Office of Graduate Studies and Research | 13th Edition | Volume XIII | 2021

New Frontiers

RESEARCH AND CREATIVE ACTIVITY AT THE UNIVERSITY OF NEBRASKA AT KEARNEY

Brain Gain

LADAN GHAZI SAIDI

WELCOME TO NEW FRONTIERS

For the last dozen years, the publication of New Frontiers has signaled a time for the UNK community to celebrate the immense talent that our campus possesses. By spotlighting the innovative research and creative activities from professors across disciplines, this publication offers a window into the extraordinary work being done in Kearney that impacts our students and the world at large. This 2020-21 version is strikingly normal when framed in this way, but it is extraordinary when viewed through the prism of a global pandemic.

The COVID-19 pandemic has presented challenges to the ways that we live and work, making 2020 a difficult year for all of us. We have seen friends, family and our community affected by the pandemic. And while the impacts on research and creative activities at UNK are not comparable to the human toll, these operations have not been spared from disruption and difficulties. Nevertheless, the faculty and students who are the lifeblood of these endeavors have persisted through intermittent shutdowns of labs and studios, changed protocols for working with collaborators, students and human subjects, and COVID-19 has created a new reality through which the work of our faculty is now viewed. This reality has sharpened some of the work on our campus by providing an outlet for applied research, such as integrating best practices in advocacy trainings for at-risk groups into COVID response trainings, manufacturing of personal protective equipment in labs, and developing Spanish-language information networks to increase the outreach of community services. In short, these unique times have demonstrated the tangible value of the work our faculty and students do in the research and creative realm.

These impacts continue to grow each year, and New Frontiers offers the opportunity to highlight an elite selection of what is being done at UNK every day. Furthermore, UNK's research enterprise continues to expand, as evidenced by the 383% increase in research awards over the last six years, providing more opportunities for our students while creating positive changes in the world at large.

The 2020-21 New Frontiers displays the depth and breadth of our amazing faculty and their work at UNK. This edition displays UNK faculty who are asking the big questions to drive us toward nuanced solutions that change the world: from Dr. Ladan Ghazi Saidi's work to better understand cognition to improve cognitive decline to Jessica Hollander's reinterpretation of the world for her readers to provide opportunities for personal reflections to Dr. Liaquat Hossain's quest to harness big data and social networks to solve system-level societal problems to Dr. Melissa Wuellner's ability to uncover linkages in habitats and ecosystems to build better management.

Also displayed within these pages are examples of the UNK community putting solutions into action with examples from Dr. Megan Adkin's work to integrate physical activity and STEM in K-12 students and Drs. Hollman and Obermier's

innovative solution to understand the true status of rural broadband through both lived-experience and significant computational data. Fittingly, the highlighted graduate student, Gail Blankenau, brings us a story that displays the interconnected nature of the world, contextualizing our understanding of early Nebraska and slavery.

New Frontiers is always an exciting celebration of the innovation of the UNK campus community, as the title suggests. The COVID-19 pandemic has created new obstacles to overcome and underscored new problems to be addressed. In my eyes, UNK has done well to address our local issues to help keep the campus safe while remaining vibrant.

Let New Frontiers 2020-21 help us turn the page to a bright future, while recognizing the sacrifices of our community, as well as their vast talents and dedication.

Richard Mocarski
Assistant Vice Chancellor for Research
Sponsored Programs & Research Development

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VOLUME XIII

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FROM THE CHANCELLOR

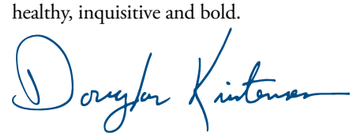
A year ago, as the 2020 spring semester was just getting underway, we encountered the greatest challenge imaginable. Check that. A global pandemic wasn't even in the scope of our imagination. Individuals and institutions had no choice but to adapt, and I could not be prouder of the way UNK reacted and adjusted to the new reality. Focused on maintaining our operations as "normally" as possible, faculty provided leadership and determination to keep teaching and researching amid the disruption. Instructional delivery, office procedures and activities changed, and the protective measures we adopted and followed resulted in relatively few students and staff becoming ill. In the fall, students eagerly moved back to campus and were given the opportunity to enjoy college experiences and in-person instruction while wearing masks and practicing social distancing. These last months have been surreal yet fulfilling.

