For five years in a row University of Utah Health Care has been recognized by the University HealthSystem Consortium as one of the Top 10 academic medical centers in the country for quality* and as one of the top health systems for improving quality while reducing costs.

What does this mean for you? When you choose University of Utah Health Care you are selecting quality, safety, and value from a team devoted to providing each individual patient with an exceptional experience. Learn more at quality.uofuhealth.org
During the 2013 State of the Union address, President Obama said, "Every dollar we invested to map the human genome returned $140 to our economy — every dollar. Today our scientists are mapping the human brain to unlock the answers to Alzheimer’s. They’re developing drugs to regenerate damaged organs, devising new materials to make batteries 10 times more powerful. Now is not the time to gut these job-creating investments in science and innovation."

The president’s words sound a non-debatable message — that exploration and innovation are necessary and crucial to enhancing the lives of Americans and individuals throughout the world.

The search for innovative new therapies for patients with neurological disease is a core mission of the University of Utah’s Clinical Neurosciences Center. Our physician researchers have a proud history of discovery and continue to seek a better understanding of the causes of neurological disorders and to develop and test novel treatments.

It is with this spirit of exploration and innovation that we present to you the 2014 edition of Convergence.

In this year’s issue, we have chosen to highlight a small sample of the unique stories housed within our walls — stories that set the Clinical Neurosciences Center apart from any other medical facility of its kind in the region.

For example:

- How the Clinical Neurosciences Center became one of only a handful of centers in the country to take part in two of the nation’s most prestigious research programs.
- How a neurosurgeon is affecting the lives of patients through peripheral nerve transplant surgery.
- Why University of Utah Health Care is one of the top Deep Brain Stimulation centers in the nation.
- How a popular neuroradiology conference has managed to grow and become one of the premier neuroradiology conferences in the world.

As one of the top neurosciences centers in the country, and part of the only academic medical system in the Intermountain Region, we are proud of our team and its history of discovery, innovation, and service to our patients and their families.

In the following pages, you will get a brief glimpse of the amazing things we are doing for patients with today’s technology. On behalf of everyone at the Clinical Neurosciences Center, we hope you enjoy this year’s edition of Convergence.
RE-CERTIFIED AS, AND REMAINED, THE INTERMOUNTAIN WEST’S FIRST AND ONLY COMPREHENSIVE STROKE CENTER

For the 5th year in a row, received the American Heart/American Stroke Association’s Gold Plus Award for Stroke Excellence

NAMED BY NEUSTRATEGY, INC. AS THE TOP PERFORMER FOR ITS 2014 NEUROSCIENCE CENTER OF EXCELLENCE SURVEY

CONTINUED INVOLVEMENT WITH A VARIETY OF COMMUNITY EVENTS

- ARTILEPSY
- BE WELL UTAH HEALTH FAIR
- SEIZE THE NIGHT 5K WALK/RUN
- SAVING STROKES
- CARS FOR A CURE GOLF CHALLENGE
- TEAM BRAIN CYCLING TEAM

PLANNED AND EXECUTED A NUMBER OF REGIONAL AND NATIONAL NEUROSCIENCE CONFERENCES

- 12TH INTENSIVE INTERACTIVE HEAD & NECK IMAGING CONFERENCE
- 11TH ANNUAL UTAH STROKE SYMPOSIUM
- 2014 BRAINSTORM NEUROSCIENCES CONFERENCE
- 43RD WESTERN INTERMOUNTAIN NEUROLOGICAL ORGANIZATION (WINO) CONFERENCE

STEFAN M. PULST, MD, DR MED, CHAIR OF THE DEPARTMENT OF NEUROLOGY received the George C. Cotzias Award for Neuroscience from the American Academy of Neurology. He was also honored by the National Institutes of Health with the Senator Jacob Javits Award in Neuroscience in 2014.

William Couldwell, MD, PhD, chairman of the Department of Neurosurgery, concluded his term as president of the American Association of Neurological Surgeons (AANS)

RECIPIENT OF the Platinum Award at the 2014 Healthcare Internet Conference as the top marketing campaign for our Stroke Awareness Month campaign

BECAME THE ONLY medical facility in the Intermountain West to have two Pipeline-certified neurosurgeons for the treatment of brain aneurysms

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

CONTINUED TO participate in the National Neurosurgery Quality and Outcomes Database (N2QOD) for spine surgery

WELcomed ELEVEN new physicians to the Clinical Neurosciences Center – three in Neurosurgery and eight in Neurology

OVER THE PAST YEAR, added eight new sites to our growing TeleStroke Network

WELcomed A NEW CHAIRMAN OF RADIOLOGY, SATOSHI MINOSHIMA, MD, PHD
“BECAUSE OF THE RESEARCH THAT GOES ON HERE WE CAN HAVE A BIG IMPACT IMMEDIATELY AND DIRECTLY.”

DR. MEIC SCHMIDT

Michael Pruett is missing ten days. The ten days from the moment a truck pulled out in front of his motorcycle on a quiet road in Jackson Hole, Wyo. and he had no other choice but to lay the bike down and die. Ten days before he discovered he was still alive. Ten days before he learned he’d been literally put back together by a top-notch team at University of Utah Health Care. It was ten days after that moment, the moment he skidded under the wheels of the truck and thought he was dead and gone, that Michael Pruett came out of the fog.

“My wife told me that suddenly I had a clarity in my eyes that I hadn’t had before,” the 48-year-old realtor says. “And she told me the 1,000th time that I had been in a motorcycle accident and I was alive. I started crying. It sunk in. I should be paralyzed, or dead. That moment it became clear to me that this really was a miracle.”

Pruett had been conscious and awake during those ten days, but the severity of his injuries kept him in a fog he still can’t pierce. But in the years since, he has painstakingly worked to reconstruct his missing days. And no, he should not be walking, much less alive.

On the afternoon of July 15, 2012, Jackson Hole Fire paramedics arrived on the scene to find a man in pieces. His head was split open and he was lying on the asphalt in a way that emergency responders know is never good. Pruett was taken to St. John’s Medical Center, where an MRI showed his spine was completely dislocated just below his neck and his care was beyond the regional hospital’s capabilities. He was immediately flown via AirMed to University of Utah Hospital in Salt Lake City.

Enter Meic Schmidt, MD. A taciturn physician of German descent, Schmidt was called into consult because despite the alarmingly damaged spine, Pruett was still neurologically intact, a rare occurrence. Dr. Schmidt felt there was a chance, a slight chance based on the rarity of Pruett’s condition, that he could intervene.

“It would have been very risky for the doctors [at St. John’s Medical Center] to try and realign his spine, but they were able to transfer him to an academic hospital where we have experience with difficult and complex cases,” Dr. Schmidt says. “I’ve probably seen only one or two cases like it, but I knew the chance were good.”

Dr. Schmidt and his team went into a seven-hour surgery on Pruett. They used a specialized titanium plating system, developed by Ronald Apfelbaum, MD, at University of Utah Health Care over a 20-year period, to reassemble Pruett’s broken spine.

“Because of the research that goes on here we can have a big impact, immediately and directly,” Dr. Schmidt says. “And because we are an academic medical center, we have the opportunity to teach these complicated procedures so they can be done in the future.”

Pruett’s recovery was difficult. But today he is a walking, talking testament to the combination of research and clinical application at University of Utah Health Care. To him, it is nothing short of divine intervention.

“This really was a miracle,” he says. “Being able to walk out of the hospital because Dr. Schmidt was in the right place at the right time with his training is proof to me that God was watching over me.”

Dr. Schmidt, however, prefers to focus on the literal nuts and bolts of the case.

“This is the reason why I’m in this profession,” he says. “The fact that we can fix such a problem that, 20 years ago, would have left a patient dead or in a nursing home is the main reason we do this kind of work. Every doctor dreams of seeing a patient doing so well after such a severe injury.”

Today, Pruett has sold his motorcycle and is anxiously awaiting the release of a new book detailing his experience. The Hard Road: What if Almost Dying Was the Very Thing That Saved Your Life? will be available April 2015.
Sometimes it’s all about the basics. In the vast world of international medical conferences, there is a wide range of knowledge out there. Much of it, says Richard Wiggins, MD, is focused on cutting-edge research that, while fascinating, is not always much use in the day-to-day clinical setting. Therefore, for the last 12 years, Dr. Wiggins has built two reputable neuroradiology conferences around intensive fundamental case studies that provide attending physicians with knowledge they can take home to their practices and use right away.

“So often we go to societal conferences and see some interesting, high-tech methods to image our patients,” Wiggins says. “But it often turns out that these techniques are highly specialized, and nobody else can do it. At our conferences, we stress clinically relevant, basic topics that can be implemented immediately in the clinical practice.”

The conferences, titled the Intensive Interactive Brain and Spine Imaging Conference (odd years) and the Intensive Interactive Head and Neck Imaging Conference (even years), take place every year in March. Dr. Wiggins took over and expanded the Head and Neck Conference first created by Ric Harnsberger, MD, and created the Brain and Spine conference in 2009.

And they are intense. During the weeklong events, attendees are at it for eight hours a day, seeing hundreds of case studies. Dr. Wiggins, a neuroradiologist and professor with University of Utah Health Sciences, selects his speakers carefully with an eye for those who are not only stellar physicians but excellent teachers as well.

“We are a unique academic hospital,” Wiggins says, “in that we have a lot of great teachers. Residents and fellows come to University of Utah Health Care because of the emphasis on teaching, and this conference is an opportunity to share all these great lecturers with the world.”

Harish S. Jhaveri, MD, a radiologist originally from India who practices in Charleston, NC, attended the conference last year and says that the emphasis on pedagogy and instruction helped his experience stand out.

