

SPECIALTIES: Pediatric Neurology, Congenital Infections

HELEN I. BARKAN, MD, PHD
joined the Department of Neurology as associate professor, coming from New York University Medical Center. Her expertise includes intractable epilepsy in both adult and pediatric patients, having a particular interest in surgical treatment for seizure disorders. Dr. Barkan has also written numerous publications on brain mapping and electrophysiology (EEG).

SPECIALTIES: EEG, Epilepsy

JOSHUA L. BONKOWS (SPECIALTIES: Neurocritical Care)

K.C. BRENNAN, MD
is assistant professor and division chief for Translational Neuroscience in the Department of Neurology. His research and clinical focus is both on headache disorders. His laboratory examines the basic mechanisms of migraine and post-traumatic headache. A particular interest is critical spreading depression, which is also relevant to stroke and traumatic brain injury. He and his colleagues also focus on translational research on patients with migraine and post-traumatic headache. His clinical work involves seeing patients in the Headache Clinic and in the hospital on the Neurology Consult Service.

SPECIALTIES: Headache

MARK B. BROMBERG, MD, PHD
directs both the Motor Neurotransmission/Myasthenic Lateral Sclerosis (ALS) Clinic and the Muscular Dystrophy Association (MDA) Clinic at the University of Utah. His research interests include clinical care of ALS patients and the development of new therapeutic strategies. Dr. Bromberg is also an active research investigator regarding the quality of life for ALS patients and caregivers.

SPECIALTIES: Neuromuscular, Electromyography, ALS

JAMES B. BURNS, MD
is a specialist in headache disorders. He has research focuses on inherited diseases of the nervous system with an emphasis on spinocerebellar ataxias and Parkinson’s disease. In addition to molecular and cellular approaches in the laboratory, he also sees patients at the Utah Parkinson’s Disease Center. The database to examine the genetic epidemiology of neurodegenerative diseases. Dr. Pulst is past editor of the international Journal Current Genetics and is on the editorial board of several international journals, including Nature Reviews of Neuroscience. He serves on the American Academy of Neurology (AAN) Board of Directors and is former chair of the AAN’s Science Committee.

SPECIALTY: Multiple Sclerosis

RUSSELL J. BUTTERFIELD, MD, PHD
is assistant professor in the Division of Neurological Surgery and co-directs the Muscular Dystrophy Association Clinic. Dr. Butterfield sees patients with neuromuscular and neurovascular disorders with a specific interest in congenital muscular dystrophies and myopathies. He research efforts aim to genetically analyze inherited neuromuscular disorders.

SPECIALTIES: Pediatric Neurology, Neuromuscular Disorders, Muscular Dystrophy

GORDON J. CHELUNE, PhD
is professor of neurology and senior neuropsychologist at the Center for Alzheimer’s Care, Imaging and Research (CACAIR) in the Division of Cognitive Neurology. Dr. Chelune is board certified in clinical neurology and has over 35 years of experience in this field. His clinical interests include memory disorders, deficits of higher executive function and structures of cognitive change in aging. He has been actively involved in test development and outcomes research throughout his career. He is a fellow of the American Psychological Association, National Academy of Neurology and the Personality Assessment. He has served as the President of the International Neuropsychological Society.

SPECIALTIES: Neuropsychological Disorders, Personality Assessment, Outcome Research, Neuropsychological Assessment

STACEY L. CLARDY, MD, PHD
is both clinical and research faculty in the Division of Neuroimmunology within the Department of Neurology. Prior to joining the University of Utah, Dr. Clardy furthered her training with a fellowship in Autoimmune Neurology at the Mayo Clinic. Her training and her experience has focused on the evaluation and management of autoimmune and paraneoplastic disorders of the nervous system. Her main clinical interest is devoted to patients affected by antibody-mediated disorders of the nervous system, as well as demyelinating disorders including neuromyelitis optica (NMOSD) and multiple sclerosis, and central nervous system complications of immune logic disease. She established the Autoimmune Neurology Clinic at the University of Utah, one of the few clinics in the United States focused on serving this group of patients.

