Neurosurgery

December 2021
Volume 2, Issue 2

Message from the Chair

How can I keep from singing?

As I reflect on the many challenges we faced and what sustained our journey this past year, a Robert Wadsworth Lowry hymn recently sung by my son's choir resonated: "Through all the tumult and the strife, I hear the music ringing. It finds an echo in my soul. How can I keep from singing?"

In this issue, I would like to share with you some of the "songs" that have sustained, nourished, and inspired me through 2021.

Courtney's song is one of endearing selflessness (page 2). She was in the last year of her internal medicine residency when she was diagnosed with brain cancer. While navigating the challenges of surgery, chemotherapy, and radiation, Courtney dedicated her time to blog posts as a means of informing her family and friends and eventually, to support other brain cancer patients. With her cancer in remission and as a practicing physician, Courtney continues to share her perspectives and support brain cancer patients. Her song during this Covid pandemic sustains us with purpose and meaning in the face of adversity.

Dr. Sandoval's song is one of humility and beneficence (page 4). Her patient, Ibrahim, was born with hydrocephalus, a condition characterized by fluid buildup in the brain. His parents are first-generation immigrants from Somalia and Saudi Arabia who faced the daunting prospect of brain surgery for their beloved newborn and the terror of a seemingly exotic disease. Divergent cultural interpretations about the meaning of this disease further magnified the challenges of Ibrahim's care. Dr. Sandoval and nurse practitioner Leah Kann invested time and effort to help get Ibrahim the care he needed. With humility, the team bridged the cultural chasm, performed the needed surgery, and coordinated social support for Ibrahim and his family after the procedure. They sang with the harmony of compassion as the universal language of healing.

The song of our nursing staff is built on notes of resilience and admirable service. Despite severe staff shortages and COVID-related stress, our nurses continue to serve the needs of our patients — beyond impeccable medical care. During this challenging time, they worked with Dr. Michael Park, our Vice-Chair of Quality, to improve patient safety, including preventing falls with injury in the hospital (page 5). They helped introduce the use of a portable MRI (page 2), reducing risks associated with patient transport. Our nurses found creative ways to reunite families with patients who required extended hospital stays during periods of restricted visitation (page 2). Their song is captured by Lowry's words, "while though the tempest loudly roars, I hear the truth. I liveth. And though the darkness 'round me close, songs in the night it giveth."

We have all sung our own songs in the past years, contributing to a symphonic grace that will endure as our legacy.

The COVID-19 pandemic continues to remind us of the hazards of foretelling destiny and the unpredictability of events to come. While we do not know what tomorrow holds, we do know what we can do for one another today.

We can sing the songs that echo in our souls.

We can keep on singing,

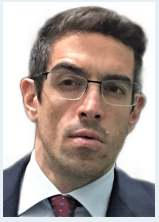
Clark

Inside this issue

Residents Huy Do, MD; and Bryan Ladd, MD; and medical student Erika Kaske were featured in this year's Medical School Annual Report.

Making fMRI better

Assistant Professor **Luca Vizioli**, PhD, recently joined the department to continue his research with fMRI.



Functional magnetic resonance imaging measures brain activity by detecting changes associated with blood volume, flow, and oxygen levels. This technique relies on the fact that cerebral oxygenated blood flow and neuronal activation are coupled. When an area of the brain is in use, blood flow to that region also increases, according to Vizioli.

He acknowledges there are a lot of challenges in his work with fMRI. "As we get more precise, the images become noisier," he said. "We need to deal with the noise effectively to be able to use the images constructively."

Noise compromises the quality and reliability of the images and represents a limit to the spatial and temporal resolution that can be achieved, according to Vizioli.

There are computational algorithms that help reconstruct fMRI images to get rid of the noise, Vizioli noted. "At ultra-high field, as the resolution of functional images keeps increasing, thermal noise becomes dominant," he said. "Some of my latest work focuses on how we can suppress thermal noise."

Vizioli is first author on an article in the journal, *Nature Communications*, *Lowering the thermal noise barrier in functional brain mapping with magnetic resonance imaging*, which focuses on that topic.

Expanded Access Program for brain tumor patients – thinking outside the box

Erin Anderson (pictured at right with daughters Julia and Clara) was diagnosed with glioblastoma in late 2018. Since then, she's had eight brain surgeries, and gone through radiation and chemotherapy.

