

UCLA

Neurosurgery

Connections



ADVANCES

MULTIDISCIPLINARY TEAM OF EXPERIENCED, WORLD-CLASS PHYSICIANS

UCLA Health sits in a unique position: as one of the top hospitals in the U.S., it attracts patients with the most complicated and serious conditions. Providing the safest, most effective treatment requires an expert team of physicians and ancillary healthcare providers. UCLA Neurosurgery's masterful surgeons, often working in a team approach, can successfully remove tumors deemed "inoperable" by others. UCLA Neurosurgery also offers the most advanced, minimally-invasive techniques driven by technological innovation and resources.

A critical part of implementing world-class care in both the creation and application of treatments is multidisciplinary collaboration. Dr. Marvin Bergsneider, Director of the UCLA Pituitary and Skull Base Tumor Program, explains that clinical success is nearly impossible to achieve by one person alone. He likens cross-departmental

collaboration to a championship basketball team, explaining that, "championship teams have multiple great players because the sum is greater than any individual part. The broad spectrum of expertise is what makes UCLA phenomenal." UCLA's teamwork approach benefits all patients, with conditions ranging from the most routine pituitary tumor to the rarest of diagnoses.

This teamwork strategy is exemplified in the Pituitary and Skull Base Tumor Program. Pituitary and skull base neurosurgeons routinely work with a diverse group of specialists across a panoply of disciplines, including neuroradiologists, head and neck rhinologists, neuro-endocrinologists, pathologists, and neuro-ophthalmologists.

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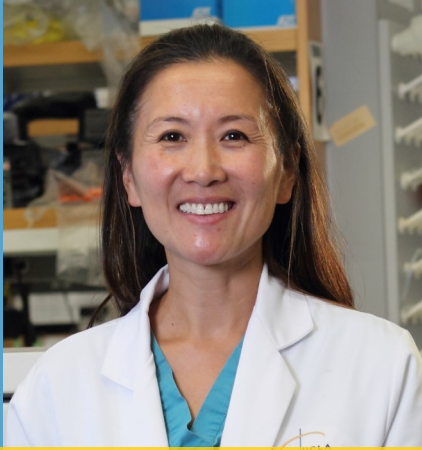
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Linda Liau, MD, PhD, MBA

Professor & W. Eugene Stern Chair
UCLA Department of Neurosurgery

“UCLA Neurosurgery is committed to excellence, innovation, and to the successful development of future treatments in our field.”

Dear Colleagues and Friends,

Welcome to the spring edition of the UCLA Neurosurgery Connections newsletter!

While the past two years spent in the pandemic have been challenging, the Neurosurgery department continues to forge ahead to find a rhythm in this new normal. In particular, I am endlessly grateful for our patients and their families for patiently standing beside us as care pathways have evolved. As a result, we have seen a significant increase in telehealth visits, which has enabled our physicians to meet with patients from all across the globe—patients that might normally never reach our care. Beyond these clinical developments, our researchers are continuing to develop and implement cutting-edge therapies and potential cures to improve the lives of many of our patients.

Additionally, we are proud of the work being done by our nationally-renowned team of neurosurgeons. Thanks to our dedicated and hardworking team, we continue to be ranked among the top 10 neurosurgical programs in the nation and top 3 in the nation for NIH research funding.

In this edition of the newsletter, we would like to take the opportunity to highlight some of the innovative clinical care and research occurring in our programs. From the multidisciplinary approaches to treatment (page 3) employed by our **Pituitary and Skull Base Tumor** team, to the novel rehabilitation strategies and AI algorithms (page 6) that our **Spine** neurosurgeons are using to treat spinal cord patients, we are paving the way for new therapies that have the potential to improve patients' quality of life. Additionally, our **Neurotrauma and Neurocritical Care** team continues to expand our knowledge of traumatic brain injuries (page 5), while our **Functional and Epilepsy** neurosurgeons are conducting cutting-edge research to learn more about how the brain functions to better treat complex memory disorders and chronic low back pain (page 4). Lastly, we have the pleasure of welcoming Dr. Jeremiah Johnson (page 3) to our **Cerebrovascular** Division, where he will work to improve outcomes for patients with life-threatening vascular conditions.