SPECIALTY: Neuroimmunology

ANN MARIE COLLIER, MD
graduated from the University of Tennessee, Knoxville with a degree in biochemistry and cellular and molecular biology. She received her MD degree from the University of Texas Health Science Center, San Antonio. She completed her neurology residency at the University of Utah. Dr. Collier treats patients with a wide range of neurological diseases. Her special interests include in stroke disorders, traumatic brain injury, and neurodegenerative conditions.

SPECIALTIES: General Neurology, Neurophysiology, Epilepsy

L. DANA DEWITT, MD
is in medical and pediatric research, Dr. Pulst focuses on inherited diseases of the nervous system with an emphasis on spinocerebellar ataxias and Parkinson’s disease. In addition to molecular and cellular approaches in the laboratory, he also sees patients at the Utah Parkinson’s Disease Center. The database to examine the genetic epidemiology of neurodegenerative diseases. Dr. Pulst is past editor of the international Journal Current Genetics and is on the editorial board of several international journals, including Nature Reviews of Neuroscience. He serves on the American Academy of Neurology (AAN) Board of Directors and is former chair of the AAN’s Science Committee.

SPECIALTIES: Stroke, Multiple Sclerosis, White Matter Disease

KATHLEEN B. DIGRE, MD
in medical and pediatric research, Dr. Pulst focuses on inherited diseases of the nervous system with an emphasis on spinocerebellar ataxias and Parkinson’s disease. In addition to molecular and cellular approaches in the laboratory, he also sees patients at the Utah Parkinson’s Disease Center. The database to examine the genetic epidemiology of neurodegenerative diseases. Dr. Pulst is past editor of the international Journal Current Genetics and is on the editorial board of several international journals, including Nature Reviews of Neuroscience. He serves on the American Academy of Neurology (AAN) Board of Directors and is former chair of the AAN’s Science Committee.

SPECIALTIES: Stroke, Multiple Sclerosis, White Matter Disease

KEVIN DUFF, PHD
joined the University of Utah as associate professor of Neurology in 2009 and practices neuroepidemiology for the Center for Alzheimer’s Care, Imaging and Research (CACAIR). Dr. Duff is a board-certified neuropsychologist with over 10 years of experience working in dementia and other neurologic diseases. His research program examines the role of cognitive changes in the development of dementia, practice effects as a marketillusibility, and methods for improving cognitive functioning in late life. Finally, he frequently lectures in these areas.

SPECIALTIES: Dementia, Alzheimer’s Disease, Huntington’s Disease, Other Neuropsychiatric Conditions

ANGELA D. EASTVOLD, PHD
joined the Department of Neurology in 2011 as assistant professor, with significant experience in the College of Medicine and the College of Nursing. Dr. Eastvold has an extensive research background in health services and policy analyses. Her main research interest is the development of innovative strategies for the delivery of effective health care services for high-risk populations and communities, with a focus on rural communities.

SPECIALTIES: General Clinical, Neuropsychological Assessment

FRANCIS M. FILLoux, MD
is the chief of the Division of Pediatric Neurology at the University of Utah. He is a member of the American Academy of Neurology and the American Epilepsy Society. Dr. Filloux is an Epilepsy board-certified in clinical neurology and has over 20 years of experience working in epilepsy. His clinical interests include epilepsy, particularly in children and adults, with a specific interest in intractable epilepsy in both adult and pediatric patients, having a particular interest in surgical treatment for seizure disorders. Dr. Barkan has also written numerous publications on brain mapping and electrophysiology (EEG).

SPECIALTIES: Pediatric Neurology

SPECIALTY: Headache

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SPECIALTIES: Pediatric Neurology

SPECIALTY: Headache

SPECIALTY: Headache

SPECIALTY: Headache

SPECIALTY: Headache

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SPECIALTY: Headache

SPECIALTY: Headache

SPECIALTY: Headache

SPECIALTY: Headache

SPECIALTY: Headache

SPECIALTY: Headache

SPECIALTY: Headache
NORMAN L. FOSTER, MD
is a board-certified geriatric neurologist who has specialized in brain imaging and dementia and neurodegenerative diseases for over 30 years. He is professor of neurology, chief of the Division of Cognitive Neurology, senior investigator in the Brain Institute and director of the Center for Alzheimer’s Care, Imaging and Research (CACIR), which he helped establish in 2000. His recent research has focused on pragmatic studies to improve evaluation, diagnosis and treatment of neurodegenerative disorders and the development and application of neuroimaging in clinical care. Dr. Foster is a fellow of the American Academy of Neurology and the American Neurological Association, a member of the Alpha Omega Alpha Honor Medical Society, an appointed member of the Utah State Governor’s Alzheimer’s State Plan Task Force and a member of the Utah Commission on Aging.

