

JULY 2022

NeuroNEXT

from the Departments of Neurological Sciences & Neurosurgery

People Are Everything

The 2022 year is half over, or if you are looking at the fiscal calendar, it is just beginning. Either way, it is July and that also means exciting staffing changes.

The mission of Nebraska Medicine and UNMC is to lead the world in transforming lives to create a healthy future for all individuals and communities through premier educational programs, innovative research and extraordinary patient care. People are at the heart of our mission.

In this issue, we focus on the people who make a difference. We introduce you to faculty who recently joined us, bid farewell to our neurology and neurosurgery residency and fellowship graduates, look at those who make the Multiple Sclerosis Program run successfully and have grown it to a national reputation, meet the people behind the GP IDeA CTR Technology Initiative, applaud the house officers who presented at the Graduate Medical Education Research Symposium, see who is behind the deep brain stimulation virtual exposure therapy program, learn what our neurology residents have been up to in the simulation lab and read the kudos to the Neuroscience Unit Provider of the Quarter. We also highlight academic and intellectual achievements at community and national levels ranging from

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music and the brain, to a “deep learning” framework for dementia diagnosis, to developing a national framework of neuroethics for principled deployment of novel neurotechnologies for treating heretofore irremediable neurological conditions.

Patients are at the heart of our work, and our clinicians and staff are always looking at ways to educate their patients. May was Stroke Awareness month. Michael Pichler, MD, provides an overview of stroke and offers an easy-to-read chart on stroke.

The war in Ukraine is still ongoing, and we are proud of the support our staff, colleagues and friends have given to the fundraising campaign to provide medical supplies. Over 8,000 pounds of supplies have been shipped and more is on its way. Read an update on the on-going work of this important mission.

Plans are underway for the 2022 Parkinson’s Disease Conference. This conference is open to Parkinson’s disease (PD) patients, their care partners and families. This year it will be held in-person at the Scott Conference Center, with an option to view virtually as well. Attendees will hear from UNMC/Nebraska Medicine faculty with updates on PD, including any newfound research.

Our clinicians, researchers and staff, with their education, background and experience, are always looking for ways to move the needle forward, to make a wave out of a ripple. Read the inspiring story of Taylor Kizer who was a high school senior in 2015, made a wave through her awareness and fundraising to benefit the Multiple Sclerosis Research and Education Fund.

To all our patients, care givers, faculty, students and staff, we wish you a fabulous summer!

Sincerely,
Matthew Rizzo, MD, FAAN
Aviva Abosch, MD, PhD
Howard Fox, MD, PhD

New faculty joining us!

Department of Neurological Sciences

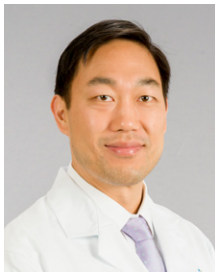


Haley Phillips, MD
Assistant Professor

Research Interests: Clinical and surgical treatments of epilepsy, women and pregnancy in epilepsy, ICU EEG.

Three things people may not know about me:

1. I love to bake - the more challenging the dessert, the better!
2. I love dogs, especially dachshunds
3. I enjoy traveling to new places and learning about new cultures.



Peter Soh, MD
Assistant Professor

Research Interests: Headache, Migraine, Status Migrainosus, Botox, Nerve blocks.

Three things people may not know about me:

1. I finished my first 5K earlier this year to raise awareness for headache disorders.
2. I enjoy meeting people.
3. In high school, I was invited to join dance which I had no prior experience. We practiced for weeks, and the final performance was during one of my lacrosse games. So instead of missing the game, I played for a few quarters (scored three goals) and then left to perform on stage. I had a blast and still remember how to swing dance.

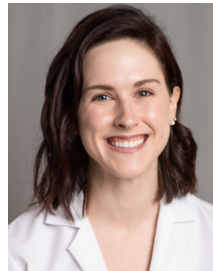


Steven Phillips, MD
Assistant Professor

Research Interests: ICU POCUS, arterial/venous access, education, especially simulations.

Three things people may not know about me:

1. Played competitive hockey and am an NHL (especially Detroit Red Wings) fanatic.
2. Avid fly fisherman.
3. Hiked Mt. Olympus in Greece and met Zeus (the mountain dog).



Shelley Lee, DO
Assistant Professor

Research Interests: Management of medically refractory epilepsy, neuromodulation, ICU EEG, medical education.

Three things people may not know about me:

1. I was not born musically inclined, but I am learning how to play the piano.
2. My husband and I have two adopted black cats.
3. If I weren't a physician, I would be a meteorologist.



Audrina Mullane, PhD

Research Interests: Memory disorders, stroke/cerebrovascular disease, epilepsy, movement disorders, cancer, multiple sclerosis, traumatic brain injury, increasing access to rural communities.

Three things people may not know about me:

1. I love to travel and try different foods unique to the community.
2. I also love fall, which, for me, typically begins when Starbucks releases the first Pumpkin Spice Latte of the season.
3. I love all things Christmas! There's something about the energy, lights and excitement during the month of December that brings me such joy.



Hesham T. Ghonim, MD
Assistant Professor

Research Interests: Anti-seizure medications, medically refractory epilepsy, epilepsy surgery and magnetoencephalography.

Three things people may not know about me:

1. I was a game master on a World of Warcraft server in college, still an avid gamer to this day
2. Space travel is on my bucket list
3. I play an ESP electric guitar

New faculty joining us!

Department of Neurosurgery



Nicholas Borg, MD

A native of Malta, Dr. Borg completed medical school at University of Malta, followed by neurosurgery residency at the Wessex Neurological Centre in Southampton, UK, where he also undertook his first fellowship in open and endovascular neurosurgery. He then completed a second endovascular fellowship at Mayo Clinic Rochester, where he further developed his interests in the open and endovascular management of cerebrovascular disorders including aneurysms, vascular malformations, stroke and steno-occlusive disease. He has additional experience in novel endovascular treatments for IIH, spontaneous intracranial hypotension, chronic subdural hematoma and facial vascular malformations.

Research Interests: Integration of machine learning with robotics in endovascular procedures and prospective comparison of outcomes of bypass vs endovascular revascularization for cerebral hypoperfusion.

Faculty joining us this fall:

Dr. Peng Zhong (Research)

Dr. Kuan-Hua Chen (Research)

Introductions on these faculty will be included in our October newsletter.

The Department of Neurosurgery receives a deep brain stimulation grant

Deep Brain Stimulation for Severe Treatment Refractory Methamphetamine Use Disorder (National Institute of Drug Abuse; UG3DA054746), which is a collaboration between UNMC and the University of Colorado Medical Center (CUMC). Multiple PIs are Drs. Joseph Sakai (Psychiatry, CUMC), Jody Tanabe (Neuroradiology, CUMC) and Aviva Abosch (Neurosurgery, UNMC). The focus of this grant, which is aimed at understanding and treating methamphetamine addiction and craving, is both crucially important and timely, given the ongoing US opioid epidemic.

Congratulations

to our DONS Residency & Fellowship Graduates!



In order of appearance from left to right: Dr. Navnika Gupta, Dr. Daniel Crespo, Dr. Matthew Purbaugh and Dr. Brian Villafuerte Trisolini

Graduating residents and fellows celebrated their graduation Thursday, June 2.