"This cancer is unique," Erin said. "It's aggressive and likes to come back. What we've learned is that even though our plans change in ways we don't want them to, there is just so much hope out there. There are medical professionals who are committed to helping us and there are technological and medical advances that people didn't have 5 or 10 years ago – or even months ago."

Neuro-oncologist Dr. Elizabeth Neil, Department of Neurology, and Neurosurgery Department Head Dr. Clark Chen have thrown everything in their arsenals against Erin's cancer.

When her tumor recurred, Dr. Chen applied for the use of an experimental drug for Erin through the FDA's Expanded Access Program (EAP). "Erin had gone through so many different treatments that we had to think 'outside the box' of available trial and treatment options," he said.

To ensure patient safety, each EAP request must undergo multiple rounds of independent review, including review by the sponsoring company, the FDA, and the U's Institutional Review Board.

The approved EAP gave Erin an opportunity to be treated with a virus engineered to express a cytokine called interleukin-12. After a brief surgical procedure, Dr. Chen injected the virus directly into Erin's tumor. She also gets an infusion of an immunotherapy every two weeks, which helps T-cells activated by the injected virus seek out and kill cancer cells.

Complexities associated with Erin's procedures meant that she was hospitalized for more than a month. Thanks to the efforts of hospital nursing staff, she was able to have her two little girls visit during her stay, despite visit limitations imposed during the Covid pandemic. Her glioblastoma remains in remission four years after diagnosis.

A portable MRI machine was recently introduced to the Neuroscience Unit (6A) and nursing staff have been instrumental in helping patients feel comfortable using it. Pictured here with several radiology techs and the new machine is 6A Nurse Manager Mary Speake (second from right).

Endowed Chair reflects a renewed effort to foster collaboration

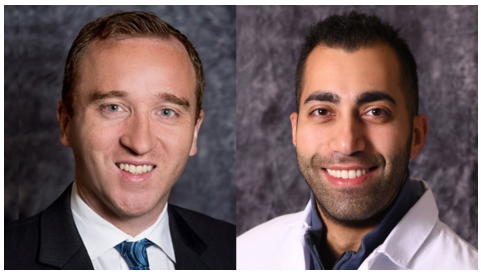
Congratulations to **Dr. David Darrow** for being named the Rockswold-Kaplan Endowed Chair for Traumatic Brain Injury at the Hennepin Healthcare Traumatic Brain Injury Center. This endowed chair, whose goal is to advance research and innovations, was funded by the generosity of Elliot and Eloise Kaplan in gratitude for the care Eloise received, and by Hennepin Healthcare neurosurgeon and University of Minnesota Neurosurgery Program alumni Gaylan Rockswold, MD.

"The intention of the Kaplans and myself in creating this endowed chair is to attract the brightest minds and advance the treatment for those suffering from traumatic brain and spinal cord injuries," said Dr. Rockswold. "The appointment of Dr. Darrow does just that."

David's appointment is historic as it is the first time an endowed chair in the Hennepin Healthcare system was awarded to a faculty member whose primary appointment resides in the U of M Medical School's Department of Neurosurgery and reflects a renewed, programmatic effort to foster collaboration between the two entities.

Speaking of collaborating, David has initiated key partnerships with the Departments of Psychiatry, Bioengineering, and Neurology, resulting in several innovative clinical trials including the landmark E-STAND (Epidural Stimulation After Neurologic Damage) study, which aims to optimize epidural spinal cord stimulation as means to restore volitional movement in spinal cord injury patients. As a functional neurosurgeon focusing on neuromodulation and electrophysiology to elucidate new treatment options and mechanism of disease, David brings a new lens to understanding and treating traumatic injuries of the central nervous system. (Source: Hennepin Healthcare press release)

Department researchers uncover ethnic and racial disparities in epilepsy surgery



Drs. Bob McGovern and Youssef Hamade published a study in 2021 highlighting racial and ethnic disparities in epilepsy surgery. Bob, who specializes in treating epilepsy, noted that while there are around three million people diagnosed with epilepsy in the U.S., one-third of those patients will not be seizure-free without epilepsy surgery.

"We only do around 2,000 epilepsy surgeries a year in the whole country, so the number of people who actually get epilepsy surgery versus the number of people who are potentially eligible, is off by orders of magnitude," Bob said. It was this realization that prompted the two doctors to find the pattern behind this discrepancy. They began analyzing large national datasets between 2006-2016.