SPECIALTIES
Alzheimer’s Disease and Related Neurodegenerative Disorders, Position Emission Tomography, Neuroradiology

SUMMER GIBSON, MD
completed medical school at the University of Texas Southwestern. As a neurologist resident at the University of Utah, she served as co-chief and chairwoman once completed her Neurology Fellowship, having a specialty interest in neuromuscular diseases. Summer has completed research in immunology, genetics and epigenetics and is currently pursuing her neurosciences education by teaching medical students, residents and clinical staff.

SPECIALTIES
Neuromuscular, Electromyography

JOHN E. GREENLEE, MD
in 2011 as assistant professor of Neurology, joined the University of Utah, where he served as chief resident during his final year. He completed his fellowship training at the University of Utah’s Center for the Neuroimaging of Alzheimer’s Disease. His research interests currently focused on chemotherapy-induced neurotoxicity.

SPECIALTIES
Neuromuscular, Electromyography

PAUL L. JONES, MD
in 1999 Dr. Jones, with Drs. H-Y Fu and LJ Ptacek published the first report of an autosomal dominant human short stature syndrome. In addition, Dr. Jones is a fellow of the American Neurological Association.

SPECIALTIES
Neurological Assessment, Neurodegenerative Disorders, Other Neuropsychiatric Conditions

SANDRA P. REYNA, MD
is assistant professor of ophthalmology, director of the Neurology Clinical Trials Unit and director of the Pediatric Motor Disorders Research Program. A long-time researcher at the University of Utah, Dr. Reyna has specific interest in spinal muscular atrophy. She has served as an Editor and Associate Editor as well as studies that include drug interventions. She also has extensive experience in preparation of clinical trials and coordination of multiple team members as well as activities involving multiple sites.

SPECIALTY
Neuromuscular Research

AWAS RIAZ, MD, PHD
is director of Intraoperative Neurophysiology Monitoring Services at the University of Utah. His interests include improving the existing protocols for intraoperative monitoring, incorporating evolved potentials, electroencephalography (EEG) and transcranial Doppler. He has also recently developed an epilepsy course geared towards basic scientists.

SPECIALTIES
Clinical Neurophysiology, Intraoperative Monitoring, Epilepsy

JOHN W. ROSE, MD
is professor of Neurology, director of the University of Utah’s Center for Neurologic Imaging and Research (CNIR). His major interests include improving the existing protocols for intraoperative monitoring, including advanced magnetic resonance imaging (MRI) and the detection of subclinical seizures.

SPECIALTIES
Neuroimmunology, Multiple Sclerosis

DUONG P. HUYNH, PHD
in Alzheimer’s disease (NIA grant K23 AG03835). Dr. Huynh is currently investigating neurodegenerative diseases such as Alzheimer’s disease, Parkinson’s disease, and spinocerebellar ataxia type 2. Currently, his group is focusing on the influence of genetic changes on specific genes associated with Parkinson’s disease. Dr. Huynh is a member of the Society for Neuroscience and the American Association for the Advancement of Science. He’s also a faculty representative for the Interventional Chapter of the Society for Neuroscience.

SPECIALTY
Research

CHRISTOPHER R. JONES, MD, PHD
in 1999 Dr. Jones, with Drs. H-Y Fu and LJ Ptacek published the first report of an autosomal dominant human short stature syndrome. In addition, Dr. Jones is a fellow of the American Neurological Association.

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SPECIALTY
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SPECIALTIES
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SPECIALTY
Neuromuscular Research
LAUREN E. SCHROCK, MD
joined the Department of Neurology in July 2009. The clinical interests include movement disorders, particular for dystonia and tics, and the surgical management of movement disorders. Dr. Schrocks has a special interest in the neurology of oral-gingival palatal-motor circuits in relation to Parkinson's disease, dystonia, tics and movement disorders.