Dr. Navnika Gupta

Future Plans: Epilepsy Fellowship
Emory University School of Medicine

Dr. Matthew Purbaugh

Future Plans: Neurohospitalist
Bryan Hospital

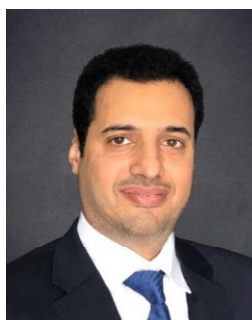
Dr. Daniel Crespo

Future Plans: Neuroimmunology Fellowship
Medical College of Wisconsin

Dr. Brian Villafuerte Trisolini

Future Plans: Stroke Fellowship
Johns Hopkins University

Fellows



Dr. Zacharia Shebani

Future Plans:
Neuropsychology Fellowship
Texas



Dr. Mohamed Darwish

Future Plans:
Children's Neurology Residency
Children's Mercy Hospital/Kansas
University



Dr. Trevor Wolterstorff

Future Plans:
Clinical Neuropsychology
Sanford Health, Sioux Falls, S.D.



Dr. Erin Kindred

Future Plans:
Assistant Professor
Psychiatry, UNMC

Graduating Fellows

who are staying on as new faculty at UNMC



Dr. Spriha Pavuluri

Research Interests: I am interested in learning the role of MEG (Magnetoencephalography) in the current landscape of neurology. I am hoping it can help with early diagnostics and interventions in several neurodegenerative and progressive neurological diseases.

Three things people may not know about me:

1. I am a national award-winning artist (oil painting, graphite work).
2. I am a gold medalist in Sanskrit and Physics. I was a physics tutor all through high school, undergrad and medical school.
3. I am an avid gardener and grew vegetables for my whole neighborhood.



Dr. Kiel Woodward

Research Interests: I subspecialize in movement disorders neurology, so I am interested in treating people with Parkinson's disease, tremors, balance problems, dystonia, tardive dyskinesias, restless legs syndrome, tics and any other abnormal movements. I am particularly

interested in gait disorders and plan to develop a clinic specifically for people with this problem.

Three things people may not know about me:

1. My whole family works in medicine: my brother and father are orthopedists, my mother and sisters are registered nurses, my wife is an occupational therapist, and my siblings-in-law are all doctors here at UNMC!
2. It's pronounced "Kyle"
3. Omaha Interclub Men's Youth Tennis Doubles Champion 1997. Now retired.

Congratulations

to our 2022 Department of Neurosurgery
Residency Graduates

Our two neurosurgery Chief Residents celebrated their graduation on Saturday, June 18, 2022, at the end of seven years of hard work and significant accomplishments. Dr. Eric Chen is returning to Louisville, Ky., for a staff position with Baptist East Medical Group, based at Baptist Hospital. Dr. Landon Ehlers is headed to The Ohio State University for one year of endovascular fellowship training.



Dr. Eric Chen



Dr. Landon Ehlers

Multiple Sclerosis

Program Update

by: Rana Zabad, MD, Professor, Department of Neurological Sciences, UNMC

Another busy and productive year went by for the Multiple Sclerosis (MS) Team in the Department of Neurological Sciences.

The MS team would like to thank and wish Dr. Kathleen Healey a happy and healthy retirement! “Kathi,” as we all know, has been with the Multiple Sclerosis Program in the Department of Neurological Sciences at the University of Nebraska Medical Center for almost a quarter of a century. But it is not only about the quantity but also the quality Kathi brings to patients and all of us in the MS Program. Kathi’s presence and work have enriched the program and allowed its growth

Kathi spearheaded the MS At Home Access (MAHA) Program and conferred it a national reputation through her education, knowledge, and wisdom, and above all, a magnanimous persona. Kathi’s MAHA program is her legacy to the Community of people with MS. Understandably, the MAHA program’s growth and expansion into the Exercise, Advocacy, Socialization and Engagement (EASE) Program and transdisciplinary clinic have been made possible with the efforts of several fearless ladies: Dr. Renee Stewart, Mrs. Kristen Bayly and Aubrie Lindner, who remain

faithful to the “Patient First” Team adage. This dedication is reflected in a recent article that was posted on the front page of Omaha world Herald and Lincoln Journal Star. We remain very grateful for the generosity of Mr. Richard Kelley, whose invaluable support has made this essential endeavor possible.

Starting July 1, 2022, Dr. Healey will remain in the DONS as Assistant Professor Emeritus. She will continue working on her overarching MAHA program vision: to establish a Day Achievement Program, a Community-University partnership for people with MS and advanced disabilities in the State of Nebraska. Dr. Healey’s input was critical in hiring Mrs. Sheryl McKim, MSPAS PA-C, to assume patients’ continuity of care and allow further growth of the MAHA Program. Sherry is highly trained in caring for urological problems in people with MS. Above all, her patients and colleagues highly respect her for her patient-centric philosophy of care.

We welcome Kammie Wallace, BSN and Vanessa Ellenberger, BSN to the MS Team.

Both Kammie and Vanessa join a group of compassionate and seasoned providers to serve our people with MS and other demyelinating and auto-immune diseases. Both come with skills that complement and deepen our staff’s expertise in caring for people with multiple sclerosis. The MS Division remains very strong with its patients who put their trust in us, its providers and support staff.

Thanks to our community donors’ (The Kelley and Kizer Families) loyalty and support, the UNMC Multiple Sclerosis Fellowship Program is gaining momentum. This year’s clinical fellow, Dr. Darwish, was supported by a generous grant from Biogen Idec. Dr. Darwish is moving on to another endeavor, and the team welcomes Dr. Krystian Solis, MD. A native of Mesquite, New Mexico, Dr. Solis completes his 4-year neurology residency at the University of New Mexico to start a year of Clinical MS fellowship on August 1, 2022. Dr. Solis is interested in serving underserved communities in his native state, making

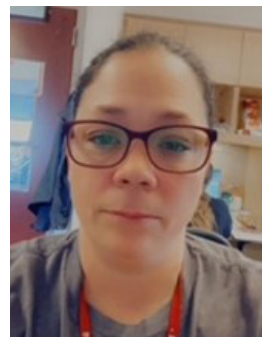
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Dr. Kathleen Healey



Sheryl McKim, MSPAS, PA-C



Kamie Wallace, BSN



Vanessa Ellenberger, BSN



Great Plains IDeA-CTR Technology (engineering-medicine) Initiative

Clinicians and Engineers are collaborating to provide better care for patients through the design of new technologies. The Great Plains IDeA-CTR is collecting design projects from clinical research partners to match with a research collaborator in engineering and technology. These design projects are part of a larger technology initiative to link investigators/clinicians with engineering expertise. The goals of this initiative include integrating engineering and technological resources into clinical and translational research (CTR), facilitating development of innovative tools for CTR clinicians and researchers, linking engineering expertise and clinicians and researchers, establishing a link between engineers and researchers to tech transfer experts and funding technology (engineering-medicine) pilot projects.