“Dr. Wiggins is a very smart and articulate professor,” Dr. Jhaveri says. “He is enthusiastic to teach and he pulls together a very talented, educated group. What I learned has made a difference in diagnoses and helped patients.”

Wiggins says he likes to keep things casual and conversational. To that end, another pillar the conference is built on is interactivity between attendees and speakers.

“We want people to not only be able to reach our speakers on breaks or at lunch to ask them questions,” he says. “But, we find that passing a microphone in the audience doesn’t always lead to the best questions and answers.”

So Wiggins uses a unique interactive Q&A system. Attendees can text questions at any time during the conference week for the next Q&A session.

“The speakers can then put those questions directly into their presentations,” he says. “And it gives them time to consider their answers and put together additional materials in advance. It’s an interesting dynamic that contributes to the conference’s success.”

The two conferences continue to grow and attendees come from all over the world. Last year more than 250 physicians from 18 countries attended. Dr. Wiggins expects a similar turnout at the next Intensive Interactive Brain and Spine Imaging Conference, which will take place March 2015.

“It’s a great statement for our academic institution that people will fly from the other side of the Earth to Salt Lake City to get this education,” Dr. Wiggins says.

“IT’S A GREAT STATEMENT FOR OUR ACADEMIC INSTITUTION THAT PEOPLE WILL FLY FROM THE OTHER SIDE OF THE EARTH TO SALT LAKE CITY TO GET THIS EDUCATION.”

DR. RICHARD WIGGINS
n the world of medical research, physician researchers often refer to early-phase clini-
cal trials (Phase II) as the “valley of death.” That’s when, for a myriad of reasons includ-
ing methodology, trial design, and inefficiencies, potentially effective therapies fail to make the transition from the laboratory to the clinic. To help build a better bridge over the valley between scientific discovery and treatment for both adults and children with neurological diseases, the Clinical Neurosciences Center at University of Utah Health Care (UUHC) is participating in two trial networks funded through an ambitious, innovative pair of grants from the National Institutes of Health (NIH): the Network for Excellence in Neuroscience Clinical Trials (NeuroNEXT) and StrokeNet. NeuroNEXT and StrokeNet aim to improve and streamline clinical trials to accelerate testing of in-
новative treatments for brain diseases and stroke so that successful therapies can reach the public more quickly. To do that, both networks have centralized institutional ethics review, contracting, trial design and statistical support, and other aspects of initiation and performance of clinical trials that up to now have dramatically slowed development of new treatments. NeuroNEXT and StrokeNet each comprise 23 medical centers across the country. All, including University of Utah Hospital, comprise a network of participating “spoke” hospitals also engaged in trial performance. UUHC is one of just nine institutions nationwide to have secured grants from both programs, for which the combined grant award was $2.7 million.

“Competition for these grants was fierce,” says Gordon Smith, MD, chief of the Division of Neurovas-
cular Medicine, professor and vice chair of research in the Department of Neurology, and the NeuroNEXT principal investigator. “To have one of them in a real feather on your cap. To have both at a single institution, that puts us in quite an elite group.”

The accomplishment reflects the strength of the UUHC comprehensive neurological programs; its long history of conducting clinical trials; and the overall quality of the department’s neurologists, neurosurgeons, and researchers. Dr. Smith says, “We are one of the best neurosciences centers in the country,” he says, “with very strong neurology, neurosurgery, and neurocritical care groups, an outstanding stroke group, and a leading children’s hospital. Our leadership is strong and efficient. We have all the right pieces in place.”

Under the NeuroNEXT umbrella, UUHC physi-
cians are currently conducting research studies involving patients with spinal muscular atrophy, multiple sclerosis, myasthenia gravis, and stroke, says Sandra Reyna, MD, director of the clinical trials office and the project director on both grants. Eight protocol trial proposals are currently being considered within StrokeNet and final funding decisions are expected soon, says Jennifer Majersik, MD, director of the clinical trials office and the project director on both grants. Eight protocol trial proposals are currently being considered within StrokeNet and final funding decisions are expected soon, says Jennifer Majersik, MD, director of the clinical trials office and the project director on both grants.

Prior stroke trials networks have only focused on hyper-acute therapies. But in StrokeNet, trials of stroke prevention and recovery (or rehabilitation) are just as critical. This means that we are touching on all aspects of the continuum of stroke care. “We add that although stroke is the number one cause of adult disability in the U.S., the dissemination of critical therapies to patients has often been slow.” In the past, physicians and patients were fatal-
istic about the chances for recovery after stroke. The thinking was that the brain is dead and you’re not going to get it back,” Dr. Majersik says. “We now know that’s not true. The brain has a lot of plasticity and there is tremendous potential for recovery.”

NeuroNEXT and StrokeNet bring numerous di-
erct and indirect benefits to UUHC and its patients. Dr. Smith says. First and foremost, patients from across the Intermountain West now have access to innovative therapies. The grants also help attract other top-notch faculty and researchers to UUHC. The development of trials networks also fosters col-
laboration throughout our large region and in im-
provement of systems of care. “Ultimately, this will benefit patients, whether they live in Salt Lake City, Idaho, Montana, Nevada, Wyoming, or elsewhere in our region,” says Dr. Smith.

“Our leadership is strong and efficient. We have all the right pieces in place.”

Dr. Gordon Smith
I sounds like something straight from a scene in a science fiction film. Surgery that places a set of wires under the skull so that electrical signals can be transmitted to different areas of the brain. It’s called DBS, or deep brain stimulation. And if the idea of it seems a bit science-fictiony or scary, then understanding the power of what it can do — quiet the tremors associated with Parkinson’s disease and other brain disorders — will likely wash away any patient’s fears.

“Told patients about the fear part is this: This is not new or experimental brain surgery. more than 100,000 of these procedures have been done,” says Paul House, MD, a neurosurgeon and the surgical director of University of Utah Health Care’s Movement Disorders Program. “We know DBS does not change the progression of Parkinson’s disease, but it does improve people’s quality of life after they have it,” says House, who himself has done more than 400 of the surgeries here at University of Utah Health Care (UUHC). “We know DBS causes no injury to the brain, which in the future may allow for expanded applications to other types of movement disorders,” House says.

While DBS cannot cure Parkinson’s disease or other disorders, the improved quality of life in well-selected patients is profound. Outcomes are no good, in fact, that the word-of-mouth patient experience has become a major source of referrals, he says.

Dr. House is particularly proud of the interdisciplinary approach to diagnosis and treatment, which has developed so that patients get the right screen-

“I know DBS does not change the progression of Parkinson’s disease, but it does improve people’s quality of life after they have it,” says Paul House, MD, a neurosurgeon and the surgical director of University of Utah Health Care’s Movement Disorders Program.

“He says he chose UUHC over others because he believed Utah provided the best environment for advancing his research, the goal of which is to use neurostimulation therapy to improve the lives of patients with a range of neurological and psychiatric disorders.”

“The one thing we aspire to do in my lab is create and achieve insights that would be difficult to achieve otherwise,” he says.

One of Dr. Butson’s most promising ideas: an iPad-based interactive computer program that creates a three-dimensional picture of the brain. This provides clinicians with a better look at a patient’s brain and helps them make better predictions about DBS lead placements, stimulation settings and effects. It also saves time. Clinicians who used the program in a small study reduced their patient evaluation time by 99 percent.

The program, which allows for simulated stimulation of the brain’s circuits, may eventually help enhance the precision of surgical targets and DBS treatment for a multitude of disorders and diseases. It’s something that until recently couldn’t really be done, but has been made possible by advances in medical imaging technology — another area of research that UUHC helped advance.

“Where the field is going is toward circuit-based therapy.…”

TO ACHIEVE MY LAB IS CREATE AND ACHIEVE INSIGHTS THAT WOULD BE DIFFICULT TO ACHIEVE OTHERWISE.”

DR. CHRISTOPHER BUTSON
WHEN
TIME IS NOT
ALWAYS ON
YOUR
SIDE

BY JENNIFER DOBNER

REGION’S ONLY TELESTROKE PROGRAM CONTINUES PAVING WAYS FOR PATIENTS TO GET HELP FAST

Twenty-eight-year-old Trey Orsak was on the telephone with a co-worker when it happened.

“My eyes went crossed and the computer screen just doubled,” he says, recalling the events of June 13, 2013.

In the emergency room at Timpanogos Regional Medical Center in Orem, Utah, the double vision persisted. Trey couldn’t focus his eyes or move because of weakness throughout his body. He was having a stroke — a surprising diagnosis for someone Trey’s age and one that might have been missed if emergency room doctors hadn’t consulted with neurologists at University of Utah Health Care (UUHC) via its TeleStroke program.

TeleStroke is a video medical service which, for more than a decade, has been putting experts from UUHC at the virtual bedside of patients in 23 rural and small urban community hospitals across the Intermountain West — from as near as Orem and Tooele to sites as far away as Ely, Nev. and Jackson, Wyo.

From her video viewpoint, UUHC vascular neurologist Jana Wold, MD, who is one of seven physicians that provide Telestroke consultations, could see Trey’s eyes were not moving properly. She suspected a stroke and recommended he be treated in Orem with t-PA, an intravenous drug that breaks up blood clots, and transported via AirMed to University of Utah Hospital. The treatment came just in time — right before the critical three-hour-from-onset window that t-PA has to be effective.

“I probably would have said, ‘Gosh, he’s so young. I don’t know if this is a stroke,’ she says. “I probably would have transferred him to our hospital, but I wouldn’t have treated him over the phone.”