SPECIALTIES: Movement Disorders, Neurophysiology

DANIEL R. SCOFFS, PHD
is a basic scientist with two areas of interest, brain tumors and spinocerebellar ataxias. 2. Dr. Scoles is a member of the National Neurofibromatosis Foundation, the American Academy of Neurology, and the American Association for Cancer Research. He has also been a grant reviewer for the Department of Defense since 1999.

SPECIALTIES: Neurofibromatosis, Spinocerebellar Ataxia

DAVID R. SHREACHER, DO, MS
is director of the Sleep and Movement Disorders Division and one of three neurologists in the Intermountain West with fellowship training in Parkinson's disease and other movement disorders. Dr. Shreacher conducts observational and interventional clinical trials in atypical parkinsonism, PD, Huntington’s disease, and Tourette syndrome. His collaborative research with the Departments of Psychiatry and Radiology is designed to clarify why many, but not all, patients with Tourette syndrome outgrow their symptoms. His work with our team of gastroenterologists explores whether routine colonoscopies may be useful in early diagnosis of Parkinson’s disease.

SPECIALTIES: Movement Disorders, Experimental Therapeutics

J. ROBINSON SINGLETON, MD
is director of the Neurophysiology Laboratory at the Salt Lake City Veterans Administration Hospital. He teaches neuro muscular disease diagnosis and electro diagnostic techniques to neurology, physical medicine and rehabilitation residents, and has helped train many neuro muscular fellows. Dr. Singleton also serves on the Centers for Medicare and Medicaid Services, and is a reviewer for the National Institute of Neurological Disorders and Stroke and the American Diabetes Association.

SPECIALTIES: Neuromuscular, Electromyography, Diabetic Neuropathy

A. GORDON SMITH, MD
is professor of neurology, chief of the Division of Neurovascular Medicine and director of the Jack H. Petajan EMG Laboratory at the University of Utah. He also directs the University of Utah’s Peripheral Neuropathy Clinic and Cerebrovascular Intervention Laboratory. Dr. Smith’s research focuses on peripheral neuropathy associated with early diabetes and metabolic syndrome. He is a principal investigator of the Utah Regional Site for the NINDS funded Network for Excellence in Neurosciences Clinical Trials (NEuroNET), and he co-directs the Neurology Clinical Trials Unit. His clinical expertise is in neuro muscular disorders, clinical neurophysiology and the therapeutic application of botulinum toxin.

SPECIALTIES: Neuromuscular, Electromyography, Botulinum Toxin, Peripheral Neurophy

PAMAY SOLTANZADEH, MD
did his initial medical training and internship at Tehran University of Medical Sciences in Tehran before he moved to Paris, France, where he was a postdoctoral fellow at the Hôpital Saint-Pierre Hospital. He moved to Utah, where he worked in the Department of Human Genetics. Payam completed his internship and neurology residency at the University of Maryland and Clinical Center in Baltimore, then returned to Utah to complete a fellowship in clinical neurophysiology (neurological track).

SPECIALTIES: Neurology, Neuromuscular Disorders, Myology

JOHN D. STEFFENS, MD
is director of the Division of Diagnostic and Clinical Neurology. He is currently reducing his outpatient practice in order to focus on clinical and research education and academic neurology at the University of Utah. In addition, Dr. Steffens maintains a part-time private practice in Twin Falls, Idaho.

SPECIALTIES: Neurohospitalist, Neuromuscular, General Neurology, Electromyography

MATTHEW T. SWENEY, MD, MS
is currently an assistant professor with joint appointment in Pediatrics and Neurology at the University of Utah. His specific clinical interests are in pediatric epilepsy and EEG. Intraoperative Neuromonitoring, movement disorders and general child neurology. His research interests include investigation into the genetic basis for and treatment of Alternating Hemiplegia of Childhood, as well as ongoing participation in novel anti-epileptic drug trials. He will see patients with epilepsy, movement disorders, as well as general neurologic issues such as headaches and developmental delay. Dr. Sweny is board certified in General Pediatrics and Neurology with special qualification in child and adolescent neurology, as well as the American Board of Clinical Neurophysiology with qualification in Epilepsy Monitoring and Intraoperative Monitoring (EMI).