Overall, UCLA Neurosurgery is committed to excellence, innovation, and to the successful development of future treatments in our field. From all of us at the UCLA Department of Neurosurgery, we wish you good health and all the best to you and your families!

Warm regards,

Linda M. Liau

PITUITARY/SKULL BASE

(CONTINUED FROM COVER STORY)

The Pituitary and Skull Base Tumor team works closely with other specialists for conditions close to the brain. For example, Dr. Won Kim has teamed up with UCLA oculoplastic surgeons to provide state-of-the-art care for challenging intraorbital and intracranial pathologies through minimally invasive incisions around the eye.

When surgical cure is not possible for a patient, the program offers additional advanced treatment modalities. UCLA neurosurgeons work closely with radiation oncologists to deliver “beam-shaped” pinpoint radiation treatment that can spare critical nervous system function, while stopping tumor growth. Additionally, through the ability to divide the focused radiation treatments into 5-10 doses, physicians are able to treat tumors near critical structures such as the optic nerve where single dose treatments may hold unacceptable risk. All treatment options are considered by the multidisciplinary Pituitary and Skull Base Tumor team, which meets weekly in a “skull base tumor board.” As a major research institution, in addition to being a leading expert in primary and



Dr. Marvin Bergsneider (Neurosurgery) and Dr. Marilene Wang (Head and Neck Surgery)

metastatic brain cancers through the NCI-designated SPORE (Specialized Program in Oncologic Research Excellence), UCLA is also conducting important research on meningiomas, pituitary tumors, and acoustic neuromas.

“It is a privilege to work in a place where all subspecialties are covered by experienced experts,” notes Dr. Bergsneider. “And that makes for exceptional care and better patient outcomes. From the patient viewpoint, this team approach occurs seamlessly. We take the responsibility to coordinate and facilitate care throughout the diagnosis and treatment course.”

CEREBROVASCULAR

NEW PHYSICIAN HIGHLIGHT

DR. JEREMIAH JOHNSON

Dr. Jeremiah Johnson is the newest member of the Cerebrovascular division. Joining UCLA from the Baylor College of Medicine Department of Neurosurgery in Houston, Texas, he is active nationally in neurosurgery, recently serving as chair of the American Association of Neurological Surgeons’ Young Neurosurgeons Committee. Dr. Johnson specializes in the surgical and endovascular treatment of vascular conditions, including brain aneurysms, arteriovenous malformations (AVMs), dural arteriovenous fistulas (DAVFs), and spinal vascular malformations, among others.

For Dr. Johnson, coming to UCLA meant uniting with a hardworking, world-class team that could help burgeon both his personal and professional development. Dr. Johnson is particularly interested in developing novel Cerebrovascular research to expand treatment options for patients with vascular conditions and explore what still remains unknown about the brain. He plans to pursue research that will help elucidate the dynamics of blood flow in and out of the brain during different physical states and how that influences intracranial pressure and cerebrospinal fluid dynamics. Alongside the Director of Cerebrovascular Neurosurgery, Dr. Geoffrey Colby, and Dr. Anthony Wang, Dr. Johnson hopes to achieve NIH-funded research in the division and to continue providing outstanding modern Cerebrovascular care to patients.



Dr. Jeremiah Johnson

The Cerebrovascular division continues to spearhead the advancement of innovative techniques to treat complex vascular conditions. For example, UCLA endovascular neurosurgeons are playing a prominent role in advancing the use of the most modern minimally-invasive treatments for complex brain aneurysms and the use of middle meningeal artery embolization for the treatment of chronic subdural hematomas. The division has also established a multidisciplinary Moyamoya center, directed by Dr. Anthony Wang, to provide best in class coordinated care, research, and treatment for Moyamoya patients.

Through collaborative research projects, the Cerebrovascular division is studying and developing new treatment options for complex disease processes such as cerebral vasospasm, a condition that occurs after brain hemorrhage from aneurysm rupture. The division is also involved in many studies aimed at understanding the genetic underpinnings and gene expression patterns that result in vascular diseases such as arteriovenous malformations (AVMs), aneurysms, and Moyamoya.