Four major components of this initiative help achieve the above goals:

1. Concierge Service: linking engineering expertise and clinicians
2. Research Studios: focused on technology and innovation
3. Design Projects: engineering students and faculty are paired to researchers/clinicians in need of prototype development and/or innovative solutions
4. Engineering and Technology track within the UNMC College of Medicine

The Enhanced Medical Education Track (EMETTrack) for Engineering and Technology in Medicine has been approved by a curriculum for recruitment of students in the fall of 2022. Each year, a cohort of up to four students will be selected to participate in this four-year program for



Dr. Mark Riley, UNL



Dr. Bethany Lowndes, UNMC

research and education on the design, application and implementation of technologies in health care delivery. Through this experience, students will develop a deeper appreciation for the role of technology and engineering applications through a systems approach to healthcare delivery. They will be paired with mentors and receive opportunities to collaborate on clinical and translational research.

As a part of this Technology Initiative, Bethany Lowndes, PhD, MPH, will serve as the Health Systems Engineering Liaison. Her role includes working across institutions, campuses and clinical programs to achieve the four goals described above. Dr. Lowndes will work with the Mark Riley, PhD, Engineering Liaison from the University of Nebraska-Lincoln College of Engineering, along with faculty members to connect clinical researchers to partners in the appropriate fields of engineering and technology.

For more information and to become a member of the Great Plains IDeA-CTR Network, visit <https://gpctr.unmc.edu/>.

Program Update from pg. 8

our MS program, with outreach to rural Nebraskans and those with advanced disabilities, among other strengths, a great fit for him. Welcome, Dr. Solis! We look forward to working with you, reciprocating knowledge and wisdom, and most importantly, keeping a lifelong relationship that allows us to develop outreach to all people with MS in rural areas in the United States!

With the growing numbers of patients in the MS program, it was natural to shift our attention to research opportunities. As a result, over the last decade, the MS Program at UNMC has been increasingly involved in cutting-edge research that increases patients'

opportunities to participate in alternative treatments and ground-breaking therapies while advancing our scientific understanding of MS and related conditions.

On a final note, several collaborative scholarly activities (12 abstracts) involving trainees at all levels and MS and non-MS faculty were accepted and presented this year at national conferences, including the American Academy of Neurology, American Society of Neuroimaging, Americas Committees for Treatment and Research in Multiple Sclerosis and the Consortium of MS Centers. Additionally, three articles were published in peer-reviewed journals.



MS Team

For a complete list of ongoing clinical trials visit unmc.edu/neurologicalsciences/patient-care/programs/multiple-sclerosis

CoNDA Center

Supports Research on Brain Parasite *Toxoplasma Gondii*

by: Leonardo Augusto, PhD, Assistant Professor, Department of Pathology and Microbiology, and Raj Dave, PhD, Instructor, DONS

The Cognitive Neuroscience of Development & Aging Center (CoNDA) is an NIH Center of Biomedical Research Excellence (COBRE) in Omaha, Neb., with a focus on neuroscience research across the lifespan.

The Center is led by Anna Dunaevsky, PhD, and has garnered outstanding resources to advance translational and human neuroscience in Omaha. Cutting-edge technologies for innovative neuroscience research are offered in the Center's Translational Imaging and Behavior Assessment and Neuroimaging Acquisition and Analysis Cores. Besides UNMC, several research centers (Boys Town National Research Hospital, Creighton University and University of Nebraska at Omaha) that focus on neuroscience have partnered with CoNDA Center. The Center supports investigators to develop new innovative areas in neuroscience via several support mechanisms (Research Project Program, Pilot Project Program and Core Usage Vouchers).

The Research Project Program is the key mechanism to mentor junior investigators as they embark on building their project towards an R01 award. Recognizing that "siloe science creates incredible barriers for junior investigators," this program offers a rigorous multi-tiered support to investigators from their mentors, internal advisory committee and external advisory committee, all of which are comprised of world-renowned experts. Additionally, the investigators have access to the resources and expertise of the CoNDA Center Cores to conduct their studies. Junior investigators selected into the research project program aim to lay foundation for their research and improve their career trajectory towards an independent scientific career. The research project leaders are conducting studies in aging, behavior, empathy, cognition, neurogenesis and encephalitis fill important knowledge gaps.

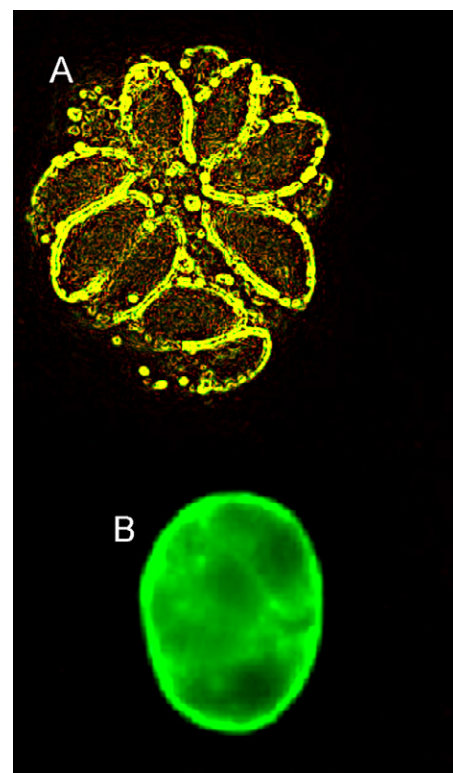
The latest addition to the Center's research project program is Leonardo da Silva Augusto, PhD. He is studying "the role of host amino-acid metabolism in behavioral changes during latent toxoplasmosis" and aims to understand the role of neuro-metabolism in the persistence of an opportunistic parasite infection in the brain. *Toxoplasma gondii* is one of the most prevalent parasites worldwide, and it is capable infecting virtually all cell types in the body. It is estimated that nearly two million people in the world have been infected with this pathogen and the persistence of *Toxoplasma* chronic forms in the brain is associated with neurological and cognitive alterations. The current recommended therapy for toxoplasmosis causes severe adverse effects and only targets acute forms of *Toxoplasma*. Therefore, one of the highest priorities in the field is elucidating how latent parasites persist in the brain in order to identify potential drug targets against chronic forms.

While protected within cysts, *Toxoplasma* has evolved tools to exploit the host metabolism and its organelles. It acquires amino-acids and nutrients to persist in the brain, which results in neurological alterations. Thus, in collaboration with cores of the CoNDA center, using combined metabolomics approaches, single-cell analysis, imaging and behavioral studies, Dr. Augusto's CoNDA project seeks to expand the knowledge on the role of amino acids in neurological and cognitive alterations during *Toxoplasma* chronic infection. He has recently identified a new host autophagy pathway exploited by *Toxoplasma* to increase amino acid availability needed for parasite long-term

persistence. Remarkably, the viability of



Dr. Leonardo Augusto



Toxoplasma gondii (A) replicative forms and (B) chronic forms

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Nine house officers honored at Graduate Medical Education Research Symposium

by Kari Nelson, PhD, UNMC College of Medicine

The Fourth Annual Graduate Medical Education (GME) Research Symposium was held on May 4 in the Truhlsen Events Center.

More than 50 residents and fellows presented their research in oral or poster formats. Presentation content ranged from original research to reviews, meta-analyses and case reports. The presented research abstracts covered a wide range of topics that included clinical outcomes, patient safety, quality improvement, basic science, education, health policy/advocacy, health care business practices, global health, wellness and other topics relevant to graduate medical education.