SPECIALTY: Pediatric Neurology

KATHRYN J. SWOBOADA, MD
is an associate professor of Neurology and Pediatrics at the University of Utah, Salt Lake City, Utah, where she directs the Pediatric Motor Disorders Research Program. Her clinical focus includes the diagnosis and treatment of children and adults with neuromuscular diseases, movement disorders and anxiety neurodevelopmental disorders. A major focus of her research efforts over the past decade includes genetico-phenotypic studies in inherited neuromuscular diseases and movement disorders. She has led or collaborated in numerous clinical trials and studies in children and adults with spinal muscular atrophy (SMA), alternating hemiplegia of childhood (AHC), and inherited disorders of neurotransmitter biosynthesis and metabolism.

SPECIALTIES: Neurogenetics, Pediatric Neuromuscular, Muscle

PERLA C. THULIN, MD
has special expertise and training in the evaluation and treatment of movement disorders, including Parkinson’s disease, tremor, chorea, hemifacial spasm, tics and dystonia, including torticollis and blepharospasm, and is an expert in the use of botulinum and Dupixten. Dr. Thulin also evaluates patients with Parkinson’s disease and essential tremor for deep brain stimulation surgery.

SPECIALTY: Movement Disorders

COLIN B. VAN ORMAN, MD
focuses his clinical practice on pediatric epilepsy, which also includes general pediatric neurology. He is involved in the Comprehensive Epilepsy Program at the University of Utah, which includes the use of standard anti-epilepsy medications, vagus nerve stimulation, dietary treatments and evaluation for potential epilepsy surgery. Dr. Van Orman’s research interests focus on the study of investigational medications, the ketogenic diet and epilepsy surgery.

SPECIALTY: Pediatric Epilepsy

JUDITH E. WARNER, MD
specializes in neuro-ophthalmology, the study of the eye as it relates to the brain. She evaluates complex visual complaints, which can be due to optic nerve or brain diseases, and provides treatment for these disorders. Dr. Warner’s interests include diplopia, giant retinal arterials, optic neuropathies and diabetic intraretinal hemorrhages.

SPECIALTY: Neuro-Ophthalmology

MICHAEL J. WILDER, MD
is assistant professor in the Departments of Otolaryngology and Neurology. His practice focuses on the acute treatment of stroke and other disorders involving blood vessels of the head, neck and spine using endovascular, minimally invasive, imaging-guided techniques. Dr. Wilder participates in the University of Utah’s TeleStroke Network, which provides real-time assessment for acute stroke patients in remote areas via video. He also sees acute stroke patients in the outpatient setting.

SPECIALTIES: Neurocritical Care, Neurointerventional Surgery, Stroke

JANA WOLD, MD
evaluates and treats acute stroke patients in the hospital and through use of the TeleStroke Network (Telemedicine). Dr. Wold provides outpatient consultation in the Stroke Clinic and in the General Neurology Clinic, as well as serves on the Neurological Intensive Care Service. She is the director of the annual Utah Stroke Symposium, the Program Director for the Neurology Residency and the Vice-Chair of the Utah Stroke Task Force. Her interests lie in inpatient neurology and education.

SPECIALTIES: Stroke, Vascular Neurology

GEORGE M. ZINKHAN, MD
obtained a medical degree from the University of Texas Southwestern with distinction in research, after which he completed a residency in neurology at the University of Utah in 2011. Dr. Zinkhan treats a variety of neurological conditions in General Neurology Clinic including headaches, multiple sclerosis, movement disorders, stroke, etc.

SPECIALTY: General Neurology

CLINICAL NEUROSCIENCES CENTER | UNIVERSITY OF UTAH
Department of Neurosurgery

WILLIAM T. COULDWELL, MD, PHD
serves as professor and chair of the Department of Neurosurgery at the University of Utah. He also has served as director of the Program for the American Board of Neurological Surgery and is currently the President of the American Association of Neurological Surgeons. Dr. Couldwell has over 300 peer reviewed publications and has been the recipient of several federal NIH and other research grants. His clinical interests include surgical management of epilepsy, trauma, oncology, pituitary tumors, skull base and cerebrovascular neurosurgery.