Just over one year since his stroke, Trey has made a full recovery and is preparing for the arrival of his third child with his wife, Rachelle, who considers the TeleStroke program to literally be a lifesaver.

“We were really lucky that we got the medicine in time,” Rachelle says. “It’s frightening to think how close we were to having things go really poorly.”

Part of the comprehensive stroke care offered by UUHC, TeleStroke served some 103 patients in 2013, and has served another 98 through October of 2014, says Jill Austin, clinical manager of University of Utah’s Comprehensive Stroke Center. The program is in such high demand that eight new hospitals joined the network in 2014.

“What sets UUHC’s TeleStroke program apart from other telemedicine-driven consultation programs in its continuum of care,” Austin adds. “TeleStroke allows us to provide stroke care comparable to what patients would receive if they came directly to our hospital,” says Austin. “We focus on quality and developing the resources and programming they need to provide acute stroke care for their community. Whenever we contract with these hospitals, we really do look at these relationships as partnerships, from beginning to end.”

That’s exactly the kind of partnership that 78-bed Grand Junction Community Hospital in Grand Junction, Colo., was seeking when it joined the network six months ago, says Tami Honnen, clinical education director for the hospital’s emergency department.

“We are in an isolated area and we don’t have a University of Utah Hospital down the street,” says Honnen. “When we have someone come in with a possible stroke, we have limited neurology coverage, so we need the additional help that TeleStroke provides. It allows us to offer a much higher level of care for our patients.”
In the wake of the 9-11 attacks, Mark Mahan, MD, made a choice. The Princeton graduate walked away from his high-powered job as an investment banker and enrolled in the nearby Columbia School of Medicine.

“The building I worked in was destroyed during the attacks,” the now Dr. Mahan says. “It was a key moment for me. I wasn’t directly helping others and I wanted to do something where I could.”

And now years later, serving as a neurosurgeon at the Clinical Neurosciences Center at University of Utah Health Care (UUHC), Dr. Mahan is one of only a few national practitioners of specialized surgical procedures that can restore movement and motor skills in patients who once would have had limited or no motion after suffering nerve damage.

Surgical neurorehabilitation techniques allow surgeons like Dr. Mahan to move nerves from uninjured areas of a patient’s body and transplant them in damaged areas. It is incredibly versatile, Mahan says, and he and his colleagues are still discovering its range of possible applications.

“We are starting to realize all the possibilities with this major breakthrough,” he says. “One of the powerful functions of nerves is that they can regrow. We can use that capability to recreate functions that may have previously been lost for a patient.” Alternatively, with other surgical techniques, he can modulate the function of nerves. “We can take a patient who has post-stroke spasticity or someone who has cerebral palsy and dramatically improve their quality of life.”

While many of his colleagues focus their practice on dramatic interventions like removing malignant brain tumors, which no doubt prolongs lives, Dr. Mahan says he was drawn to this area of neurosurgery because he can see its direct impact on a patient’s life after surviving a life-threatening illness, accident or event.

“We are trying to give somebody something back that they are missing,” he says. “It’s what drew me to this area of study. I want to help that kid who was in the car accident get back on his bike again.”

And although Mahan only began his work at UUHC last summer, his patient list is growing. Recovery, however, takes time (nerves don’t regrow over night, after all) but he is already seeing promising progress in the patients he has treated. And the area of study also has applications beyond just repairing injury. It may be of use in areas like diabetes treatment, for example.

“Diseases like diabetes have their origins in nerves that affect a patient’s metabolism,” he says. “If we can selectively stimulate those autonomic nerves in a beneficial way, we may be able to control things like diabetes or even asthma. We really are thinking about things in new ways and that’s amazing stuff for a physician.”

**SURGICAL NEUROREHABILITATION GIVES NEW HOPE TO PATIENTS, NEW OPTIONS FOR DOCTORS**

**BY JEREMY PUGH**

**A NEW KIND OF RESTORATION**

“ONE OF THE POWERFUL FUNCTIONS OF NERVES IS THAT THEY CAN REGROW.”

DR. MARK MAHAN
Hearts beat, eyes water, bodies sweat or shiver — all based on the quiet work of the autonomic nervous system (ANS). This complex system works behind the scenes — running the automatic workings of the body. The ANS helps integrate and maintain balance in the essential systems that allow us to adapt to our environment, including sweat, tears, digestion, and breathing. Yet only within the last few decades has the neurophysiology and interconnections of the ANS become better understood. In fact, access to testing and experts continues to be limited.

At University of Utah Health Care (UUHC), the Clinical Neurosciences Center is working to meet this need by establishing a comprehensive autonomic laboratory — one of only a handful of such labs in the western United States and the only lab of its kind in the Intermountain West. Sitting at the helm of this unique research and clinical service is Melissa Cortez, DO, founder and director of the lab.

In her specially designed lab, Dr. Cortez is able to measure autonomic physiology, expanding the toolbox of neurologists beyond the central and peripheral nervous systems, and providing diagnostic, prognostic, and treatment-guiding information for the care of a wide array of neurological conditions.

Problems with the ANS often affect more than one of the body’s organs and can lead to irregular and confusing symptoms, including dizziness, excessive fatigue, rapid heart rate, difficulty adjusting eyesight from light to dark, sweating changes, constipation, stomach pain and vomiting.

“Since these types of symptoms are not specific to one medical condition, the pattern seen on autonomic testing can often help measure the abnormalities and shed light on the pattern of dysfunction relative to other neurological changes,” says Dr. Cortez. Because symptoms of autonomic disorders can be complex, many patients are often seen in multiple specialties before finally receiving a diagnosis. “It is my hope that this testing laboratory can help provide answers sooner for patients suffering from autonomic dysfunction,” she says. “The sooner we can put our finger on the pattern, the better chance we have in identifying the right treatment approach.”

While the ANS and its inner workings may seem mysterious, disordered autonomic function is now recognized across the whole spectrum of neurologic disease.

“We see it in neurodegenerative diseases, such as dementia and variants of Parkinson’s disease, where the presence and pattern of autonomic symptoms can guide diagnosis. And, while autonomic disorders can manifest as unusual autoimmune or idiopathic syndromes, we are discovering that these disorders are not as rare as once thought,” says Dr. Cortez. “We also see autonomic problems in fairly common disorders, such as diabetic neuropathy, multiple sclerosis and headache, and having the tools to measure the dysfunction will go a long way in increasing awareness of autonomic problems in these diseases.”

Dr. Cortez credits this unique resource to her organization’s commitment to providing advanced patient care and support of education and discovery in the neurosciences. “This lab is an investment in advancing the scope of our diagnostic resources and level of care, and I hope to contribute not only by expanding the availability of these tools, but also continuing to work towards better identification and treatment of these life-changing disorders.”
It was an idea more than a decade in the making: bring the imaging power of the MRI machine into the surgical theater and examination room. It's called interventional neuroradiology, and under the leadership of Edwin “Steve” Stevens, MD, surgeons and clinicians at University of Utah Health Care (UUHC) are now able to use MRI technology in real time during complicated surgical interventions and clinical diagnoses, which is leading to new discoveries, new techniques and new insight into the way the human brain works.

Flash back to 1997. Dr. Steve Stevens stepped in as a vice chairman of radiology and looked toward the future. It was an exciting time in MRI advances; soaring computer-processing power and new magnetic resonance technology was opening up a brave new imaging world. But the trick when embracing any evolving technology, Dr. Stevens says, is to take the long view.

“We knew we wanted to get on board with this new technology to take care of patients, but we needed to do it in a wise fashion that would temper obsolescence,” Dr. Stevens says. “So we worked closely with Siemens (and other medical-tech companies) to look at what was going to be created. These are million-dollar machines, so the key is to see what was coming and anticipate it. We were careful not to box ourselves out of new technology.”

In 2001, Stevens assumed the department’s chairmanship, a post he’ll move on from this year, satisfied that he’s built a sustainable model that can continue to grow with technology, improving the quality of education, research and patient care in UUHC’s system.

Colleague Karen Salzman, MD, underscores Stevens’ focus on patient care in the educational setting, saying, “He is an amazing professional role model for our trainees, especially in regard to patient care. He goes to great lengths to ensure patients receive exceptional care. He is a wonderful educator and has contributed immensely to the education of each and every neuroradiology fellow who has spent time at UUHC.”

“He’s a very good example of a player manager,” adds colleague H. Christian Davidson, MD. “He has been a great leader, but because he’s in the trenches working with patients, he gets what needs to happen. He has a very practical perspective.”

Via the interventional radiology suite he helped design and fund, doctors are now able to bring MRI technology to bear in the examination room. After his years of administrative work, Stevens says he is excited to finally “drive the machine.” He is looking forward to focusing on the clinical setting and working with teams to find new and novel ways to implement the imaging technology at their disposal.

“I’m looking forward to seeing if we can work with patients undergoing an acute stroke,” Stevens says. “With stroke we always say ‘time is brain.’ Can we decrease the time to get to treatment? Can we do it faster? Can we choose patients better? This tool will help us do that. We can see what is happening in the brain without delaying treatment. In stepping down, one of my goals is to drive this machine and use it as a tool to improve the outcomes of patients.”

**A LEGACY REALIZED**

Radiology Chairman Dr. Steve Stevens moves on to work with technology he helped bring to University of Utah Health Care

By Jeremy Pugh

Dr. Karen Salzman
A s surgical specialist, go, neurosurgery is relatively young. It was not formally recognized until the early 1920s. And, for many decades after that, every neurosurgeon treated patients of all ages. However, in the 1940s there was a group of neurosurgeons that believed children with neurosurgical problems should be treated by pediatric subspecialists. And, Marion “Jack” Walker, MD, helped lead that charge.