Youssef was drawn to work with Dr. McGovern when he saw the opportunity to work with big datasets, look into trends in epilepsy surgery over the years, and identify problems with access to surgery.

Black, low-income patients less likely to get surgery

The two researchers found that black patients were half as likely to undergo epilepsy surgery compared to white patients. They also noticed that patients with Medicare and Medicaid were far less likely to undergo surgery than patients who held private insurance. There was no improvement in those disparities throughout the entire decade.

Bob and Youssef are working on another study that emphasizes similar disparities in Parkinson's disease. They hope to receive pilot funding to look at how they can improve their patient referral base and continue to make it more diverse and accessible.

"We wanted to put something out there that will hopefully change the way people think about surgery and maybe force folks to re-examine their own biases when they're treating patients and when they're treating epilepsy," Bob said.

New AANN chapter in the region

Thanks to the efforts of neuroscience nurses, **Emma Venteicher,** MS, FNP; **Suzi Fuguet**, RN, CNRN; **Will Majerus**, RN; and **Lindsey Grimmer**, RN, the 10,000 Lakes Chapter of the American Association of Neuroscience Nurses (AANN) was officially approved in June. It is the only chapter in Minnesota.

AANN
10,000 LAKES CHAPTER
American Association of Neuroscience Nurses

Getting the new chapter going was challenging. "It hasn't been easy doing this while nursing through a pandemic, but we believe our AANN chapter will give us an opportunity to unite nurses here in Minnesota," said Will.

Primary goals

Education and connection are the primary goals for the new group. The new chapter plans to hold large, biannual meetings; smaller get-togethers will eventually be added, as will the ability to earn Continuing Education Credits. Membership is open to any neuroscience nurse in the Twin Cities and surrounding area; dues are $10 annually. The organizers are also going to encourage new graduates to join.

Another goal of the new chapter is to encourage neuroscience nurses to continue their formal education. "We are trying to get more nurses to become stroke and neuroscience certified through AANN," said Emma. "We also plan to invite other providers like neurosurgeons and neurologists in to give us educational presentations."

Expanding the Chou Nursing Award

By Larry Gunderson

The Chou Award for Excellence in Neuroscience Nursing was started in 1991 with a gift from former Department Head Dr. Shelley Chou and his wife, Jolene, who was a nurse. The award honors excellence in how a nurse assesses, plans for, provides, and evaluates nursing care for neuroscience patients and their families.

With the growth of the neurosurgery program and the increasing number of support staff, we have expanded the Chou Award to now include two recipients each year. This will allow us to recognize even more great work done by our nurses.

We are fortunate to have so many talented nurses and look forward to recognizing two each year with the Chou Award.

Newest family member

Welcome, Charlotte! She is a brand new addition to Chief Resident Lauren Albert Sand's family, seen here cuddling with older sister, Gabby.

Patient sees her diagnosis as a "difficult gift" that enables her to help others

In January 2020, Courtney Burnett, MD, was in her final year of an internal medicine residency at the U of M. She had chosen to spend a month in Thailand and explore different types of Eastern medicine to supplement her training. It was here that she would be diagnosed with brain cancer.

When she returned to Minnesota, her care team would be led by Dr. Clark Chen. She underwent surgery to remove her brain tumor and then went through radiation and chemotherapy.

Because all this happened during the pandemic, Courtney couldn't have visitors. She decided to start a blog titled, *Elephant, Lotus, Brain Tumor*, to keep family and friends updated on her condition. Unexpectedly, the blog drew an international audience. Through her own experience and what she was hearing from her followers, Courtney realized that brain cancer patients may not have all the resources that other cancer patients do.

To help fill that gap, the blog led her to publishing a book titled, *Difficult Gifts: A Physician's Journey to Heal Body and Mind*, and appearances during various events and on the media. Courtney also began working one-on-one with other brain cancer patients. "I felt I could bring a different perspective to it, one of hope – that you can get through this and live the life you want to live, despite the diagnosis," she said.

Making sure a family has everything they need to support their son born with hydrocephalus

When Ibrahim Ali was born on July 1, 2020, his parents Egal Abdi and Amal Mohamoud, would quickly learn that he had severe hydrocephalus and needed to have brain surgery to implant a shunt that would remove the excess fluid. Their pediatrician referred them to Dr. Carolina Sandoval for the procedure.