FUNCTIONAL/EPILEPSY

NOVEL RESEARCH EXPANDS
TREATMENT POSSIBILITIES*Decoding Memories Using Sleep and Awake Cycles*

With the population aging, we are facing a “Cognitive Tsunami,” or the state of a society with millions of people with memory disorders. Thus, understanding the mechanisms of memory, and finding interventions that can enhance memory, are critical endeavors that possess the potential to improve the lives of countless people worldwide. Although it is established that memory is critical for cognitive well-being, and that memories are consolidated during sleep, the underlying mechanisms of these processes in the human brain are still poorly understood. Dr. Itzhak Fried, Director of the Epilepsy Surgery Program at UCLA, plans to further elucidate the relationship between sleep and memory and develop means to strengthen memory while patients are asleep.



Dr. Itzhak Fried

When we are asleep, our memories are consolidated. Dr. Fried likens consolidation to an “engraving” of one’s memories, as consolidation occurs when the brain takes recently acquired memories and transforms them into stable, long-term memories. This process is a crucial step to memory formation, and thus is an intriguing place to probe when considering how sleep and memory intertwine, especially in patients whose memory might be compromised.

This research is further development of previous NIH-supported research by Dr. Fried’s lab on mechanisms of memory and its enhancement during the awake state. Dr. Fried’s study is focused on patients with epilepsy who undergo evaluation for potential surgical cure. To pinpoint the origin of their seizures Dr. Fried implants electrodes in the brain and monitors the patients in the hospital to capture spontaneous seizures. Simultaneously, these electrodes provide insight into the neural mechanisms of cognition down to the level of single brain cells.

Using the feedback from these electrodes, Dr. Fried hopes to identify how memory-relevant neural activation patterns are transformed and reactivated during sleep. Consequently, this will allow the researchers to establish the means to boost memory consolidation during sleep through electrical stimulation. The ultimate challenge is to be able to identify brain signals for specific memories and then selectively amplify them, thus paving the way to a “Memory Aid” that will switch between awake and sleep states and possibly help the rapidly growing population of patients with memory disorders.



Dr. Ausaf Bari

Deep Brain Stimulation as a Potential Therapy for Complex Disorders

Deep brain stimulation (DBS) is a surgical intervention in which a brain pacemaker is inserted into the brain to help reduce and regulate symptoms of neurological disorders. While DBS is a common treatment option for conditions like Parkinson’s and other movement disorders, its application to other neuropsychiatric conditions is still growing. Alongside a multidisciplinary team, Dr. Ausaf Bari, who was recently appointed as the Director of the Functional and Restorative Neurosurgery Program, seeks to expand the use of DBS to help treat complex conditions such as chronic pain, epilepsy, and psychiatric disorders.

Dr. Bari’s research is fueled by a desire to learn more about the brain, an organ of profound complexity that still challenges the understanding of researchers and physicians. To do this, he uses invasive electrophysiology, or brain mapping, to expand knowledge about how the brain functions and inform new treatment possibilities. Dr. Bari likens his work to that of a brain “electrician”—he analyzes when the brain’s circuitry is altered, and works to restore that function.

One therapy Dr. Bari is using to help restore function is DBS. In particular, he is currently investigating if DBS can be used as a treatment for chronic back pain—a debilitating condition that impacts countless people worldwide. Although low back pain is a common reason people visit their doctor, there are currently no curative treatments available. Recently, UCLA and Dr. Bari made history by successfully implanting the world’s first DBS electrodes targeted to a novel brain region to treat a patient with chronic low back pain.

While the results of the study are still pending, Dr. Bari is hopeful that this research will allow DBS to become a useful therapy not only for those suffering from chronic low back pain, but also for other hard-to-treat conditions such as addiction and depression.

NEUROTRAUMA/ NEUROCRITICAL CARE

IMPROVING OUTCOMES FOR PATIENTS WITH TRAUMATIC BRAIN INJURIES

Improved Rehabilitation after Traumatic Brain Injury

There is still much to be learned about how to treat the injured brain, especially in cases of traumatic brain injury. Metabolic depression is one side effect of acute traumatic brain injury and can unfortunately impair the function of neurons. Specifically, metabolic depression impacts the ability of neurons to meet local demand, and can thereby inhibit rehabilitation and limit functional outcomes.

Dr. Fernando Gomez-Pinilla and Dr. Neil Harris, two research scientists who study traumatic brain injuries, are interested in exploring metabolic depression. They propose that by using functional MRI combined with behavioral and molecular studies, an analysis can be formed to investigate how metabolic depression manifests in altered functional connectivity and brain reorganization in cases of traumatic brain injury.