Walker grew up in Clinton, Miss. — a town with less than 20,000 people — during the 1940s. He was the oldest and only son of three children. His father, Dr. Elmo Walker, was the quintessential family doctor, making house calls and getting paid in pies rather than cash at times. Seeing Elmo Walker’s devotion to his patients, and hearing the accompanying life-saving stories, likely influenced Jack Walker and his two siblings to pursue medicine.

“When I started off in my career, I wanted to be just like Dr. Jack Walker,” admits Doug Brockmeyer, MD, who currently holds the Marion L. Walker, MD, Endowed Chair in Pediatric Neurosurgery and is chief of the Department of Pediatric Neurosurgery at UUHC. “All the residents at Utah who went into pediatric neurosurgery did, in part, because of Jack.”

“Jack was part of the initial group that really got things rolling in pediatric neurosurgery,” says longtime friend and fellow pediatric neurosurgeon Dave McLone, MD. “If you look at all the major pediatric neurosurgery organizations, each of which he has been the head of at some point, those are the organizations that led to the recognition of us as a subspecialty.”

Dr. Walker was the first person in North America to do selective dorsal rhizotomy surgery, a treatment especially effective for children with spastic cerebral palsy. In 1956, to learn the procedure, he traveled to Cape Town, South Africa, to learn from Dr. Warwick Peacock. Today, the operation is common practice.

With a growing number of patients suffering from hydrocephalus, Dr. Walker began looking for more effective ways to treat the condition. He used urological endoscopes to perform neuroendoscopy, thus becoming one of the first pediatric neurosurgeons to use the technique for hydrocephalus. Furthermore, he spearheaded bringing together basic scientists and pediatric neurosurgeons to accelerate research in hydrocephalus, helping form the Hydrocephalus Clinical Research Network.

Dr. Walker’s professional experience has resulted in numerous honors and opportunities to serve in every significant pediatric neurosurgery organization. Past roles include chair and founding member of the American Board of Pediatric Neurological Surgery (ABPNS), chair of the Pediatric Section of the American Association of Neurological Surgeons, American Society of Pediatric Neurosurgeons, president of the International Society of Pediatric Neurosurgeons, and editor for the Journal of Neurosurgery: Pediatrics, to name a few.

Today, Dr. Walker still receives birthday cards, graduation announcements, and letters from patients and their families, reminding him of their deep-felt gratitude or how he inspired them to go into medicine because of what he had done for them.

Despite the inevitable trials and sadness that are a part of his profession, Dr. Walker knew how to play and keep situations positive — both as a teacher and as a doctor. His upbeat, encouraging attitude drew people to him and to the profession. A big country music fan, Dr. Walker played George Strait music in the operating room because, he said, “It helps stop the bleeding.” Outside the hospital, he is an avid golfer — commenting after a particular trying shot to a fellow golfer that “brain surgery’s easy, it’s golf that’s tough.”
# 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 its affiliated hospitals, representing approximately 90 percent of the nation’s non-profit academic medical centers.

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

## All Cause Readmissions

<table>
<thead>
<tr>
<th></th>
<th>7 DAY READMT</th>
<th>14 DAY READMT</th>
<th>30 DAY READMT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UHC COMP</strong></td>
<td>2.86%</td>
<td>5.92%</td>
<td>9.59%</td>
</tr>
<tr>
<td><strong>UNIVERSITY OF UTAH</strong></td>
<td>4.48%</td>
<td>7.82%</td>
<td></td>
</tr>
</tbody>
</table>

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

## Inpatient Outcomes

### Length of Stay

- **Mean LOS Observed:** 4.12
- **Mean LOS Expected:** 5.01
- **LOS Index (O/E):** 0.82

### Mortality

- **% of Deaths Observed:** 4.20
- **% of Deaths Expected:** 5.42
- **Mortality Index (O/E):** 0.77

### Inpatient Outcomes: Neurology

<table>
<thead>
<tr>
<th></th>
<th>102</th>
<th>104</th>
<th>105</th>
<th>101</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>15% DAY READMT</strong></td>
<td>1.53%</td>
<td>2.19%</td>
<td>3.91%</td>
<td>1.60%</td>
</tr>
<tr>
<td><strong>14% DAY READMT</strong></td>
<td>2.54%</td>
<td>3.05%</td>
<td>4.08%</td>
<td>2.95%</td>
</tr>
<tr>
<td><strong>30 DAY READMT</strong></td>
<td>4.61%</td>
<td>5.92%</td>
<td>7.82%</td>
<td>5.92%</td>
</tr>
</tbody>
</table>

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

### Related Readmissions

<table>
<thead>
<tr>
<th></th>
<th>2013 Q3</th>
<th>2013 Q4</th>
<th>2014 Q1</th>
<th>2014 Q2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Friendliness &amp; Courtesy of Care Provider</strong></td>
<td>96.7</td>
<td>96.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Patient’s Confidence in Care Provider</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**N=2359** Source: Press Ganey Medical Practice Survey. All scores are mean score by receive date.

### Neurology: Length of Stay Index

- UHC: 1.02
- UHC COMP: 1.04
- UHC: 1.05
- UHC COMP: 1.01

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

## Stroke

### Related Readmissions

<table>
<thead>
<tr>
<th></th>
<th>UHC COMP</th>
<th>UHC COMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-Day Readmit</td>
<td>1.29%</td>
<td>1.35%</td>
</tr>
<tr>
<td>14-Day Readmit</td>
<td>2.03%</td>
<td>2.01%</td>
</tr>
<tr>
<td>30-Day Readmit</td>
<td>2.77%</td>
<td>2.88%</td>
</tr>
</tbody>
</table>

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

### Inpatient Outcomes

#### Length of Stay

- **Mean LOS Observed**: 5.88 days in 2014 Q3 at the hospital
- **Mean LOS Expected**: 7.53 days based on the patient’s diagnosis

#### Mortality

- **% of Deaths Observed**
  - University of Utah: 10.86%
  - UHC COMP: 8.15%

- **% of Deaths Expected**
  - University of Utah: 11.55%
  - UHC COMP: 9.45%

### Stroke: Length of Stay Index

<table>
<thead>
<tr>
<th>Year</th>
<th>UHC COMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>0.78</td>
</tr>
<tr>
<td>2014</td>
<td>0.94</td>
</tr>
</tbody>
</table>

**Note**: Includes chemotherapy, rehabilitation, dialysis, delivery/birth, and mental disease/alcohol and drug use encounters.

---

**About the Numbers**

**Stroke**

**Per Stroke**

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean LOS</td>
<td>5.88 days</td>
</tr>
<tr>
<td>% Deaths Observed</td>
<td>10.86%</td>
</tr>
</tbody>
</table>

**Related Readmissions**

- **7-Day Readmit**: 1.29% for University of Utah, 1.35% for UHC COMP
- **14-Day Readmit**: 2.03% for University of Utah, 2.01% for UHC COMP
- **30-Day Readmit**: 2.77% for University of Utah, 2.88% for UHC COMP

**Inpatient Outcomes**

- **Mean LOS Observed**: 5.88 days in 2014 Q3
- **Mean LOS Expected**: 7.53 days based on DRG

- **Mortality**
  - University of Utah: 10.86%
  - UHC COMP: 8.15%

**Statin**

- Administered within 24 hours of admission

**Antithrombotics**

- Anticoag for AFib/Flutter

**Rehab Considered**

- Before discharge

**Smoking Cessation**

- Before discharge

**ISCHEMIC & HEMORRHAGIC**

- *Stroke Education*
  - Before discharge

**YEAR TO DATE: OCT 2013-SEPT 2014**

- **7-Day Readmit**: 100%
- **14-Day Readmit**: 99.5%
- **30-Day Readmit**: 98.8%
Neurosurgery

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 all academic medical centers across the United States and affiliated hospitals, representing approximately 70 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.

### ALL CAUSE READMISSIONS

<table>
<thead>
<tr>
<th></th>
<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>3.03%</td>
<td>4.70%</td>
<td>8.03%</td>
</tr>
<tr>
<td>UHC COMP</td>
<td>4.43%</td>
<td>7.33%</td>
<td>11.34%</td>
</tr>
</tbody>
</table>

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

### RELATED READMISSIONS

<table>
<thead>
<tr>
<th></th>
<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>1.36%</td>
<td>2.42%</td>
<td>4.39%</td>
</tr>
<tr>
<td>UHC COMP</td>
<td>2.16%</td>
<td>3.69%</td>
<td>5.88%</td>
</tr>
</tbody>
</table>

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

### NEUROSURGERY: LENGTH OF STAY INDEX

<table>
<thead>
<tr>
<th></th>
<th>2013 Q1</th>
<th>2013 Q4</th>
<th>2014 Q1</th>
<th>2014 Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Utah</td>
<td>99</td>
<td>96</td>
<td>98</td>
<td>98</td>
</tr>
<tr>
<td>UHC COMP</td>
<td>1.01</td>
<td>0.98</td>
<td>0.81</td>
<td>0.71</td>
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</table>

### INPATIENT OUTCOMES

<table>
<thead>
<tr>
<th></th>
<th>Mean LOS Observed</th>
<th>Mean LOS Expected</th>
<th>LOS Index (O/E)</th>
<th>Mortality Index (O/E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Utah</td>
<td>5.78</td>
<td>6.97</td>
<td>0.83</td>
<td>3.93%</td>
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<tr>
<td>UHC COMP</td>
<td>7.90</td>
<td>7.86</td>
<td>1.01</td>
<td>4.07%</td>
</tr>
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</table>

### ABOUT THE NUMBERS

Friendliness & Courtesy of Care Provider: 95.2
Patient’s Confidence in Care Provider: 94.5

N=1085 Source: Press Ganey Medical Practice Survey. All scores are mean score by receive date.
University of Utah Health Care’s spine division is participating in the National Neurosurgery Quality and Outcomes Database (N2QOD). N2QOD serves as a continuous national clinical registry for neurosurgical procedures and practice patterns. It provides opportunities to assess the quality of care provided for the most common neurosurgical procedures, as well as provide patient groups and hospitals with an immediate infrastructure for auditing, and reporting the quality of their neurosurgical care.