SPECIALTIES
Skull Base Surgery, Neurosurgical Oncology, Neurovascular Surgery

RONALD I. APFELBAUM, MD
emeritus
is professor emeritus in the Department of Neurosurgery at the University of Utah. He has served as chief of the Spine Program of the University of Utah, director of the Spine Fellowship Program at the University of Utah, and director of Neurosurgery at the University of Utah. He is recognized as an internationally known expert in the spine and has served as a distinguished educator, clinician, and investigator in the field of spine surgery. He has performed over 2500 spinal procedures.

SPECIALTIES
Cervical Spine Surgery, Cranial Nerve and Skull Base Surgery, Pituitary Surgery

ERICA F. BISSON, MD
completed her fellowship in spine surgery at the University of Utah in 2008, and returned to the University of Utah as assistant professor to provide comprehensive spine care. Her special interests include cervical spine disease, occipitocervical disease, spinal fusion techniques and image-guided surgery.

SPECIALTY
Complex Spine Surgery

F. EDWARD DUDEK, PHD
is professor and vice chair for research of the Department of Neurosurgery at the University of Utah School of Medicine. His research interests include mechanisms of spine disorders, novel therapies for spine disorders, and long-term outcomes and structural changes of the spine.

SPECIALTIES
Epilepsy

EDGAR C. GOLDSTON, JR., MD
is actively involved with the development and implementation of the Comprehensive Spine Program at the University of Utah, which incorporates a multidisciplinary approach to spine care. His clinical interests are interventional spinal medicine and spinal diagnostics, as well as the non-operative management of spinal and musculoskeletal disorders. He has strong interests in spine-related science and research.

SPECIALTIES
Spine, Pain Medicine

HOWARD COLMAN, MD, PHD
is associate professor in the Department of Neurosurgery at the University of Utah, a member of the multidisciplinary Brain Tumor Research Team and director of the Neuro-Oncology Laboratory at Huntsman Cancer Institute. He specializes in the treatment of primary and metastatic brain tumors and the diagnosis and management of neurologic complications of cancer. His clinical research is focused on the development and testing of new therapies for brain tumors. His laboratory interests include the identification of molecular markers of progression and treatment response in brain tumors. He is also working on identifying the role of tumor stem cells in the development and treatment resistance of tumors.

SPECIALTY
Neurological Oncology

ANDREW T. DAILEY, MD
patients suffering from spinal cord injury, spine trauma and cervical degenerative disease. Dr. Dailey originally came to the University of Utah in 1986, but after five years to practice at the University of Washington in Seattle. He returned to the University of Utah in 2008 to take a part in the Comprehensive Spine Program, as well as his love of the outdoors.

SPECIALTIES
Spine and Peripheral Nerve

PAUL A. HOUSE, MD
surgically treats patients who suffer from epilepsy and movement disorders, including tremor, Parkinson’s disease and dystonia. His research interests include improving the “decoding” of movement information from the brain, understanding epileptic activity across several orders of scale and designing new devices to provide communication with the brain.

SPECIALTIES
Epilepsy, Movement Disorders

L. ERIC HUANG, MD, PHD
studies mechanisms of tumor progression by the microenvironment. His research focuses on the molecular basis of genetic alterations driven by tumor hypoxia, an area of research pioneered by his team and funded by the National Institutes of Health. Dr. Huang’s interests include molecular mechanisms of tumor progression, brain tumors and molecular targets.

SPECIALITY
Tumor Hypoxia, Brain Tumors

RANDY L. JENSEN, MD, PHD
particular emphasis on the treatment of patients with brain tumors. He sees patients with malignant, benign, primary and metastatic brain tumors. Dr. Jensen’s clinical interests include neuro-oncology, stereotactic radiosurgery, general neurosurgery, interventional computer guided navigation, the use of intraoperative MRI for tumor resection and cortical mapping of eloquent brain. He is also a member of the Blue Brain Research Team at Huntsman Cancer Institute and his laboratory that examines the role of hypoxia in brain tumor growth and development. He is the director of the Neurosurgery Residency Program. He has served in leadership roles for a number of neurosurgery courses, as well as regional and national neurological societies.

SPECIALITY
Neurological Oncology

JOEL D. MACDONALD, MD, PHD
has a clinical practice and research interest in stroke. His focus is on vascular disorders of the brain, along with skull base tumors and complex spine pathologies. Dr. MacDonald recently served as vice president of the Congress of Neurological Surgeons and was also a past President of the Rocky Mountain Neurosurgical Society.