Abstracts presented at the symposium will be included in the *Graduate Medical Education Research Journal* (GMERJ), Volume 4 Issue 1, published in July.

Awards were given for the best presentations in both oral and poster categories. The award winners were:

- **Brendan Coutu, MD**, resident, radiation oncology: *Medications Affecting Hearing in Patients Undergoing Radiotherapy for Vestibular Schwannoma*
- **Erin Dennis, MD**, resident, neurology and **Joseph Menousek, MD**, resident, neurosurgery: *Prisma MRI and MEG Leading to a Successful Frontal Lesionectomy in a Medically Refractory*

Epilepsy Patient

- **Tate Johnson, MD**, fellow, rheumatology: *Cytokines and Chemokines are Associated with the Risk of Cardiovascular Disease in Rheumatoid Arthritis Independent of Conventional Disease Activity Measures*
- **Jason Lizalek, MD**, resident, general surgery: *Tick or Tack? Recurrence of Pulmonary Mucosa-associated Lymphoid Tissue (MALT) Lymphoma Following Lyme Disease*
- **Frank Mezzacappa, MD**, resident, neurosurgery: *A Unique Case of Central Nervous system Radiation-Induced Angiosarcoma in the Setting of Pleomorphic Xanthoastrocytoma*
- **Spriha Pavuluri, MD**, fellow, epilepsy: *Presurgical Evaluation of the Dominant Hemisphere function in an Adolescent Patient with Rasmussen's Encephalitis using Magnetoencephalography*
- **Jonathan Ryder, MD**, fellow, infectious diseases: *Role of Infectious Diseases Consultation for Candidemia in Setting of Established Antimicrobial Stewardship Program: A Retrospective Cohort Study from 2016-2019*

- **Kelsey Tieken, MD**, resident, general surgery: *Ergonomics of Mesh Placement in Robotic versus Laparoscopic Inguinal Hernia Repair*

Special congratulations to Neurosurgery Residents Dr. Frank Mezzacappa for best oral presentation and Dr. Joseph Menousek best poster presentation along with Neurology Resident Dr. Erin Dennis for best oral presentation.

"Research tends to be the one of the earliest casualties when clinical demands are excessive," said Chandra Are, MBBS, associate dean for graduate medical education. "It is commendable that these house officers continued with their research despite the multiple stressors associated with the pandemic. We wish them the best for the future research endeavors."

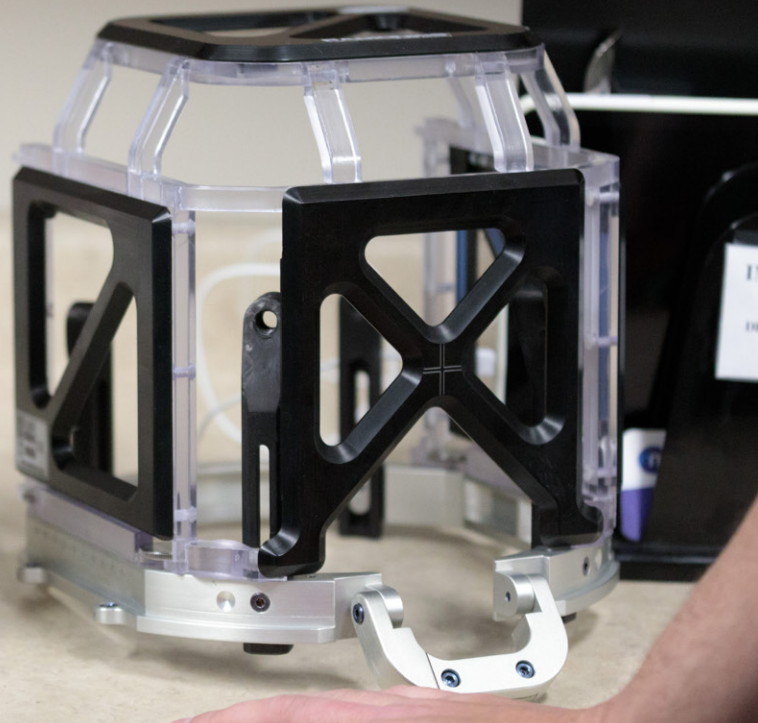
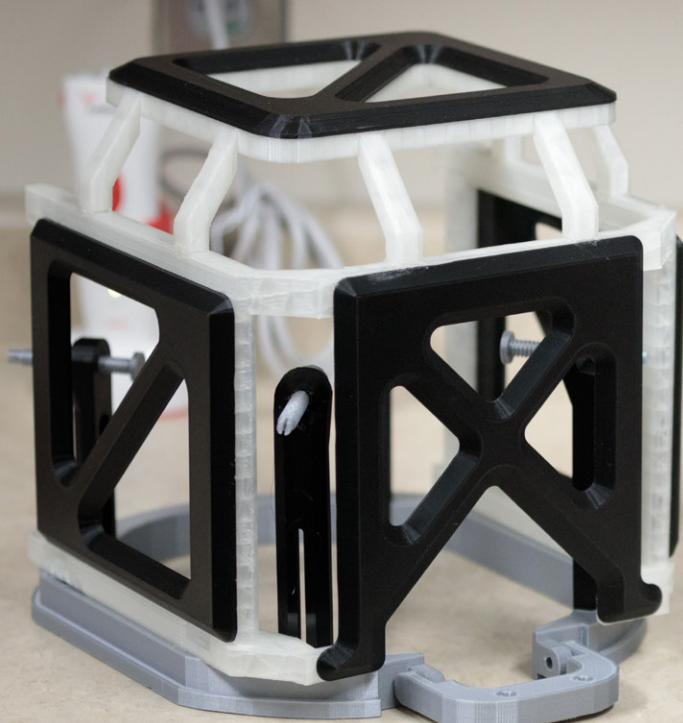
On behalf of the GME Office, Dr. Are thanked all the judges, moderators and others who helped to make the event a success, as well as Kari Nelson, PhD, Vicki Hamm, Erin Snow, Rachel Nelsen and Amy Guziec from the GME Office for their work organizing the event.

Toxoplasma gondii from pg. 10

chronic forms is drastically decreased when this accumulation of amino acids is blocked, which shed light on better treatments for toxoplasmosis. In addition, the mechanisms underlying the neuroinflammation and behavioral changes caused by *Toxoplasma* chronic infection are under investigation.

With continued multidisciplinary approaches and collaborative support among Departments of Pathology and Microbiology and Neurological Sciences and the CoNDA Center, this study will provide much needed insight on neuroinflammatory and neurological

diseases caused by opportunistic infections, putting us in a better position to develop novel therapies.



Combating Anxiety with Innovation

Neurosurgery Updates

*by Dennis Rieke, PA-C, Department of Neurosurgery, UNMC
Full story by John Keenan, Strategic Communications, UNMC
Photos by Kent Sievers, Strategic Communications, UNMC*

Deep brain stimulation (DBS) provides life-enhancing symptom control for patients with movement disorders such as Parkinson's disease and essential tremor. Patients who have perhaps not gone out to eat for thirty years due to social embarrassment from their tremor, or who have been unable to perform basic tasks due to motor fluctuations from Parkinson's Disease, with DBS, can experience near complete relief of some of their most significant symptoms.