### Level of Neck Pain (VAS Neck)

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Before surgery</th>
<th>After surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disc Herniation</td>
<td>5.76</td>
<td>2.43</td>
</tr>
<tr>
<td>Foraminal Stenosis</td>
<td>4.89</td>
<td>2.27</td>
</tr>
<tr>
<td>Central Stenosis</td>
<td>4.89</td>
<td>2.73</td>
</tr>
</tbody>
</table>

### Level of Arm Pain (VAS Arm)

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Before surgery</th>
<th>After surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disc Herniation</td>
<td>5.52</td>
<td>1.38</td>
</tr>
<tr>
<td>Foraminal Stenosis</td>
<td>4.68</td>
<td>1.79</td>
</tr>
<tr>
<td>Central Stenosis</td>
<td>4.78</td>
<td>2.76</td>
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</tbody>
</table>

### Overall Healthiness (EQVAS)

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Before surgery</th>
<th>After surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disc Herniation</td>
<td>53.10</td>
<td>65.90</td>
</tr>
<tr>
<td>Foraminal Stenosis</td>
<td>62.73</td>
<td>72.59</td>
</tr>
<tr>
<td>Central Stenosis</td>
<td>55.60</td>
<td>67.58</td>
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</table>

### Neck Disability Index (NDI)

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Before surgery</th>
<th>After surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disc Herniation</td>
<td>20.81</td>
<td>11.48</td>
</tr>
<tr>
<td>Foraminal Stenosis</td>
<td>19.27</td>
<td>9.66</td>
</tr>
<tr>
<td>Central Stenosis</td>
<td>22.00</td>
<td>13.69</td>
</tr>
</tbody>
</table>

#### About the Numbers

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

<table>
<thead>
<tr>
<th>MONTH</th>
<th>TOTAL</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>
</tr>
</thead>
<tbody>
<tr>
<td>JUN</td>
<td>1570</td>
<td>87.15%</td>
<td>11.75%</td>
<td>0.95%</td>
<td>0.15%</td>
<td>0.05%</td>
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<tr>
<td>JUL</td>
<td>1394</td>
<td>90.74%</td>
<td>8.53%</td>
<td>0.93%</td>
<td>0.00%</td>
<td>0.93%</td>
</tr>
<tr>
<td>AUG</td>
<td>98</td>
<td>98</td>
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<td>0</td>
<td>1</td>
<td>0</td>
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<tr>
<td>SEP</td>
<td>1100</td>
<td>81.91%</td>
<td>16.56%</td>
<td>1.27%</td>
<td>0.45%</td>
<td>1.73%</td>
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<tr>
<td>OCT</td>
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<td>0.32%</td>
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<td>0.34%</td>
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<tr>
<td>Nov</td>
<td>638</td>
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<tr>
<td>DEC</td>
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<td>0.00%</td>
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<tr>
<td>JAN</td>
<td>149</td>
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<td>4.70%</td>
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<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>FEB</td>
<td>3458</td>
<td>81.11%</td>
<td>17.69%</td>
<td>0.95%</td>
<td>0.23%</td>
<td>1.19%</td>
</tr>
</tbody>
</table>

*TAT=Turnaround Times computed for Fiscal Year 2014 through April 2014 (May and June Complete to Preliminary TAT unavailable due to Epic implementation.)
CONVERGENCE 2014


CONVERGENCE 2014

University of Utah Health Care   |   Clinical Neurosciences Center

PUBLICATION LIST

Robert J. Bollo, MD, MS


Brown C, Tansky P. Couldwell WT. Surgical treatment of of Neurolink 2014 in Nanning, China, for the Neutral Biomarker Related Technology path. Conference Program


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Robert J. Bollo, MD, MS


DANIEL W. FULTS III, MD


PAUL A. HOUSE, MD


L. ERIC HUANG, MD, PHD


RANDY L. JENSEN, MD, PHD


JOHN R. KESTLE, MD


F. EDWARD DUDEK, PHD

Dyekleiene R, Varell NH, Dudek TE. When and how do seizures kill... 1:103-112, 2014.

Spampampia J, Dudek TE. Vascular malformation: embolic therapy is... 156(1): 171-175, 2014.

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PHIL TAUSKY, MD


MARIAN L. WALKER, MD


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ULRICH A. RASSNER, MD

KAREN L. SALZMAN, MD


LUDBHA M. SHAH, MD


Pegah Afra, MD focuses her practice on the diagnosis and treatment of seizures and epilepsy. Her specific interests include intractable epilepsy, intracranial electroencephalography (EEG) monitoring, and magnetoencephalography (MEG). She also participates in inpatient monitoring and is currently investigating the role of new anti-epileptic drugs in treatment of epilepsy as well as neurophysiology of intracranial EEG. She has been honored as a member of the faculty for the Year from the Epilepsy Association of Utah. Specialties: EPILEPSY, CLINICAL NEUROPHYSIOLOGY (EEG, MEG), INTRACRANIAL MONITORING.

Juliann W. Allred, MD is a Utah native, specialist in general neurology, including the treatment of patients with multiple sclerosis, movement disorders, migraine/headache, stroke, and cognitive dysfunction. She also has an interest in neurogenetics and treats adult patients with neurogenetic diseases. Dr. Allred enjoys teaching medical students and residents and is dedicated to education. Specialties: GENERAL NEUROLOGY.

Safdar A. Ansari, MD is the Division Chief of Neurocritical care at the Department of Neurology. His clinical activities include managing critically ill patients in the hospital state-of-the-art Neurocritical Care Unit, providing consultation services to other intensive care units, and creating closed-loop artificial intelligence models and networks. He serves as co-chair of the Organ Donor Council, and as the site investigator for two large multinational clinical trials for brain hemorrhage as well as pursuing his own research interests in therapeutic hypothermia. He plays an integral role in education for trainees at all levels in the neurocritical care unit. Specialties: NEUROCRITICAL CARE.

Susan K. 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 treatment for seizure disorders. Dr. Barkan has also extensively researched the basic mechanisms of migraine and post-traumatic headache. She maintains a specialty clinic for adults and children with neurogenetic disorders. Specialties: EPILEPSY, KIDNEYS/DIABETES, NEUROGENETICS.

K.C. Brennan, MD is Assistant Professor and Division Chief for Translational Neuroscience in the Department of Neurology. His research activities focus on the biological basis of behavioral and cognitive processes. His laboratory examines the basic mechanisms of migraine and post-traumatic headache. A particular interest is cortical spreading depression, a wave of ion movements that contributes to stroke and traumatic brain injury. He and his colleagues also focus on psychological research on patients with migraine and post-traumatic headache. His clinical work includes seeing patients in the Headache Clinic and in the hospital in the Neuroscience Consult Service. Specialties: NEUROPHYSIOLOGY.

Mark B. Bromberg, MD, PhD directs both the Miter Neuromuscular/AntiLymphatic Subspecialties (ALS) Clinic and the Muscular Dyrophy Association (MDA) Clinic at the University of Utah. His research interests include clinical care of ALS patients and the development of new electrodiagnostic techniques. Dr. Bromberg is also very active in research as it relates to the quality of life for ALS patients and caregivers. Specialties: NEUROMUSCULAR, ELECTROPHYSIOGRAPHY, ALS.

James F. Bale, Jr., MD is the Vice Chair 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. Bale has published extensively regarding clinical child neurology, cytomegalovirus, and neurologic infections. With colleagues at the Universities of Utah and Nebraska, he has recently published Pediatric Neurology: A Clinical Handbook. Dr. Bale served as President of the Child Neurology Society from 2003-2005, and as Chair of the Council of Pediatric Subspecialties from 2004-2005. Specialties: PEDIATRIC NEUROLOGY, CONGENITAL INFECTIONS.

Helen I. Barkan, MD, PhD joined the Department of Neurology as Associate Professor, coming from New York Upstate Medical University. Her expertise includes intracranial electroencephalography 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 treatment for seizure disorders. Dr. Barkan has also extensively researched the basic mechanisms of migraine and post-traumatic headache. She maintains a specialty clinic for adults and children with neurogenetic disorders. Specialties: EPILEPSY, KIDNEYS/DIABETES, NEUROGENETICS.

Gordon J. Chelune, PhD is a Professor of Neurology and Senior Neuropsychologist in the Center for Alzheimer's Care, Imaging and Research (CACIR) in the Division of Cognitive Neurology. Dr. Chelune is board certified in clinical neuropsychology and has over 30 years of experience in his field. His clinical interests include memory disorders, deficits of higher executive function and trajectories 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 Neuropsychiatry, and Society of Personality Assessment, and currently serves as the Executive Director of the International Neuropsychological Society. Specialties: NEUROPSYCHOLOGY, MEMORY, NEURODEGENERATIVE DISORDERS, 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 Autoimmunology at the Mayo Clinic. Her training and experience focuses on the evaluation and management of autoimmune and paraneoplastic disorders of the nervous system. Her main clinical interest is directed to patients affected by autoantibody-mediated disorders of the nervous system, as well as demyelinating CNS disease, including neurofibromatosis type 1 (NF1), multiple sclerosis, and central nervous system complications of rheumatologic disease. She established the Autoimmunology and Neuroimmunology Clinic at the University of Utah, one of the few clinics in the United States focused on serving this group of patients. Specialties: NEUROIMMUNOLOGY, AUTOIMMUNE NEUROLOGY.