**Dr. Fernando
Gomez-Pinilla**

The researchers will use a molecular intervention to alter the functional trajectory of the injured brain. Additionally, Dr. Gomez-Pinilla and Dr. Harris plan to model clinical situations of early post-injury rehabilitation and delayed rehabilitation. By employing both methods, they hope to determine whether an intervention at the molecular level will mitigate the effects of acute metabolic depression and facilitate the reinstitution of function.

Dr. Gomez-Pinilla and Dr. Harris hypothesize that these interventions can be delayed while still providing a boost to brain connectivity and functional outcomes. Ultimately, the goal of this research is to determine if off-setting metabolic depression will potentiate the effects of rehabilitation.



Dr. Neil Harris



Dr. Christopher Giza

Understanding Persistent Post-Concussive Symptoms in Children

Concussions are the most common form of brain injury sustained by children and adolescents. While the majority of youth with concussions recover within a few weeks, around 15-30% take longer to recover and can develop persistent post-concussive symptoms. Unfortunately, those that develop these symptoms experience impaired function, increased pain, and require a greater amount of medical assessments and treatments. Prolonged symptoms can also result in alterations to an individual's developmental trajectory and may lead to long-term disability.

Persistent post-concussive symptoms can drastically impact an adolescent's health and development. However, there are currently no standardized objective biological markers, preventive strategies, or targeted treatments for those with persistent post-concussive symptoms. This substantial knowledge gap is what Dr. Christopher Giza and the multi-institutional and multidisciplinary study, Concussion Assessment, Research, and Education for Kids (CARE4Kids), intends to address.

"It is the central goal of [CARE4Kids] to discover objective autonomic, imaging, and blood-based biomarkers that, when integrated with neuropsychological and neurological signs and symptoms, will optimally predict [persistent post-concussive symptoms in adolescents]," says Dr. Giza, director of the UCLA Steve Tisch BrainSPORT program. Additionally, by better understanding the underlying neurobiology of persistent post-concussive symptoms, mechanism-based prevention and treatment measures can be developed.

The CARE4Kids study has the potential to change the trajectory of healing for children and adolescents who develop persistent post-concussive symptoms. The importance of this research led the National Institute of Neurological Disorders and Stroke (NINDS), a branch of the National Institute of Health (NIH), to award Dr. Giza and the other CARE4Kids researchers a \$10 million grant to conduct this study.

SPINE

INNOVATIVE THERAPIES OFFER HOPE TO SPINE PATIENTS

Restoring Naturalistic Breathing in Ventilator-Dependent Patients

Conventional thinking suggests that once the spinal cord is injured, little or no functional recovery is possible. However, Dr. Daniel Lu and his lab seek to challenge this conception by investigating how to improve respiratory function in patients with spinal cord injuries.

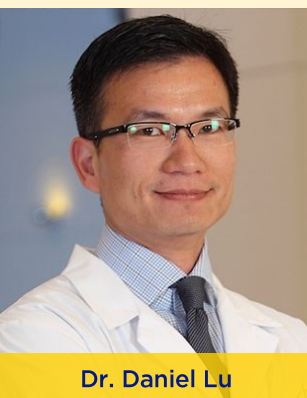
After a spinal cord injury, patients face the risk of respiratory failure. Respiratory failure impairs health and is the leading cause of death in patients with spinal cord injuries. Typical treatment of respiratory failure involves mechanical ventilation, which is when a mechanical pump is used to facilitate breathing. Unfortunately, mechanical ventilation is invasive, costly, limiting, and involves a high risk of complication and death. Mechanical ventilation ultimately cannot replace the function of natural breathing. Thus, restoration of fully integrated, naturalistic breathing in an injured patient would be a significant advancement in the treatment of respiratory failure following a spinal cord injury.