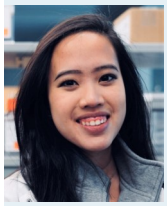
She performed Ibrahim's surgery and he quickly recovered. "His postoperative MRI looks quite good and clinically, he seems to be thriving," said Dr. Sandoval "He's moving symmetrically and is very active and alert."

One of the complicating factors for Amal is that she grew up in Saudi Arabia and doesn't speak English well. That made it important for her to have a translator in the room when meeting with Ibrahim's healthcare providers. "We have excellent interpreters with great availability; however, there is always a concern about what might be lost in translation," said Dr. Sandoval. "The patient/doctor relationship is different as a result. We must make the extra effort to create the connection and to make sure the families feel their questions are answered."

Pediatric Nurse Practitioner Leah Kann also helped the family find local resources that would enable them to connect with other families in similar situations.

Egal noted that because of the history of bad encounters with the medical profession, a lot of people in their community often have difficulty trusting doctors and that impacts how they may react to a child's illness. You just need to educate yourself and learn to deal with their condition just like we learned to raise children without it."

Studying aneurysms



Elizabeth Shih is a fifth-year PhD candidate working in the Alford Lab of the U's College of Science and Engineering. She studies the results of applying mechanical force – stretching in different directions – to biomaterial, and human and animal tissue.

When she met Dr. Andrew Grande, Elizabeth got interested in cerebral aneurysms.

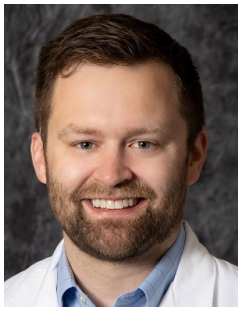
"Statistically, an aneurysm is at low risk for rupture, but it's still terrifying for a patient to be diagnosed with one," said Elizabeth. She wanted to understand when an aneurysm would be a good candidate for surgery.

Elizabeth and her colleagues believe that a ruptured aneurysm is fundamentally a mechanical problem at the cellular level, and a process known as tissue remodeling contributes to weakening of the blood vessel tissue.

After Elizabeth, Dr. Grande, and others designed a framework for stretching aneurysm tissue samples, she could see that they tear right down the middle, along the interface between the strong and the weak regions. "We think that's what is going on with rupturing aneurysms, but it hadn't been tested before," she said.

This basic research synergizes closely with the clinical research conducted by Dr. Grande, Dr. Tummala, and Dr. Jagadeesan.

Welcome, Dr. Helland!



Originally from Albert Lea, **Dr. Logan Helland**, joined the department as an assistant professor and assistant residency program director this summer. "I wanted to be in academic medicine and both my wife and I wanted to stay in the Midwest," he said. "The U of M was a huge draw."

Logan earned both his MD and BS at Creighton University in Omaha, NE. He completed his residency in neurological surgery at University of Iowa Hospitals and Clinics, and a fellowship in complex and reconstructive spine surgery at Loyola University Medical Center.

He is seeing a variety of neurosurgery patients and will have an added focus on patients with conditions such as scoliosis or who need complex spine revisions or spine surgery at UMMC and Ridges Hospital. Dr. Helland will also be collaborating closely with Dr. Parr, Dr. Guillaume, and Dr. Kim on patients needing neurosurgical spinal care.

Spine collaborative

In addition to patient care, Logan continues to do research, starting with tracking clinical outcomes. "I'm helping to build the Big 10 Spine Collaborative with several other universities, such as Iowa, Ohio State, and Northwestern," he said. "The emphasis will be on working together, trying to create a larger number of patients from which to pull data about outcomes."

When he and his wife, Jaime, and their two daughters have some spare time, they like to watch movies, go on walks with their dog, and do things with their extended family. As a big sports fan, Logan enjoys taking the family to Minnesota sporting events.

QGenda maven: Nicole Falk

Shakespeare wrote, "Some are born great, some achieve greatness, and some have greatness thrust upon them." Executive Assistant **Nicole Falk** definitely landed in that third category when it comes to the physician scheduling database called QGenda. "We use it to capture our providers' clinic hours, call, OR days, and vacation and other time-off requests," said Nicole. "It communicates with several systems, including the one the hospital operator uses and Epic."