Mélissa Cortez, DO is an Assistant Professor within the Department of Neurology at the University of Utah Health Care. Dr. Cortez is also the Director and Founder of the Autonomic Physiology Lab. Dr. Cortez is a board-certified physician and completed her neurology residency at the University of Utah School of Medicine. Before returning to University of Utah Health Care in 2014, she served as a Fellow at the Mayo School of Medical Education, receiving specialized training in Clinical Neurology and the management of multiple Sclerosis. Specialties: NEUROLOGY, MULTIPLE SCLEROSIS, AUTOPHY, AUTONOMIC, NEUROIMMUNOLOGY, EPILEPSY, URSULAR.

Adam De Havénon, MD is Assistant Professor at the University of Utah, School of Medicine. After receiving B.A. from Yale University in 2011, he received his medical degree from Brown University School of Medicine in 2019 and completed an internship and residency neurology at the University of Utah in 2022. He recently finished a vascular fellowship at University of Utah, where he also pursued additional training and certification in vascular and transtemporal Doppler (TCD). Dr. De Havénon is currently a fellow with a special interest in stroke in the young, optimizing secondary stroke risk factor reduction, and evaluating patients for interventional procedures such as cerebral endarterectomy or stenting. He also provides emergency consultation to stroke patients at community hospitals via the University of Utah telestroke network. Dr. De Havénon’s independent research fellowship is focused on studying the application of advanced imaging modalities to better understand the physiology of large vessel atherosclerosis and pathogenesis as it occurs in the older stroke prone patients. Specialties: VASCULAR NEUROLOGY, STROKE.

L. Dana Dewitt, MD is Medical Director for inpatient Neuro Acute Care and head of the NeuroIntegran group. She is board certified in Vascular Neurology and covers Brain Ataxia and Talents and interprets Transtemporal Doppler Ultrasound. She has received awards as Best of Boston Top Docs for Women, Consumer Checking Top Docs and Best Doctors in America 2015-2019. She is the PI for a number of MS trails including a Neuro-NOT study for primary progressive and secondary progressive MS, an acute stroke study of Multi-Dem, and an RPD study in stroke, REDUCE SPECIES STRIKE, NEUROIMMUNOLGY, WHITE MATTER DISEASE.
KATHLEEN B. DIGRE, MD directs the Division of Headache and Neuro-Ophthalmology in Neurology as well as directs the Neuro-Ophthalmology Fellowship at the University of Utah School of Medicine, with the hope of reducing the burden of vision loss due to neurological diseases. Dr. Digre’s research interests include the study of unilateral intracranial hypertension, migraine in pregnancy, ocular motor disorders in psychiatric disorders, and treatment and assessment of neurodegenerative diseases. Most recently, she serves as the assistant editor-in-chief of the journal Neurology. She has won numerous awards, including the Dorfman Award for her research on migraine headaches and the Headache Research Award from the International Headache Society. Dr. Digre also serves as a member of the Board of Directors of the American Headache Society. She has been involved in numerous clinical trials and is a member of the American Academy of Neurology and the American Headache Society. She has contributed to numerous peer-reviewed publications in her field.

PETER M. HANNON, MD is currently completing fellowship training at the University of Texas Southwestern Medical Center. His research interests include the study of neurodegenerative diseases, specifically Alzheimer’s disease, and he has received multiple grants from the National Institutes of Health to study the biological mechanisms of Alzheimer’s disease. He has contributed to numerous peer-reviewed publications in his field.

RICHARD D. KING, MD, PhD is Assistant Professor of Neurology in the Center for Alzheimer’s Care. His research focuses on the study of neurodegenerative diseases, specifically Alzheimer’s disease, and he has received multiple grants from the National Institutes of Health to study the biological mechanisms of Alzheimer’s disease. He has contributed to numerous peer-reviewed publications in his field.

NOAH KOLB, MD studied biochemistry at Brown University and attended medical school at the University of Michigan. He completed his residency in Neurology at the University of Utah, where he was a Chief Resident during his final year. He completed his fellowship training at the University of Utah and he currently practices neurology at the University of Utah Hospital.

JENNIFER L. MAJERSIK, MD, MS, FAHA is an Associate Professor of Neurology and the Medical Director of the University of Utah Stroke Center. Her clinical practice includes evaluating and treating patients with acute stroke in the Emergency Department and in community hospitals throughout the state. She has a special interest in sleep medicine and is a fellow of the American Academy of Sleep Medicine. She is the Director of the University of Utah’s Sleep Center and is also the Director of the University of Utah’s Stroke Center.

JULIET M. MURPHY, MD is a board-certified neurologist with a clinical interest in stroke, including acute stroke, ischemic stroke, and intracranial hemorrhage. She also has a special interest in neurocritical care and is a member of the American Academy of Neurology. She is a member of the American Heart Association and has received multiple grants from the National Institutes of Health to study the biological mechanisms of stroke. She has contributed to numerous peer-reviewed publications in her field.

FUMISUGU MATSUO, MD is a clinical assistant professor in the Department of Neurology. He specializes in the diagnosis and treatment of neurological disorders, particularly in the area of neurocritical care. He has a particular interest in the use of advanced neuroimaging techniques to improve the diagnosis and management of neurological diseases. He has contributed to numerous peer-reviewed publications in his field.

KEVIN DUFF, PhD was a board-certified neurologist in geriatric neurology and is a director of the Comprehensive Assessment and Referral Program (CARE), a multidisciplinary team dedicated to the diagnosis and treatment of acute neurological conditions in the elderly. He has a special interest in the evaluation and management of cognitive impairment and Alzheimer’s disease. He has contributed to numerous publications in his field.

ANGELA D. EASTVOLD, PhD joined the Department of Neurology in 2007 as an Assistant Professor. In 2012 she was promoted to Associate Professor and in 2016 she was promoted to Professor. She is the Director of the Center for Alzheimer’s Research and Education (CARE) and is a co-founder of the Utah Alzheimer’s Disease Research Center (ADRC). Her research focuses on the study of neurodegenerative diseases, particularly Alzheimer’s disease, and she has received multiple grants from the National Institutes of Health to study the biological mechanisms of Alzheimer’s disease. She has contributed to numerous peer-reviewed publications in her field.

KEVIN DUFF, PhD joined the University of Utah as an Associate Professor of Neurology in 2012 and he is currently a Professor in the Department of Neurology. He is a board-certified neurologist with a special interest in the diagnosis and treatment of neurodegenerative diseases. He is a member of the American Academy of Neurology and the American Neurological Association. He has contributed to numerous peer-reviewed publications in his field.

FRANCIS M. FIILOUX, PhD is an associate professor in the Division of Pediatric Neurology at the University of Utah. He specializes in the diagnosis and treatment of pediatric neurological disorders, including neonatal conditions and developmental delay. He has contributed to numerous peer-reviewed publications in his field.

NORMAN L. FOSTER, MD is a board-certified geriatric neurologist who has specialized in the diagnosis and treatment of neurodegenerative diseases, particularly Alzheimer’s disease. He has contributed to numerous peer-reviewed publications in his field.

SUMMER GIBSON, MD is a board-certified neurologist with a special interest in the diagnosis and treatment of autoimmune neurological disorders. She has contributed to numerous peer-reviewed publications in her field.

JOHN E. GREENLEE, MD is a Professor in the Department of Neurology and Psychology at the University of Utah. He specializes in the diagnosis and treatment of neurodegenerative diseases, particularly Alzheimer’s disease. He has contributed to numerous peer-reviewed publications in his field.

DUSTIN B. HAMMERS, PhD, ABPP is a board-certified internist with a special interest in the treatment of neurological diseases. He has contributed to numerous peer-reviewed publications in his field.

CHRISTOPHER J. RONAS, MD, PhD is a board-certified neurologist with a special interest in the diagnosis and treatment of neurological diseases. He has contributed to numerous peer-reviewed publications in his field.

NICHOLAS E. JOHNSON, MD has conducted research on the mechanisms of neurodegenerative diseases, particularly Alzheimer’s disease, and has contributed to numerous peer-reviewed publications in his field.

JENNIFER L. MAJERSIK, MD, MS, FAHA is an Associate Professor of Neurology and the Medical Director of the University of Utah Stroke Center. Her clinical practice includes evaluating and treating patients with acute stroke in the Emergency Department and in community hospitals throughout the state. She has a special interest in sleep medicine and is a fellow of the American Academy of Sleep Medicine. She is the Director of the University of Utah’s Sleep Center and is also the Director of the University of Utah’s Stroke Center.

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DAVID R. RENNER, MD
is currently the Director of the University of Utah Neurology Residency Program at the University of Utah School of Medicine. Previously, he was the Medical Director of Electroencephalography at the Mayo Clinic in Jacksonville, FL. Dr. Renner is a board-certified neurologist with particular interest in sleep disorders, movement disorders, and headache disorders.

RODOLFO S. SAVICA, MD
is in a clinical faculty of Sleep and Movement Disorders Division within the Department of Neurology at University of Utah Health Care. He completed a postdoctoral fellowship in sleep disorders. His current research interests include neuroimmunology, sleep architecture, neurodegeneration, and amyloidosis.