Each DBS patient undergoes two awake surgeries during which the electrodes are placed into specific targets deep into the brain and are then tested through interaction with the patient to ensure optimal placement. Before surgery even begins, a headframe is placed in pre-op which sits around the bottom of the patient's head and four large screws are used to secure to the skull. Next, a large lattice like fiducial localizer box is secured to the head frame, resulting in a sense of confinement for the patients. While this process is stressful for all patients, there is a small subset of patients who are not be able to tolerate the process due to anxiety and/or claustrophobia.

To help reduce the anxiety of the surgical process, the multidisciplinary team worked together to build a 3D printed model of the head frame and fiducial localizer. This multidisciplinary team spanned Neurosurgery, Psychology, Psychiatry, and the 3D printing capabilities of the iEXCEL team. Drs. Erica Aflagah and Pamela May, neuropsychologists in the UNMC Department of Neurological



Sciences, worked with Justin Weeks, PhD, a psychologist and psychotherapy director of the departments Anxiety Subspecialty Treatment Program, to develop a virtual exposure therapy program. To make the training more realistic, a 3D scanned model was taken of the actual equipment and modeled by Anthony Lanza and Brian Maass for printing at the iEXCEL Lab, with direction by Bill Glass. Input from Dr. Aviva Abosch, Chair of UNMC Department of Neurosurgery and Dennis Rieke, PA, was used to modify the model into a user-friendly version that still provides a good simulation of the actual product. The hope is that if this improves patient comfort that this could become a standard component of pre-surgical education for patients undergoing DBS surgery, to help improve their comfort with the DBS experience.

Read the entire UNMC Today story here:

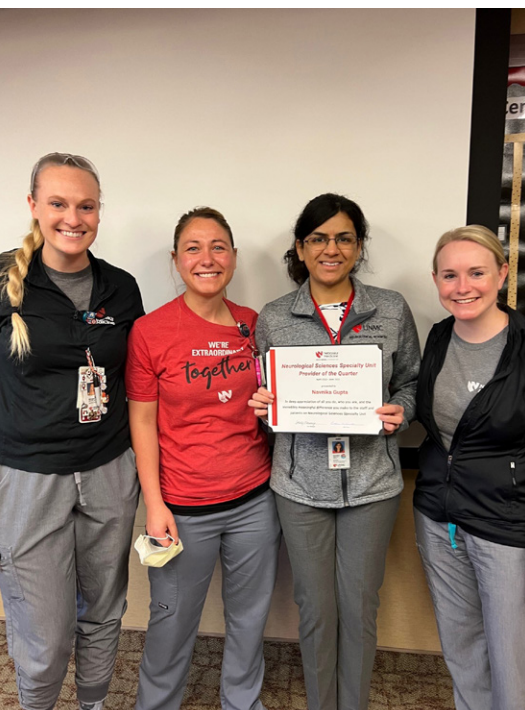
www.unmc.edu/news/stories/head-frame



Nebraska Medical Orchestra
Photo taken by Nebraska Medicine

The Nebraska Medical Orchestra (NMO)

had its spring concert on May 11 – finally performing together in-person after two years! A collaboration between UNO and UNMC, the NMO is a volunteer orchestra, directed by Dr. Matthew Brooks with assistance from Dr. Mary Perkinson and is open to all healthcare-related musicians. Musicians come from various colleges and departments at UNMC, Nebraska Medicine and Children’s Hospital & Medical Center. The NMO has also welcomed musicians affiliated with other health care organizations and institutions, including UNL, Clarkson College, Nebraska Methodist College, Creighton University and private practices. The concert featured a medley of Duke Ellington, Samuel Coleridge-Taylor’s African Suite: Danse Negre, the world premiere of Distant Reality by medical resident Nick Yeutter. The concert opened with the Ukrainian National Anthem. The NMO embodies the social, mental and spiritual benefits of music and links with ongoing investigations of music and brain health lead by Dr. Vaishali Phatak, Dr. Perkinson and their team.



Dr. Gupta is 6 Neuroscience Unit Provider of the Quarter

The nurses and staff of the 6th floor Neuroscience Unit recognized Dr. Navnika Gupta as Provider of the Quarter. They especially appreciate Dr. Gupta’s responsiveness, approachability, compassion and communication.

Quotes from the team:

- “She always comes to the bedside right away whenever there is a problem.”
- “She is so nice and helpful.”
- “She has such a great attitude and is always looking out for the patients.”
- “We really enjoy working with her.”

May was Stroke Awareness Month

The heart of cryptogenic strokes: Diagnosing strokes where the cause is unknown

by Michael Pichler, MD, Assistant Professor, DONS

A stroke occurs when a vessel supplying blood to part of the brain is suddenly blocked, killing brain tissue. When you suspect a stroke, immediately call 911. Faster treatment means better long-term outcomes.

Recognizing the symptoms of stroke is key:

- Sudden numbness or weakness of the face, arm or leg
- Sudden trouble seeing
- Sudden trouble speaking
- Extreme headache out of nowhere
- Sudden loss of balance or trouble walking

Immediate treatment is focused on restoring blood flow. Treatment may involve the use of clot-busting medications or a procedure to physically remove the blockage.

How strokes happen

Once someone is stable, our focus turns to rehabilitation preventing additional strokes. Often, a patient's first question is, "Why did this happen?" Finding the stroke cause is crucial to determine the risk of recurrence and the best prevention.

So, why did the vessel become blocked in the first place?

Four common stroke causes:

- 1. Large-artery problems:** Plaque buildup and narrowing of the large arteries in the head and neck. This is usually due to high blood pressure, high cholesterol, diabetes or other risk factors.
- 2. Small-vessel problems:** Damage to smaller blood vessels deep in the brain. This is also usually due to risk factors such as high blood pressure, high cholesterol or diabetes.
- 3. Cardiac source:** Clots from the heart travel to and block vessels in the brain, causing stroke. Most commonly a heart rhythm problem (atrial fibrillation) but potentially due to other heart conditions such as heart failure or heart valve problems
- 4. Stroke of other determined cause:** Less common but well recognized causes such as vasculitis (vessel inflammation), dissection (physical tear in a vessel) or clotting disorders.

How stroke is diagnosed

The initial workup for stroke is aimed at identifying the most likely reason for a blocked vessel. First, we look at the vessels (CT or MRI) to check for major narrowing. We also check for stroke risk factors (high blood pressure, cholesterol, diabetes) and assess the heart for structural problems or abnormal rhythms.

After this initial workup, up to 30% of strokes do not fit neatly into one of the four categories above. Strokes without a known cause are called "cryptogenic" strokes.

Types of cryptogenic strokes

Not knowing the cause of a stroke can be extremely frustrating. In cases of cryptogenic stroke, an even more detailed workup is required.

Cryptogenic strokes may be caused by:

- Atrial fibrillation or afib
- Patent foramen ovale (PFO)
- Clotting disorders
- Aortic arch atheroma

Other rare causes of cryptogenic stroke include cancer, heart valve disease and other types of heart disease.