Not an easy task

Originally rolled out in January 2019, Nicole took over QGenda's reins in August 2020. She is the only one in the department currently responsible for its care and feeding. And it's not an easy system to learn or to use.

Depending on a QGenda request's timing, Nicole has to follow several steps for it to be moved to Epic. "If it's not in Epic, schedulers can continue to put things on a physician's calendar," she said. Most requests she handles directly. For those within a shorter timeframe, she has to email the production team that manages Epic. "They will make the change right away as long as it's approved by one of the clinic representatives in the email chain," Nicole explained.

Super User

Because of her work with the system, UMP recruited Nicole for a short-term QGenda Super Users group. "We had several meetings during which we went more in-depth into the system. I learned a ton," she said. "I'm better now at troubleshooting than the agents who staff QGenda's helpline."

Resident Spotlight: Bryan Ladd, MD

When sixth-year resident Bryan Ladd began his residency, he was interested in intracranial pathology. As he gained more experience in spine surgery, however, his focus changed. "Given my engineering background, I began to appreciate the more nuanced literature coming out about spinal alignment," he said.

To further his education in spinal procedures, Bryan completed a yearlong enfolded fellowship with the Orthopedics Department and hopes to complete another spine fellowship after graduation.

Patient impact
With his work in spine came a growing awareness of the impact of these procedures on patients. "Because we do a lot of large, open spinal surgeries, we also do a lot of work with our patients to help them manage their post-operative pain," he said. "Seeing the impact these procedures have on the patient made it obvious to me that, when possible, I should use a less invasive approach."

In addition to several spine-related research projects, Bryan is involved in product development efforts – two paired with industry and one he developed himself. "It's a wound closure device that I've been working on with the U's Medical Device Institute," he said. "The University has protected it with a provisional patent and funded it with a translational product development grant."

An incredible six years
Bryan is looking forward to his year as Chief Resident (2022-2023). "It's been an incredible six years," he said. "I'm a little sad but excited that there is only one year left, and I hope it will be a great one."

During his final year, Bryan wants to perform other types of neurosurgical procedures, such as complex surgical approaches to things like brain tumors, aneurysms, and vascular bypasses. "Since I've been focused on spine, it will be good to get back to some complex intracranial pathology to ensure that I have that as a skillset going forward," he said.

Bryan and his wife, Jenna, live with their three kids (4, 2, and 6 months) and two cats (Missy and Zippy) in Plymouth. "We love to go to the local parks," he said. "With winter coming, the kids like to sled in French Park."

When asked about the best advice that he received during his residency, Bryan said, "I need to smile more…I'm still working on it."

Congrats to the 6A nursing team for diligently working to prevent falls with injuries. They clocked an entire YEAR without one! That's amazing when you think about the kind of patients they're caring for. Learn how they accomplished this feat in the right-hand column.

Celebrating one year without a fall with injury

If you spend much time on 6A, the Neuroscience Unit of UMMC, you have to be on the alert for bed alarms. Otherwise, you run the risk of being surprised by nursing staff members sprinting toward the source of an alarm.

That diligence led to them recently celebrating an entire year of having no falls with injuries. That's truly impressive when you think about the types of conditions their patients have, ranging from strokes, and head, neck, and spine injuries to epilepsy and significant cognitive impairment.

Some of the steps the team has taken to prevent falls include the use of Zone 2 bed alarms and Zone 2 magnets on doors to warn everyone that the patient is at risk for a fall.

Training is key to fall prevention on 6A. "From the beginning, we train all of our new staff on the importance of responding to bed alarms and preventing falls," said **Brittany Fjeld**, NST. "We also talk about preventing falls in huddle every day, which helps keep it fresh for everyone."

When patients are discharged, the team ensures that fall prevention continues to be important. "We set the new baseline at the hospital – what the new routine will be for the patient's mobility," said **Philip Wills**, RN, BSN. "We hope that what we do in the hospital to prevent falls will transfer to the home or acute rehab setting."

According to **Jenna Doyle**, RN, BSN, SCRN, 6A Patient Care Supervisor, about 40 to 50 bed alarms go off every eight-hour shift on the Unit. "Our nursing staff immediately stop what they're doing to go make sure our patients are safe," she said. "The credit for having no falls with injury for an entire year goes to them and the culture they helped create."

2021 Journal Articles

Clark C. Chen

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David Darrow

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Andrew Grande

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