SANDRA P. REYNA, MD
is Assistant Professor of Neurology and Director of the Neurocritical Care Unit at the University of Utah and Co-Director of the Pediatric Motor Disorders Research Program. A long-time researcher at the University of Utah, Dr. Reyna has extensive experience in research and clinical trials and has published over 100 articles in peer-reviewed journals.

THOMAS SCHENKENBERG, PHD
conducts neuroepigenetic and neurological evaluations for patients with a variety of conditions. His research interests include brain injury, pediatric neurology, and neuroepigenetics.

LAUREN E. SCHROCK, MD
is a Medical Director of the Movement Disorders Surgery Program in cooperation with Dr. Daniel R. Scolres, PhD. She is currently the Chair of the Department of Neurology at the University of Utah Health Care. She has been active in the field of neurology for over 20 years and has published extensively on topics related to neuroimmunology, neuroinflammation, and neurodegeneration.

AWAS RAZ, MD, PhD
is in the Department of Intraoperative Neurophysiologic Monitoring at the University of Utah Health Care. He is an Assistant Professor of Neurology and Director of the Movement Disorders Fellowship at the University of Utah Health Care. His research interests include the use of real-time imaging techniques and the development of novel therapeutic strategies for movement disorders.

ISHWAAR R. SANKARA, MPH, MBBS
is an Assistant Professor of Neurology at University of Utah Health Care. His research interests include the use of imaging techniques, such as positron emission tomography (PET) and functional magnetic resonance imaging (fMRI), to study the effects of traumatic brain injury on the brain and behavior.

J. ROBINSON SINGLETON, MD
is in the Department of Neurology at the Mayo Clinic. He is a fellowship-trained neurologist with a focus on movement disorders. His research interests include the development of novel therapeutic strategies for movement disorders, such as deep brain stimulation (DBS), and the use of novel imaging techniques to study the effects of these treatments.

A. GORDON SMITH, MD
is in the Department of Neurology at the Mayo Clinic. He is a fellowship-trained neurologist with a focus on movement disorders. His research interests include the development of novel therapeutic strategies for movement disorders, such as deep brain stimulation (DBS), and the use of novel imaging techniques to study the effects of these treatments.

GUGLIELMO SNOVIGLIOTTI, MD
is an Assistant Professor of Neurology at the University of Utah Health Care. His research interests include the use of imaging techniques, such as positron emission tomography (PET) and functional magnetic resonance imaging (fMRI), to study the effects of traumatic brain injury on the brain and behavior.

ROGGIUS SERAFINI, MD, PHD
in assistant professor of Neurology specializing in electromyography, neurophysiology, electroencephalography, and nerve conduction studies. His research interests include the use of novel imaging techniques to study the effects of movement disorders and the development of novel therapeutic strategies for movement disorders.

M. MATEO PAZ SOLDÁN, MD
is an Assistant Professor within the Department of Neurology at the University of Seville and University Hospital Virgen del Rocío. He is a board-certified neurologist with a focus on movement disorders and the use of functional neuroimaging techniques to study the effects of movement disorders.

JOHN D. STEFFENS, MD
is in the Department of Diagnostic and Clinical Neurology at the University of Utah. His research interests include the use of functional neuroimaging techniques to study the effects of movement disorders and the development of novel therapeutic strategies for movement disorders.

MATTHEW T. SWEENEY, MD
is in the Department of Neurology at the University of Utah Health Care. His research interests include the use of functional neuroimaging techniques to study the effects of movement disorders and the development of novel therapeutic strategies for movement disorders.

KATHRYN J. SWOBODA, MD
is in the Department of Neurology at the University of Utah Health Care. Her research interests include the use of functional neuroimaging techniques to study the effects of movement disorders and the development of novel therapeutic strategies for movement disorders.

PERLA C. THULIN, MD
has expertise in the evaluation and treatment of movement disorders, including Parkinson’s disease, dystonia, tremors, and neurodegeneration-related disorders. Dr. Thulin is a board-certified neurologist with a focus on movement disorders and the use of functional neuroimaging techniques to study the effects of movement disorders.
is also developing a functional MRI clinical service with studies large-scale brain network in children using advanced utility, and the clinical features and pathophysiology of examining promising new treatments, PET and MEG imaging in the clinical care of Alzheimer’s and related disorders. He in geriatric neurology and has more than 24 years of experience imaging and Research (CACIR). Dr. Zamrini is board certified education.

Stroke Task Force. Her interests lie in inpatient neurology and in the General Neurology Clinic, as well as serves on the

evaluates and treats acute stroke patients in the hospital and

is Professor of Neurology in the Center for Alzheimer’s Care, Imaging and Research (CACIR). Dr. Zamrini is board certified on geriatric neurology and has more than 15 years of experience in the clinical care of Alzheimer’s and related disorders. He has been an investigator on over 50 clinical research studies examining promising new treatments, PET and MEG imaging utility, and the clinical features and pathophysiology of neurodegenerative disorders. His clinical interests center on Alzheimer’s disease and related memory disorders, especially dementia that is atypical, rapidly progressive, familial, or early onset. ALZHEIMERS DISEASE AND RELATED DISORDERS. He has a special interest in sleep disorders, as well as cognitive disorders in the aging population. He has performed research on the pathophysiology of the sleep-wake cycle and the relationship between sleep and cognition.

BRANDON A. ZIELINSKI, MD, PhD

joined the Division of Pediatric Neurology after completing his subspecialty training at the University of California San Francisco. His focus on acute care fills a neurohospitalist role, and his specific clinical interests include pediatric cerebral venous sinus thrombosis, stroke, and multiple sclerosis. He obtained his medical degree from the University of Minnesota and completed his pediatric neurology fellowship training at the University of California San Francisco and the University of California Davis. He is currently an Assistant Professor of Neurology at the University of Utah.

ROBERT J. BOLLO, MD, MS

received his MD degree from Boston University School of Medicine in 2013. He then completed an internship as well as his neurosurgery residency at New York University Medical Center and Bellevue Hospital from 2013-2016. Following his residency he completed a one-year pediatric fellowship here at the University of Utah. In 2017 he was appointed as an assistant professor of neurosurgery at Baylor College of Medicine in Houston, Texas. In April 2019, he joined the Department of Neurosurgery at the University of Utah School of Medicine where he currently serves as an assistant professor of neurosurgery.

GEORGE M. ZINKHAN, MD

obtained a medical degree from the University of Texas Southwestern Medical School in 2013. He completed his neurological residency training at the University of Utah in 2016. Dr. Zinkhan treats a variety of neurological conditions including headaches, multiple sclerosis, movement disorders, stroke, etc. SPECIALTY: GENERAL NEUROLOGY

WILLIAM T. COULDWELL, MD, PhD

Serves as Professor and Chief of the Department of Neurosurgery at the University of Utah. He also has been selected as Director for the American Board of Neurological Surgery and is currently the President of the American Association of Neurological Surgeons. Dr. Couldwell has over 200 peer-reviewed publications and has been the recipient of several NIH and other research grants. His clinical interests include surgical management of epilepsy, neuro- oncology, primary tumors, skull base and cerebrovascular neurosurgery. SPECIALTIES: SKULL BASE SURGERY, NEUROLOGICAL ONCOLOGY, NEUROVASCULAR SURGERY

RONALD J. APPALBAUM, MD EMERITUS in Professor of Neurology in the Center for Alzheimer’s Care, Imaging and Research (CACIR). Dr. Zamrini is board certified on geriatric neurology and has more than 15 years of experience in the clinical care of Alzheimer’s and related disorders. He has been an investigator on over 50 clinical research studies examining promising new treatments, PET and MEG imaging utility, and the clinical features and pathophysiology of neurodegenerative disorders. His clinical interests center on Alzheimer’s disease and related memory disorders, especially dementia that is atypical, rapidly progressive, familial, or early onset. ALZHEIMERS DISEASE AND RELATED DISORDERS. He has a special interest in sleep disorders, as well as cognitive disorders in the aging population. He has performed research on the pathophysiology of the sleep-wake cycle and the relationship between sleep and cognition.

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MARK A. MAHAN, MD  

is a neurosurgeon who comes to University of Utah Health Care from the Barrow Neurological Institute in Phoenix. He completed fellowships in peripheral nerve surgery at the Mayo Clinic and UCSF. Dr. Mahan specializes in spine surgery and will be the only physician in the Intermountain Region capable of providing complex peripheral nerve reconstruction and surgical neurorehabilitation. SPECIALTIES: NEUROSURGERY, PERIPHERAL NERVE, SPINAL DISORDERS.

JAMES, P (PAT) MCCALLISTER II, PHD  

directs a multidisciplinary laboratory that investigates the pathophysiology of hydrocephalus with a particular emphasis on pharmacological treatments to prevent brain damage or promote repair, diagnostic imaging, and endoscopic/bioluminescent applications to improve cerebrospinal fluid drainage devices. He is the recipient of the Robert H. Pudenz Prize for Excellence in Cerebrospinal Fluid Physiology and Hydrocephalus from the International Society for Pediatric Neurosurgery. SPECIALTY: HYDROCEPHALUS RESEARCH.

MIN S. PARK, MD, FAANS  

is a neurosurgeon who comes to University of Utah Health Care from the Barrow Neurological Institute in Phoenix, where he recently completed a fellowship in endovascular neurosurgery. With the ability to perform a comprehensive suite of endovascular neurosurgical procedures, Dr. Park’s presence will help enable University of Utah Hospital to provide a full range of coverage for patients requiring neurovascular treatment. SPECIALTIES: ENDOVASCULAR/NEUROSURGERY.