Through it all, we focused on and were guided by our mission - our desire to provide as safe a learning and working environment as possible - and science. COVID-19 reminded us that scientific inquiry, evaluation, trial, documentation and review are critical in maintaining our universal order. Research provides the opportunity to identify and solve problems that generate new ideas, and often these endeavors are urgently needed to alter and save lives.

Basic and applied research is often taken for granted because it is ubiquitous. When normalcy is disrupted, however, people of every age and from every walk of life awaken to a renewed interest in research and a desire to be part of it. Pandemic or not, research and creative activity deserve to be front and center in our everyday lives. This annual publication showcases the accomplishments of UNK's tremendous faculty scholars, and we hope it will captivate and involve you in the important process of research.

In addition to our success in accomplishing our important teaching, engagement and research mission over the last year, in August we celebrated the long-awaited opening of Discovery Hall. This new facility forever changes campus, not just in its physical presence but in its interdisciplinary dynamic. Beautiful natural light, clean modern lines and open spaces welcome students from across campus into spaces that bring together faculty from mathematics and statistics, engineering, physics and astronomy, cyber systems and industrial technology. Locating these programs in Discovery Hall has already led to new collaborations and learning opportunities and will set the stage for exploration and research that I know will be featured in future editions of New Frontiers.

On behalf of UNK's community, thank you for your commitment to education and future discovery. Stay safe and healthy, inquisitive and bold.



Douglas A. Kristensen, J.D., *Chancellor*

CONTENTS

CLOSING THE DIVIDE

Rural Measures project addresses broadband disparities in Nebraska

By TYLER ELLYSON

The internet is an integral part of everyday life for most Americans.

We use it to communicate with friends and family, stream our favorite television shows and shop from the comfort of our living rooms.

More importantly, this technology connects health care providers with patients, teachers with students and businesses with a global marketplace.

Affordable, high-speed internet is almost a necessity in today's world, yet many people living in the U.S. still lack access.

The Federal Communications Commission estimates that 19 million Americans – 6% of the population – don't have access to broadband services with download speeds of at least 25 megabits per second (Mbps) and upload speeds of at least 3 Mbps. A majority of these people – 14.5 million – live in rural areas.

"We feel for all those people in rural areas who are suffering from this," said University of Nebraska at Kearney professor Tim Obermier, who is researching the digital divide with his colleague Angela Hollman. "You hear anecdotally all the time, 'I can't get good, quality internet.' They either can't get it at all, or they have satellite service, which is extremely limited in value because it's so expensive for what you get."

In a state where roughly 35% of the residents live in rural areas, it's easy to spot the disparities between the haves and have-nots, especially during a global health crisis that forced people to learn and work from home.

The COVID-19 pandemic exposed some "gaping holes" in Nebraska's infrastructure, according to Hollman, an associate professor in UNK's Department of Cyber Systems.

> "The internet isn't going away. We only seem to be needing more of it."

She can share story after story about UNK students who struggled with remote learning because they don't have a high-speed internet connection at home. This impacted their ability to view lectures or upload assignments, forcing some students to drive to a relative's house to get online or find a Wi-Fi hotspot they could access with their smartphone.

UNK faculty faced the same problems.

Before she found another internet provider, Hollman had trouble with Zoom calls while working from her home northwest of Gibbon, an area that also lacks cell reception. Obermier, who lives south of Aurora, continues to deal with his unstable internet.

"This directly impacts a lot of people," Hollman said. "It had a direct impact on my line of work, and it had a direct impact on students who were trying to get their education remotely."

"All of this has been a big motivator for us to try to figure out how we can help Nebraska solve this problem," added Obermier, who teaches in the departments of industrial technology and cyber systems.

RURAL MEASURES PROJECT

Obermier has conducted multiple studies analyzing the cost and capacity of internet services in Nebraska.