Atrial fibrillation

Atrial fibrillation (Afib) is an irregular and often very fast heart rhythm. Afib occurs when the upper chambers of the heart beat irregularly. This causes blood to pump inefficiently, and clots can form within the left atria. A blood clot can then travel out of the heart to the brain and cause a stroke.

Symptoms of Afib can include

- Heart palpitations (hard, fast or irregular heartbeats)
- Lack of energy/fatigue
- Shortness of breath

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However, some patients have no symptoms, making detection difficult. To complicate matters further, patients may only have Afib for a short time, followed by normal heart rhythm. One snapshot in time might not tell the whole story.

In these cases, prolonged heart monitoring may be useful. Some monitoring devices can be placed under the skin on the chest and monitor the heart rhythm 24 hours a day. If the device detects atrial fibrillation, patients are notified immediately. Your doctor may then suggest stronger blood-thinning medicine to prevent strokes. Some implanted heart monitors can be left in place for up to three years.

Patent foramen ovale

Patent foramen ovale (PFO) is a small opening between the two upper heart chambers that never closed after birth. About 25% of adults have a PFO. Most people with a PFO are completely asymptomatic and never require any type of treatment.

In rare cases, however, a PFO may allow a blood clot to travel to the brain, causing a stroke. Although rare, this is possible in younger people without another explanation for a stroke.

Depending on the patient's age and other factors, a physician may close the PFO to prevent additional strokes. PFO closure is a minimally invasive procedure performed through a small catheter inserted into a leg vein.

Clotting disorders

A clotting disorder is a condition where a person's blood has an increased tendency to form clots. There are many different types of clotting disorders. Some are inherited and others are acquired later in life without a family history. If a person tends to form clots, those clots can travel to the brain and cause a stroke. Depending on age and family history, additional labs may identify the underlying clotting disorder.

Aortic arch atheroma

An aortic arch atheroma is a build of plaque within the aorta, the largest artery in the body. The specific part of the aorta that comes off the heart is called the aortic arch. When plaque builds up within the aortic arch, pieces can break off and travel downstream, potentially blocking vessels in the brain and causing a stroke. The same risk factors for plaque buildup in the carotid arteries apply to risk of plaque formation in the aorta.

Treating strokes where the cause is unknown

If you or a loved one has had a stroke, talk to your doctor about the potential causes. Your doctor can perform additional workups to get to the underlying issue. Regardless of the cause, it is also important to address any other contributing factors such as high blood pressure, cholesterol, diabetes and tobacco use. By knowing these potential causes of stroke, working with your doctor can dramatically reduce the risk of having another stroke.

STROKE AWARENESS

Who is at risk?

Everyone

- Risk doubles every 10 years after age 55
- 1/3 of strokes occur before the age of 55

What are my risk factors?

HIGH BLOOD PRESSURE 	DIABETES 	SMOKING 	HIGH CHOLESTEROL 	EXCESSIVE ALCOHOL CONSUMPTION
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Ways to reduce my risks

LOWER BLOOD PRESSURE Keep blood pressure below 120/80	DIABETES Tips to control diabetes: exercise, weight loss, medications	STOP SMOKING Your risk decreases 5 years after you quit	LOWER CHOLESTEROL Tips to lower cholesterol: diet, exercise, medications	REDUCE ALCOHOL CONSUMPTION 1 drink/day for women and 2 drinks/day for men
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REDUCE YOUR RISK: GET MOVING!

Walking briskly for an hour, five days a week is enough to help lower your risk.

Signs of a Stroke

<ul style="list-style-type: none"> ⚠ Sudden numbness or weakness of the face, arm or leg, especially on one side of the body ⚠ Sudden trouble seeing in one or both eyes 	<ul style="list-style-type: none"> ⚠ Extreme headaches with no known cause ⚠ Sudden trouble walking, loss of balance or coordination ⚠ Sudden trouble speaking
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CALL 911 IMMEDIATELY if you or someone else are having signs of a stroke.

Congressional Neuroscience Caucus

Dr. Matt Rizzo, board chair of the American Brain Coalition (ABC), convened the June 24 Congressional Neuroscience Caucus with exciting presentations and opportunities for engagement.

The briefing focused on the NIH BRAIN (Brain Research through Advancing Innovative Neurotechnologies) Initiative, whose researchers (including Dr. Aviva Abosch) are discovering key secrets of this most complex organ and the profound meaning for health care and society. Unprecedented discovery of mind and brain mechanisms is showing critical targets for treating and curing psychiatric and neurologic disorders. Neuroscience also extends beyond the lab and clinic — to classrooms, courtrooms, offices, homes around the world and travel in between — with unprecedented tools for understanding ourselves as social, moral and spiritual beings.

Discussion explored the responsible use of advances in brain science, with outreach for strong civic engagement, addressing unmet health care needs of our rural and urban underserved. Both Congressional Neuroscience Caucus co-chairs spoke. Congressman Earl Blumenauer serves the 3rd Congressional District in Oregon. On the Ways and Means Committee, he

has promoted health care access and has been a strong champion for patients with neurological and psychiatric disorders — and for the researchers developing treatments cures to combat these disorders. Congresswoman Cathy McMorris Rodgers represents the 5th district of the state of Washington and serves as the Ranking Member of the powerful House Energy and Commerce Committee, which oversees important health-related programs and initiatives. The Congressional Neuroscience Caucus was established to build awareness of the key role brain research plays in understanding ourselves and society, to communicate research progress and benefits, and to advance federal policies to support neuroscience research.

Dr. Joseph Fins, President of the International Neuroethics Society, and The E. William Davis, Jr. M.D. Professor of Medical Ethics and Chief of the Division of Medical Ethics at Weill Cornell Medical College spoke on emerging neurotechnologies for treating patients with severe brain injuries

in prolonged coma states. Drs. Jayatri Das and Claire Weichselbaum discussed dissemination, implementation, education and outreach to our communities on how neurotechnologies and neuroscience are impacting our lives. Dr. Das is Director of Science Content and Chief Bioscientist at The Franklin Institute and an invited Fellow of the Center for Neuroscience & Society at the University of Pennsylvania. Dr. Weichselbaum is the Dana Foundation Barbara Gill Civic Science Fellow at the National Informal STEM Education Network, based at Arizona State University. She has co-led the National Informal STEM Education (NISE) Network's Changing Brains initiative, fostering national and global collaborations to promote public engagement with neuroscience and society. Student winners of the BRAIN Initiative Challenge: Ethical Considerations of BRAIN Technologies were announced, highlighting their presentations on ethical implications of emerging brain technologies for understanding the brain and treating brain disorders.

For more information visit: braininitiative.org/2021/06/07/abc-and-ins-join-the-bia-reducing-the-burden-of-brain-disorders-through-education-outreach-and-ethical-practices/

Simulation-based education in Neurocritical Care

By Subin Mathew, MD, Assistant Professor, DONS, UNMC and Kiley Cameron, MD, PGY-4, DONS, UNMC

Critical care units, like aviation and nuclear energy sectors, are driven by high-profile safety; in particular, patient safety. Through literature and practice in various institutions, it has become increasingly apparent that neuro ICU emergency and procedural simulation should ideally be adopted as the education and training method of choice to improve procedural skills, learning, communication and interprofessional teamwork. Consider

the common scenario of a patient with large intracerebral hemorrhage and hydrocephalus in respiratory failure who requires pressor support, emergency external ventricular drain, central line placement and airway placement. ICU procedural simulation can help prepare our trainees for the best care of an actual patient in similar life-threatening circumstances by training neurology and neurosurgery residents to work

effectively as a team and practice appropriately performing their individual tasks and procedures.