JAY K. RIVA-CAMBRIN, MD, MSC  

joined the faculty of the University of Utah and Primary Children’s Medical Center in 2017. Dr. Riva-Cambrin’s clinical interests in pediatric neurosurgery include the treatment of hydrocephalus and clinical trials. He performs over 200 neurosurgeries per year, with an emphasis on hydrocephalus related. SPECIALTIES: PEDiatric, NEUROSURGERY, HYDROCEPHALUS, BRAIN TUMORS, ENDOVASCULAR SURGERY.

MEC H. SCHMIDT, MD, MBA, FACS  

Serves as Vice 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, neurintima, 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. SPECIALTIES: NEUROSURGERY, SPINE, ORTHOPEDICS, TRAUMA.

RICHARD H. SCHMIDT, MD, PHD  

joined the Department of Neurosurgery in 1999 and currently serves as Associate Professor. Dr. Schmidt has clinical and research interests that include cerebellar aneurysms, Chiari malformation, hydrocephalus, trauma and critical care. SPECIALTIES: CEREBRAL ANEURYSMS, VASCULAR MALFORMATION, CHIARI MALFORMATION, ENDOVASCULAR VENTRICULAR SHUNT.

PHIL TALUSKY, MD  

completed a Skull Base/Cerebrovascular Fellowship at the University of Utah and an Endovascular Fellowship at the Mayo Clinic focusing on minimally invasive techniques to treat stroke, aneurysms, AVMs and other vascular diseases. As a result of his dual training, he has a unique perspective offering his patients both microsurgical and minimally invasive endovascular treatment for vascular disorders. He training also included extensive experiences in the use of modern flow diverters, such as the Pipeline device for the pipeline, CAVEXIOUS ANEURYSMS, MIDDLE CEREBRAL ARTERY MALFORMATION, HYDROCEPHALUS, STROKE, CAROTID DISEASE.

MARION L. WALKER, MD  

in Professor of Neurosurgery in the Division of Pediatric Neurosurgery and Adjunct Professor of Pediatrics 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 Pediatric Neurosurgery of the American Academy of Pediatrics, and the American Society of Pediatric Neurosurgeons. He also served as President of the International Society of Pediatric Neurosurgery and was a Past Editor for the Journal of Neurosurgery: Pediatrics. SPECIALTY: PEDiatric NEUROSURGERY.

Marion Walker, MD

SATOISH MINOSHIMA, MD, PHD  

in Professor and Chair of the Department of Radiology at University of Utah Health Care. Dr. Minoshima is an internationally renowned clinician and scientist on the field of dementia and molecular imaging, and most recently held the position of W.U. Help Endowed Professor in Radiology at University of Washington in Seattle. He is internationally recognized for his research, including the discovery of the posterior cingulate abnormality in Alzheimer’s disease and invention and dissemination of diagnostic statistical imaging technology for brain PET and fMRI scan interpretation. SPECIALTY: NUCLEAR MEDICINE.

KAREN L. SALZMAN, MD  

in Chief of the Division of Neuroradiology. She has special interest in neuro-oncologic imaging and new imaging techniques, including magnetic resonance (MR) perfusion, MR spectroscopy and diffusion tensor imaging (DTI). Dr. Salzman’s research interests include brain tumor perfusion imaging and DTI in an effort to help improve accurate pre-operative diagnostic, surgical planning, and predict prognosis. Other research interests include stroke imaging, along with head and neck neoplasms. SPECIALTY: NEURORADIOLOGY.

JEFFREY S. ANDERSON, MD, PHD  

directs the (MRI) Neuroradiological Mapping Service and is Principal Investigator for the Utah Functional Neuroradiology Laboratory. Dr. Anderson’s lab studies brain networks using functional imaging techniques such as fMRI, diffusion tensor imaging, and magnetoencephalography. Dr. Anderson also has particular interest in autism, multiple sclerosis, vision research, and dementia. SPECIALTY: NEURORADIOLOGY.

H. CHRISTIAN DAVIDSON, MD  

is a board-certified neuroradiologist with subspecialty interests in imaging of brain ischemia, imaging of the orbit, and imaging of the head and neck. Dr. Davidson has a background in medical informatics including clinical and educational computer systems. He is also Program Director for the Radiology Residency Program and has served in various leadership capacities in the University of Utah Medical Group for the past decade. SPECIALTIES: NEURORADIOLOGY, MEDICAL INFORMATICS.

H. RIC HARNISBERGER, MD  

is a Professor of Radiology at the University of Utah. He is an internationally recognized expert in head and neck imaging, having published over 350 articles and books in this area. Dr. Harnisberger is also Chair and CEO of ARAMIS, Inc; a medical electronic decision support company. SPECIALTY: NEURORADIOLOGY.

ANN E. OSBORN, MD  

is Distinguished Professor of Radiology at the University of Utah. She is recognized internationally for her ability to help advance the field of neuroradiology, which deals with the head, neck, spine and the central and peripheral nervous systems. 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. SPECIALTY: NEURORADIOLOGY.

EDWARD P. QUIGLEY II, MD, PHD  

seeks to improve diagnostic, characterization, and the treatment of neurologic diseases through advanced imaging. Disease processes studied by Dr. Quigley include multiple sclerosis, optic neuritis, neoplasms, epilepsy imaging, dementia and aging brain, vascular anomalies and aneurysm. SPECIALTY: NEUROINTERVENTIONAL SURGERY.

ULRICH A. RASSMEN, MD  

is Medical Director of Magnetic Resonance Imaging (MRI) and Computed Tomography (CT) at the University of Utah. Dr. Rassmen also has special research and clinical interest in MRI physics and MRI safety. SPECIALTY: NEUROINTERVENTIONAL SURGERY.

LUBAHA M. SHAH, MD  

has interests that include advanced magnetic resonance imaging (MRI) techniques such as functional MRI, diffusion tensor imaging, and perfusion MRI for the brain and spine. In addition to diagnostic radiology, Dr. Shah performs interventional procedures such as epidural, intrathoracic injections and biopsy. SPECIALTY: NEURORADIOLOGY.

EDWIN A. “STEVE” STEVENS, MD  

in Professor and Chair of the Department of Radiology at the University of Utah. Dr. Stevens specializes in neurointerventional surgery, treating neurological diseases by endovascular and minimally invasive techniques guided by imaging. Dr. Stevens has given over 50 presentations, published over 30 articles and book chapters, and is a reviewer for the American Journal of Neuroradiology. SPECIALTY: NEUROSURGICAL INTERVENTIONAL SURGERY.

RICHARD H. WIGGINS III, MD, CIIP, FSIIM  

is Professor of Radiology, Director of Imaging Informatics and the Medical Administrator for the Picture Archiving and Communication System (PACS) at the University of Utah. He is an internationally recognized expert in both head and neck imaging and imaging informatics. In 2018, the Department of Radiology awarded Dr. Wiggins with the Teacher of the Year Award. Dr. Wiggins research interests include BioMedical informatics, head and neck and brain tumor perfusion imaging, and advanced head and neck imaging. Dr. Wiggins has published over 50 books, book chapters, and peer-reviewed publications, and has given over 250 invited presentations. SPECIALTY: HEAD AND NECK IMAGING, IMAGING INFORMATICS.
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<th>RESIDENTS &amp; FELLOWS</th>
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### NEUROLOGY

#### RESIDENTS

- **PGY-4**
  - Alicia Bennett, DO
  - Tina Burton, MD
  - Kelsey Juster-Swiftly, MD
  - Marilyn McKasson, MD
  - Farzohsanghi, MD

- **PGY-3**
  - Daniel Abenroth, MD
  - Ricky Chen, MD
  - Patrick Nicholson, MD, MSC
  - Gurjeet Singh, MD
  - Victor Wang, MD, PHD

- **PGY-2**
  - Verena Haringer, MD
  - Melissa Heiry, MD
  - Kristin Mitrovich, MD
  - Donald McCorquodale, MD, PHD
  - Lizzie Doll, MD
  - Gary Nelson, MD
  - Carey Wilson, MD

#### FELLOWS

- **EMG**
  - Angela Peters, MD
  - Vascular Neurology
  - Lee Chung, MD
- **EEG**
  - Neurocritical Care
  - Timothy Delgado, MD
- **Neuromuscular**
  - Ligia Onofrei, MD
- **Movements Disorders**
  - Behrang Saminejad, MD

### NEUROSURGERY

#### RESIDENTS

- **PGY-7**
  - Sarah Garber, MD
  - Khaled Krisht, MD

- **PGY-6**
  - Christian Bowers, MD
  - Ricky Kalra, MD
  - Andrew Tsen, MD

- **PGY-5**
  - Chih-Ta Lin, MD
  - Marcus Mazur, MD
  - Walavan Sivakumar, MD

#### FELLOWS

- **Pediatric Neurosurgery**
  - Heather Spader, MD
- **Skull Base**
  - Jayson Neil, MD

### NEURORADIOLOGY

#### RESIDENTS

- **PGY-4**
  - Craig Kilburg, MD
  - Vijay Ravindra, MD

- **PGY-3**
  - Jian Guan, MD
  - Osama Jamil, MBBS

- **PGY-2**
  - Andrea Brock, MD, MSCI
  - Michael Karsy, MD, PHD

#### FELLOWS

- **Sarah Cantrell, MD**
- **Blair Winegar, MD**
- **Jason Ginos, MD**
- **Nic Pernier, MD**
- **Luke Leibert, MD**
- **Nick Koontz, MD**
- **Justin Cramer, MD**
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

A PATIENT-FOCUSED HEALTH SCIENCES CENTER DISTINGUISHED BY COLLABORATION, EXCELLENCE, LEADERSHIP, AND RESPECT