The main hurdle to restoring naturalistic breathing in an injured patient is that the neural mechanisms responsible for breathing reside deep in the brainstem, which is dangerous to access surgically. However, Dr. Lu and his team recently elucidated a novel breathing pathway in the spinal cord that can be impacted by electrical stimulation of the cervical spine, an area that is surgically

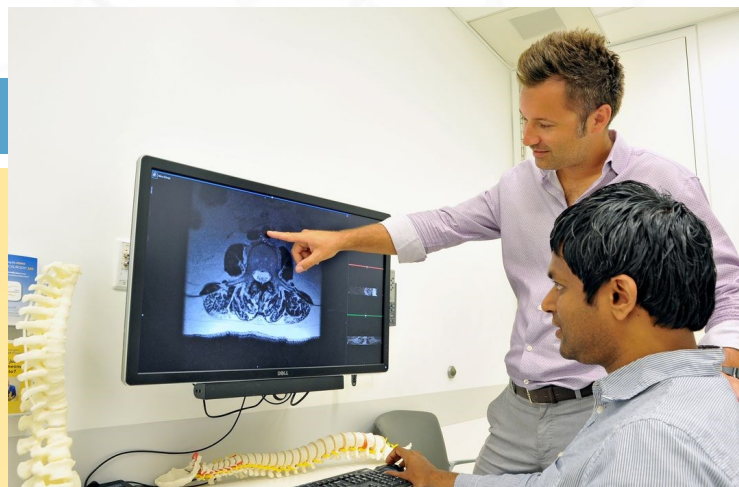
accessible. “We have compiled significant data that stimulating the cervical spine can restore or augment breathing,” said Dr. Lu. “Clinically approved epidural spinal cord stimulators exist to treat pain, and these stimulators can also be used to stimulate the cervical spine to restore respiratory function.”

Dr. Lu’s research aims to provide proof that cervical epidural stimulation can improve respiratory function in ventilator-dependent patients with

spinal cord injuries. The study proposes that by using epidural stimulation, patients with spinal cord injuries can be partially or completely weaned off of mechanical ventilation. If successful, patients will experience a plethora of benefits—increased independence, improved quality of life, and decreased costs and risks associated with mechanical ventilation.



Dr. Daniel Lu



Dr. Luke Macyszyn and Bilwaj Gaonkar, PhD

AI Technology Provides Objective Interpretations of Spinal Imaging

MRI scans and other forms of medical imaging are crucial to the diagnosis and treatment of patients with a variety of conditions, including those with spinal abnormalities. However, there is an inevitable element of subjectivity when physicians interpret these images. Thus, an objective method to analyze patient scans would help standardize interpretation, streamline the treatment process, and improve patient outcomes.

Recently, Dr. Luke Macyszyn, a neurosurgeon at the UCLA Spine Center, received grants from the UCLA Innovation Fund and National Institute of Health (NIH) to support the research and development of a system to objectively interpret spinal MRI scans. Working with Los Angeles-based startup Theseus AI and Bilwaj Gaonkar, PhD, a postdoctoral researcher in the department of bioengineering, Dr. Macyszyn and his multidisciplinary team created a system that examines MRI scans to provide objective measures of spinal stenosis. Spinal stenosis occurs when the spaces within the spine narrow, which can cause symptoms such as low back pain and, depending upon the severity, might require surgery.

To provide this objective measure of spinal stenosis, the AI technology compares a patient’s results to a catalogue of data collected from other patients of a similar height, age, and gender. This comparison not only facilitates the interpretation of the scans, but also assists with determining the severity of the disease. Consequently, the AI can help identify patients who might be eligible for surgery.

Ultimately, the system is designed to improve the way physicians diagnose and treat patients. As Dr. Macyszyn explains, “Providing clinicians with more objective data to support their decision-making will ultimately lead to better identification of candidates for surgical treatments and better outcomes.” As this technology expands, so will the treatment possibilities for patients suffering from spinal conditions.

RESIDENT & FELLOW HIGHLIGHTS



NIH-NINDS R25 GRANT

Investigating the neural encoding within the human posterior parietal cortex (PPC) of visually perceived object contact

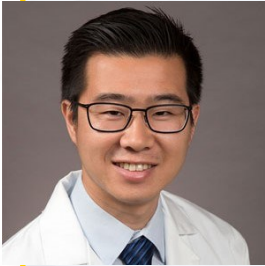
Awarded to: Dr. Srinivas Chivukula (Stereotactic and Functional Fellow)



NIH-NINDS R25 GRANT

Identifying Somatic Mutations in Non-Lesional Temporal Lobe Epilepsy

Awarded to: Dr. H. Westley Phillips (Resident, PGY-7)