SPECIALITIES
Complex Spine, Cerebrovascular, Skull Base Tumors, Epilepsy, Movement Disorders

JAMES P. (PAT) MICALILST II, PHD
directs a multidisciplinary laboratory that investigates the pathophysiology of epilepsy with a particular emphasis on pharmacological treatments to prevent brain damage or promote repair. His diagnostic imaging, and novel bioengineering applications, to improve cerebrospinal fluid drainage devices. He is the recipient of the Robert H. Fulerio Prize for Excellence in Cerebrospinal Fluid Physiology and Hydrocephalus from the International Society for Pediatric Neurosurgeons.

SPECIALITY
Hydrocephalus Research

JAY K. RIVA-CAMBRI, MD, MSC
joined the faculty of the University of Utah and Primary Children’s Medical Center in 2012. Dr. Riva-Cambri’s clinical interests in pediatric neurosurgery include the treatment of hydrocephalus and cranial base tumors. He performs over 250 neurosurgical procedures per year, with 100 being hydrocephalus related.

SPECIALTIES
Pediatric Neurosurgery, Hydrocephalus, Brain Tumors, Endoscopic Surgery

MEICH. H. SCHMIDT, MD, MDA, FACS, MBA
serves as chair of the Department of Neurosurgery at the University of Utah, and chief of the Spinal Oncology Service at Huntsman Cancer Institute. His academic practice specializes in neurosurgical oncology, neurotrauma, minimally invasive and complex spinal surgery. He provides neurosurgery and spine care for patients with metastatic spine disease, traumatic spine injuries, brain and spinal cord tumors, and degenerative spine disease.

SPECIALITIES
Neurosurgery, Spine, Oncology, Trauma

PHIL TAUSKY, MD
completed his neurosurgical fellowship at the University of Utah and served as associate professor. He also has served as an instructor at the University of Utah and served as an assistant professor at the University of Utah Medical Center. He has been a consultant to several national and international neurosurgical societies, as well as an expert in the field of neurosurgery.

SPECIALITIES
Cerebral Aneurysm, Vascular Malformation, Chiari Malformation, Endoscopic Ventricular Surgery, Hydrocephalus, General Neurosurgery

RICHARD H. SCHMIDT, MD, PHD
joined the Department of Neurosurgery in 1983 and currently serves as associate professor. Dr. Schmidt has clinical and research interests that include coronary aneurysms, cerebral aneurysms, aneurysms, aneurysmal disease and other vascular disorders. As a pacemaker specialist, he has a unique perspective offering his patients both minimally invasive and minimally invasive endovascular treatment for vascular disease. He has served as an expert in the use of modern flow diverters, such as the Pipeline device.

SPECIALITIES
Aneurysms, Cavernous Angiomas, Meningiomas, Moya-Moya, Stroke, Carotid Disease

MARIAN L. WALKER, MD
is professor of neurosurgery in the Division of Pediatric Neurosurgery and adjunctor Professor at the University of Utah and Primary Children’s Medical Center. Dr. Walker is former chair of the Pediatric Section of the American Association of Neurological Surgeons, the Section on Neurosurgery of the American Academy of Pediatrics, and the American Society of Pediatric Neurosurgeons. She also served as president of the International Society of Pediatric Neurosurgeons and was a past editor for the Journal of Pediatric Neurosurgery.

SPECIALITY
Pediatric Neurosurgery

PHYSIOLOGY AND HYDROCEPHALUS FROM THE INTERNATIONAL SOCIETY FOR PEDICATRIC NEUROSURGEONS

SPECIALITY
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SPECIALITIES
Cerebral Aneurysm, Vascular Malformation, Chiari Malformation, Endoscopic Ventricular Surgery, Hydrocephalus, General Neurosurgery
PERRY P. NG, MD is fellowship director of the Neuroradiological Surgery Program. His clinical practice includes diagnostic neuroradiography and embolizations, as well as spinal pain management. Dr. Ng has authored more than 20 peer reviewed articles and has presented papers and didactic lectures at national and international conferences.