Critical care teams around the world have used simulation as an excellent teaching tool in ICU's and have published impressive research on it, but neurologists and neurocritical care staff have often been late to adopt this

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teaching method. UNMC's Davis Global Center for Advanced Interprofessional Learning has ability to change this learning curve. The innovative technology at the center allows trainees to develop understanding of real-life situations and obtain procedural skills.

We hosted our first neurocritical care procedural skills session (intubations, central and arterial line placement) on June 30 for neurology and neurosurgery residents. Initially, many felt uncomfortable with procedures, but after the simulation, they felt more prepared for their upcoming ICU rotations. The main goal of the ICU simulation modules was to increase patient safety, improve resident confidence in procedure, decrease medical errors and improve outcomes. Our future goal is to develop simulation enhanced curriculum for neurologic emergencies for our trainees, which will include emergent cases such as cerebral herniation, massive subarachnoid hemorrhage and status epilepticus in patients with other medical comorbidities. This will help in inculcating effective leadership during crisis mode, improve team management in stress and

develop an art of clinical debriefing/sign-outs with a multidisciplinary team.

Kiley Cameron, MD, DONS PGY-4, Chief Resident, had this to say: "Many neurology residents have expressed interest in increasing our presence in the neuro ICU, and it is also a common topic brought up by residency applicants each year. We are so fortunate to have this opportunity to practice procedural skills under the direct guidance of our neurocritical care faculty, and our residents will be more prepared than ever to hit the wards this coming academic year. Simply establishing the muscle memory involved in performing intubations, central and arterial line placements is crucial and achievable with the resources available at the Davis Global Center, and we know simulation modules are effective in preparing trainees to act in high pressure situations. My hope is that by hosting an annual to biannual ICU procedure skills night, our residents will be better prepared to work as a team to perform intubations, work with precision to place arterial lines and work quickly to place central lines when the time comes."



Neurology residents in the Davis Global Center simulation labs



Daryl Gress, MD, DONS professor, instructs neurology residents

New tools to help identify and validate forms of dementia

by Robin Taylor, Department of Neurological Sciences | July 5, 2022

UNMC researchers along with national and international leaders recently published a study on identifying dementia through deep learning computer models.

The study, "Multimodal deep learning for Alzheimer's disease dementia assessment," published in the highly recognized [Nature Communications](#) journal, looked at persons with normal cognition, mild cognitive impairment, Alzheimer's disease (AD) and non-AD dementias and ways to improve the diagnosis.

The UNMC team from the Department of Neurological Sciences included Drs. Daniel Murman, Arun Swaminathan, and Olga

Taraschenko and former colleague Dr. Sachin Kedar.

With nearly 10 million new cases of dementia diagnosed annually, new measures are needed to clarify the various etiologies of these devastating conditions.

"This study will allow us to move forward with further real-life validation of the created artificial intelligence algorithm that can be subsequently applied in the resource- poor

settings with no available specialists in dementia," said Dr. Taraschenko.

The group, using routinely collected clinical information such as MRI scans, demographics, medical history, functional assessments, and neuropsychological tests, were used to develop deep learning models on various classification tasks.

The modeling interpretability methods showed high accuracy in disease-specific

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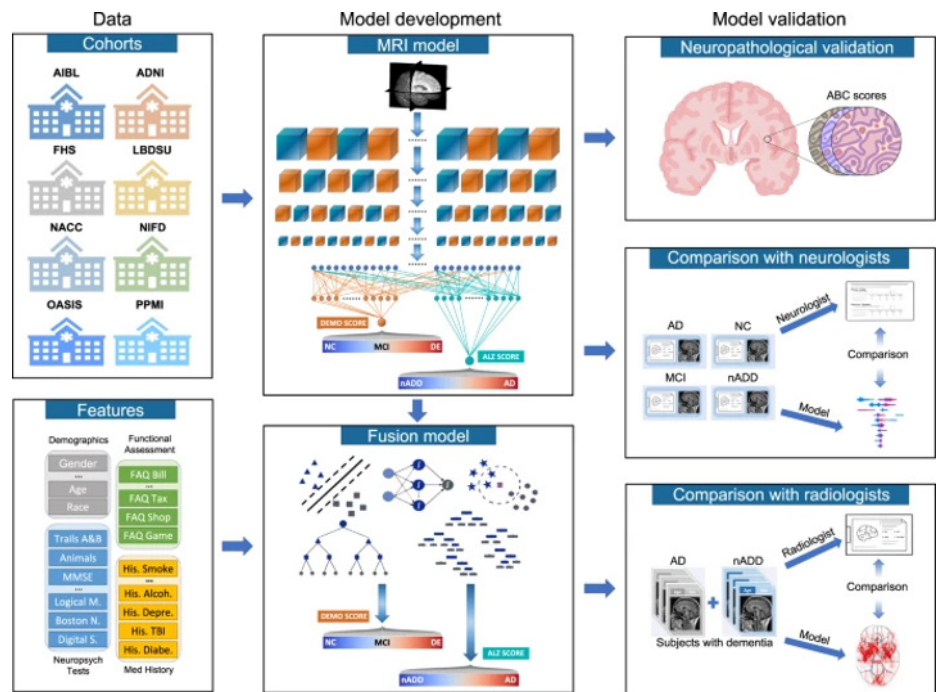
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patterns of degenerative changes throughout the brain that closely correspond to neuropathological lesions at autopsy.

Drs. Swaminathan, Murman, and Taraschenko were among the clinicians who reviewed and validated neuropsychological assessments, patients' history and their imaging studies that were compared then to the machine learning models developed in this study.

To confirm the models used in this study to assess dementia status, observational studies in memory clinics are being planned. Confirmation of machine learning for AD diagnosis and care would provide another screening tool for healthcare providers.

The team recognizes the limitations of the study such as cases of mixed dementia or comorbidities and future work may include multi-label classifications.



Modeling development and overall strategy used to validate the deep learning framework.

This project was supported by grants from the Karen Toffler Charitable Trust, the

Michael J. Fox Foundation, the Lewy Body Dementia Association, the Alzheimer's Drug

Discovery Foundation, the American Heart Association, and the National Institutes of Health.

Update on Ukrainian Fundraising Efforts

Efforts continue to raise money and send medical supplies to Ukraine.

To date, two large shipments to have been sent to the hospitals in Dnipro and Kharkiv with more than 8,000 lbs of medical supplies, and a third shipment is ready to send to Ukraine. In addition to surgical kits, instruments and sterile dressing, 680 tourniquets and packs of hemostatic gauze were included. The latter items were delivered to the field hospitals on the frontlines in the southern and eastern parts of the country where the battles have been the most severe in the past weeks.

Our fundraising efforts have been expanded to an art auction with paintings donated by our epilepsy fellow Dr. Spriha Pavuluri. If you would like to tour our art gallery at the MEG center or purchase a painting, please contact Dr. Gumenyuk at vgumenyuk@unmc.edu.