NIH-NINDS R25 GRANT

Elucidating Nuclear NY-ESO-1 Expression as a Diagnostic Biomarker and Therapeutic Target in Malignant Meningiomas

Awarded to: Dr. Matthew Sun (Resident, PGY-7)



NIH-NINDS R25 GRANT

Neoantigens arising from alternative pre-mRNA splicing may be targeted by tumor-specific T lymphocytes in histone H3.3 G34R mutant pediatric GBM

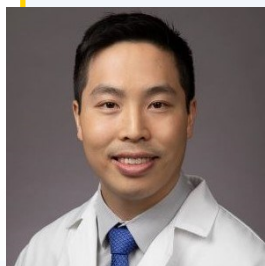
Awarded to: Dr. Sophie Peeters (Resident, PGY-5)



NIH-NINDS R25 GRANT

Neuromodulation of the autonomic nervous system for regulation of cerebral blood flow

Awarded to: Dr. Wi Jin Kim (Resident, PGY-4)



NIH-NCI T32 TRAINING GRANT

Tandem Bispecific CAR-T Cells Against IL-13R α 2 and TGF- β for Glioblastoma Therapy

Awarded to: Dr. Benjamin Uy (Resident, PGY-4)

APPOINTMENT REQUESTS



Dr. Paul Vespa demonstrating telemedicine technology

SCHEDULING AN APPOINTMENT AS A PATIENT

To make an appointment with a UCLA neurosurgeon, please call 310-825-5111 or visit [our website](#) for more information.

For information about spine related conditions and treatments, visit [the UCLA Spine Center in Santa Monica](#).

Over the past several years, UCLA Health has been dedicated to making services more accessible to patients outside the immediate Los Angeles area. To make a Telemedicine appointment with a UCLA neurosurgeon, please visit [our website](#) or call 310-825-5111.

REFERRING AS A HEALTHCARE PROFESSIONAL

Our partnership with health professionals in the community is key to our success at UCLA Health. Registered nurses and referral coordinators are available to assist referring physicians. Case managers can access services at UCLA Health through the toll-free UCLA Physician Referral Service phone line 1-800-UCLA-888 (825-2888). Visit [our website](#) to learn more.

GIVING

Thank you for your interest in supporting the UCLA Department of Neurosurgery. Donations help fund innovative research that has the potential to alter patients' lives. We are grateful for your life-changing generosity.

[**CLICK HERE TO DONATE**](#)

IF YOU WOULD LIKE MORE INFORMATION, PLEASE CONTACT:

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CONNECT

NPFAC VIRTUAL SUPPORT GROUP

UCLA Neurosurgery is dedicated to providing patients and their families support during every step of their journeys. On the third Tuesday of every month from 5-6:30 PM, the Neurosurgery Patient and Family Advisory Council (NPFAC) hosts a Virtual Support Group open to all Neurosurgery patients, family members, and caregivers looking for support. The NPFAC is comprised of former patients and family members of those who have been treated for a variety of conditions, as well as faculty and staff from the Department of Neurosurgery. This support group aims to empower the patient and the caregiver in the care and recovery processes.

If you are interested in learning more, please contact us at NPFAC@mednet.ucla.edu or [click here to visit our website](#).



STAFF HIGHLIGHT EMMA BILLINGSLEA-YOON, NURSE PRACTITIONER

Nurse Practitioner Emma Billingslea-Yoon loves working for the Neurosurgery Department at UCLA. She began her career 10 years ago as an assistant helping coordinate care for patients. During this time, she was inspired to do more to help patients and thus pursued a Master's Degree in Nursing. Fortunately, Emma returned to UCLA and has continued her career working with Dr. Linda Liao and UCLA Neurosurgery's highly capable and dedicated group of researchers, surgeons, nurses, and staff members.

Over the years, Emma grew close to many patients during their greatest time of need. Dealing with a major medical illness can be difficult and challenging for both patients and their families. Helping patients along this intimate journey continually reminds Emma of how precious each moment of life is. She carries with her many unique life stories and hopes she is able to convey to patients how much she truly cares for them. Every day Emma feels blessed that she is able to contribute to patient well-being surrounded by a wonderful group of professionals who share her commitment to providing excellent patient care.