SPECIALITIES: Endovascular Stroke Therapy, Intracranial Aneurysms, Arteriovenous Malformations of the Brain and Spine

ANNE G. OSBORN, MD is distinguished professor of Radiology at the University of Utah. She is recognized internationally for helping establish the field of neuroradiology, which deals with the head, neck, spine, and the central and peripheral nervous system. Dr. Osborn is also the author of numerous medical books and journal articles and is the co-creator of the first comprehensive point-of-care electronic imaging reference system.

SPECIALITY: Neuroradiology

EDWARD P. QUIGLEY III, MD, PHD centers his research on improving detection, characterization, and the treatment of neurologic diseases through advanced imaging. Disease processes studied by Dr. Quigley include multiple sclerosis, optic neuritis, epidural imaging, dementia and aging brain, vascular anomalies and aneurysm.

SPECIALITY: Neuroradiology

ULRICH A. RASSNER, MD is medical director of Magnetic Resonance Imaging (MRI) and Computed Tomography (CT) at the University of Utah. Dr. Rassner also has specific research and clinical interest in MRI physics and MRI safety.

SPECIALITY: Neuroradiology

LUBDMA M. SHAH, MD has interests that include advanced magnetic resonance imaging (MRI) techniques such as functional MRI, diffusion tensor imaging, and perfusion MRI of the brain and spine. In addition to diagnostic radiology, Dr. Shah performs spine interventional procedures such as vertebral intravascular injections and biopsies.

SPECIALITY: Neuroradiology

RICHARD H. WIGGINS III, MD, CIIP, FSIIM is an internationally recognized expert in head and neck imaging, having published over 250 articles and 8 books in this area. Dr. H. Wiggins is also a co-founder of Health Imaging, Inc., a medical decision support company.

SPECIALITY: Neuroradiology

MICHAEL J. WILDER, MD is assistant professor in the Departments of Radiology and Neurology. His practice focuses on the acute treatment of stroke and other disorders involving blood vessels of the head, neck and spine using endovascular, minimally invasive, imaging-guided techniques. Dr. Wilder participates in the University of Utah’s TeleStroke Network, which provides remote consultation and care for stroke patients in remote areas via camera. He also sees stroke patients in the outpatient clinic setting.

SPECIALITIES: Neuroradiological Surgery, Stroke
Our Mission
The University of Utah Health Sciences Center serves the people of Utah and beyond by continually improving individual and community health and quality of life. This is achieved through excellence in patient care, education, and research, each is vital to our mission and each makes the others stronger.

• We provide compassionate care without compromise.
• We educate scientists and health care professionals for the future.
• We engage in research to advance knowledge and well-being.

Our Values
• Compassion  • Collaboration
• Innovation  • Responsibility
• Diversity  • Integrity
• Quality  • Trust

Our Vision
A patient-focused Health Sciences Center distinguished by collaboration, excellence, leadership, and respect.

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Thanks to the following individuals for their service to the Clinical Neurosciences Center. Their vision and guidance are critical to our success.

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JR Miller Enterprises
Salt Lake City, UT

Nick Madsen
One Eighty
Salt Lake City, UT

Contact Us
Department of Neurology
175 N. Medical Drive East
Salt Lake City, UT 84132
Phone: (801) 585-6387
Fax: (801) 581-4192
medicine.utah.edu/neurology

Department of Neurosurgery
175 N. Medical Drive East
Salt Lake City, UT 84132
Phone: (801) 581-6908
Fax: (801) 581-4385
medicine.utah.edu/neurosurgery

Division of Neuroradiology
175 N. Medical Drive East
Salt Lake City, UT 84132
Phone: (801) 581-7553
Fax: (801) 581-2414
medicine.utah.edu/radiology

Clinical Neurosciences Center
175 N. Medical Drive East
Salt Lake City, UT 84132
Phone: (801) 585-7575
Fax: (801) 581-4585
utahneurosciences.com

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University of Utah Clinical Neurosciences Center
Department of Marketing and Public Affairs
175 N. Medical Drive East
Salt Lake City, UT 84132
(801) 585-7777
DIRECTOR
Paul Gadd
QUALITY ANALYSTS
Tim Nielson, Cheryl Daniels, Dana Sanone
WRITERS
Jeremy Paul, Lori Fairbanks, Paul Gadd
PHOTOGRAPHY
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