Dr. Zeleniuk of Dnipro, Ukraine, receiving donated shipments of surgical kits, instruments, sterile dressing and gauze.



One of Dr. Spriha Pavuluri's paintings "Young Ukrainian in a folk costume"

We would like to thank everyone for their donations and help with this initiative.

Sincerely,

Dr. Olga Taraschenko, Dr. Valia Gumenyuk and Viktoriya Mashinson

DONS Donor Highlight

By Connie White, University of Nebraska Foundation



Taylor Kizer

Taylor Kizer wants to start a ripple.

"Enough ripples can start a wave," the 24-year-old says.

Taylor's hope is that a wave of research can someday bring a cure to her dad.

Lance Kizer was diagnosed with multiple sclerosis in 2015 at the start of Taylor's senior year at Overton High School, which is about 25 miles west of Kearney.

On vacation in California with his wife, Lance noticed that his leg began to drag as he tired while walking on the beach. He had experienced other symptoms back home in Nebraska: weakness in his legs and trouble with balance and coordination. Lance went to see an orthopedist and then a neurologist. After undergoing a spinal tap and an MRI, Lance learned his diagnosis.

"None of us was super sure what multiple sclerosis was," Taylor said, recalling her family's reaction.

But Taylor knew this: There is no cure.

Taylor set out to learn all she could about the chronic neurological disease while raising funds to benefit the Multiple Sclerosis Research and Education Fund at the University of Nebraska Medical Center.

Taylor and her best friend Sidney Enochs organized a "Take the Shot for MS" basketball tournament at their high school. The "shot" referred to more than just basketball. At the time, Lance was giving himself three injections a week to treat his symptoms. Nine teams signed up, and Taylor and Sidney netted \$4,000 in donations.

Taylor and Sidney weren't done.

After graduating, the two friends enrolled at the University of Nebraska at Kearney. With the help of family, friends, the community of Overton and the surrounding central Nebraska towns, Taylor and Sidney put on three more basketball tournaments and a sand volleyball tournament. They also hosted a 30-mile bike ride between Overton and Kearney. In 2020,

The "Take the Shot for MS" fundraisers and other donations have brought in approximately \$33,000 for the Multiple Sclerosis Research and Education Fund at the University of Nebraska Medical Center. Pictured here is one of the basketball tournaments organized by Taylor Kizer and Sidney Enochs.



when COVID-19 shut down in-person events, Taylor and Sidney sent out donation packets. Their 2022 fundraiser was another sand volleyball tournament, held July 9 in Kearney.

Before the July event, approximately \$33,000 had been donated to the UNMC fund through Taylor and Sidney's fundraising and other donations sent on behalf of the Kizer family.

Rana Zabad, MD, chief of the multiple sclerosis/neuroimmunology division in UNMC's Department of Neurological Sciences, said Taylor's fundraising is critical to advancing the program's goals.

"Within the last quarter of the century, the science of multiple sclerosis and similar conditions has gone through unprecedented growth in all scientific aspects of the disease, resulting in an earlier diagnosis of MS and similar conditions," Dr. Zabad said.

The UNMC fund supports training and a fellowship program to prepare the next generation of interested neurologists and psychiatrists to care for people with MS and to conduct research. She said a rise in the prevalence of MS in the United States and worldwide has led to increased demand for neurologists specializing in MS.

And while great strides are being made, treatment and diagnostic gaps exist, including understanding the disease's "fingerprints" through biomarkers, blood tests or tests of other bodily fluids to allow for earlier diagnosis, managing treatments for long-term safety, reaching MS patients in rural and urban areas, and researching cheaper treatment options.

"With the proven benefit of early treatment and the availability of 23 (and counting) FDA-approved disease-modifying therapies, there is a pressing need to train more providers with expertise in the accurate diagnosis, earlier treatment and management of treatments' side effects," Dr. Zabad said.

MS occurs when the immune system attacks the nerve fibers and the myelin, the protective layer insulating healthy nerve fibers in the brain and spinal cord. Each patient reacts differently, with some having minimal

to no symptoms, others mildly to moderately impacted and a third group with significant limitations.

Due to available treatments, Dr. Zabad said the disease's effects can be somewhat mitigated. However, MS still impacts the employment, family and social life of a sizeable group of patients.

Lance, a veterinarian in Overton, is among 4,000 patients being actively followed through UNMC's multiple sclerosis program.

He says his symptoms have progressed as he expected over the past seven years.

He now uses a walking stick and has lost dexterity in his fingers. "One arm is less useful than it was before," Lance says.

If he gets a fever, like he did when he had COVID-19 last fall, he can barely walk.

He has cut back his work schedule to part time because of the physical demands of working with large animals.

Lance, 54, attends weekly physical therapy sessions and does balance and stretching exercises at home. Under the care of Dr. Zabad, he comes to Nebraska Medicine in Omaha every six months to receive infusions.

He's grateful for the care he has received, noting that Dr. Zabad is always willing to spend whatever time it takes to answer questions from him or his wife, Sue.

Sue says her family, which also includes two sons, gets through the tough days with the support of family and friends and their faith.

"You do learn to take it one day at a time. One minute, one hour," she says. "I wish we knew what the future held."

Lance and Sue Kizer say they are proud of their daughter's fundraising efforts but say they're not surprised. Once she gets an idea, Taylor is determined to see it through.

"This is one way she can help me directly," Lance says.

Lance's diagnosis also influenced Taylor's choice of profession. After earning a degree in health sciences from UNK in 2020, she



Friends Taylor Kizer and Sidney Enochs, both from Overton, Nebraska, have put on yearly fundraisers benefitting multiple sclerosis research since Taylor's father Lance was diagnosed with MS in 2015. Pictured from left to right are Sidney Enochs, Lance Kizer and Taylor Kizer.

enrolled in UNMC's physician assistant program. She expects to graduate in December and hopes to eventually return to the Kearney area to practice medicine.

Taylor says she has been fortunate to meet other families coping with MS through the fundraisers. Donations often are made on behalf of someone with MS. Taylor says she tries to inspire hope because living with a chronic disease like MS can cause people to lose hope.

"We've just been able to spread a lot of awareness for multiple sclerosis," she says.

Dr. Zabad called Taylor a "rising health care advocate."

"Taylor's fundraising put Nebraska on the map of MS centers of excellence that offer fellowships," Dr. Zabad said. "I trust that Taylor will continue to partner with us. She and her family have been of great help to their community raising awareness about the disease and encouraging patients to seek a second opinion and care at UNMC. Taylor's work enables us to think over and over about our priority — patients first."



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If you have any news or upcoming events that you would like featured in the next edition of the *NeuroNExT UNMC* newsletter, please send the information to sallie.weathers@unmc.edu



Save the Date

2022 Parkinson's Disease Conference

For PD patients and their care partners/families

Monday, October 12, 2022 | 9 a.m. – 3 p.m.
Scott Conference Center, 6450 Pine St, Omaha, NE

Hear from UNMC/Nebraska Medicine experts in Parkinson's disease. The event will be held in-person with a virtual option as well. If you are interested in receiving more information on the event, please email: unmcneuroconf@unmc.edu

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