However, that research, much like the FCC estimates, relied on generalized data that came from the providers themselves.

"For a long time, the service providers have been the only source of this data," Hollman noted. "There are no checks and balances."

To fully understand the issue, Obermier and Hollman are taking this research one step further by comparing a customer's internet package with the actual bandwidth they're receiving. This data will more accurately depict the deficit experienced by rural residents, agricultural producers, businesses, schools and communities as a whole while assisting regulatory agencies and internet providers working to close the digital divide.

A one-of-a-kind undertaking, the Rural Measures project uses a small device developed by Hollman to measure internet speeds at an individual location. The quantitative throughput (QT) unit – a Raspberry Pi computer – is mailed to each participant along with a power cord and ethernet cable. After the device is installed and activated on the project's website – RuralMeasures.com – it collects 1,800 bandwidth readings over seven days.

"It literally runs around the clock," Obermier said. "We wanted to capture something of high statistical significance."

These readings give the UNK research team a detailed look at each participant's internet speeds. These can be compared with the speeds their provider promises and analyzed to determine whether there are differences between peak and nonpeak hours.

The project also includes a survey component designed to determine how the internet, or lack thereof, impacts someone's quality of life. For instance, could they effectively start a business, access remote education or telehealth or trade commodities online?

"Taking that hard data and matching it with the social science data is something nobody else is doing across the nation. And it's actually something that's needed," Hollman said.

Still in its "pilot phase," the Rural Measures project has been slowed by the COVID-19 pandemic, which impacted distribution of the QT units. As of mid-January, about 85 locations in roughly 70 counties, mostly residences and a few businesses, had been tested. Much of that work was completed last summer through a collaboration with Nebraska Extension.

"The trend that we're starting to see is the farther you move away from a populated area, the lower your internet speed gets," Hollman noted.

> "If you look down the road at what these farmers are going to need 10 years from now, we're not even close to that."

The UNK research team also includes geography professor Paul Burger. The team has a total of 300 testing units, purchased with funding from the Nebraska Public Power District and Nebraska Rural Electric Association.

Moving forward, they plan to focus testing on specific regions before putting these individual pieces together like a puzzle that tells the entire state's story. They're hoping to access federal CARES Act funding to support this initiative.

Along with residences, businesses and schools, precision agriculture is another area of interest for the researchers.

Many ag operations already have "massive" data needs, according to Obermier, whether they're adjusting an irrigation pivot on a smartphone, mapping crop yields from the cab of a combine or using high-tech ear tags to monitor the health of their livestock.

"If you look down the road at what these farmers are going to need 10 years from now, we're not even close to that," said Obermier. He believes "broadband in the field" will become the norm.

POTENTIAL PARTNERS

The ultimate goal of the Rural Measures project is to "visualize" the digital divide, giving regulatory agencies and internet providers a clearer picture of where broadband infrastructure needs to improve.

It's a topic receiving both state and national attention.

Obermier and Hollman have presented their project to FCC subcommittees, the Nebraska Information Technology Commission and Nebraska Telecommunications Association, economic development districts and state Sen. Wendy DeBoer of Bennington, who serves on the Legislature's Transportation and Telecommunications Committee.

There's also interest from internet providers that could use the UNK research to satisfy reporting requirements tied to federal funding awarded to companies to expand broadband services.

"They're receiving thousands of dollars to roll out networks and now the government is asking them to verify that their networks work," Obermier explained.

> "The trend that we're starting to see is the farther you move away from a populated area, the lower your internet speed gets."

Within the University of Nebraska system, the UNK team is partnering with Nebraska Extension's Community Vitality Initiative, which works with rural communities and resource providers to promote entrepreneurship, recruit new residents, build businesses and engage youth and young adults.

"You can't have that community vitality unless the broadband is there," said Hollman, who sees an opportunity for communities to create "digital dashboards" advertising their technology readiness.

"We have an interest in laying that groundwork," she said.

Hollman believes the Rural Measures project can be a model for broadband mapping across the country.

"The internet isn't going away," she said. "We only seem to be needing more of it."

OBERMIER

TIM

Title: Professor

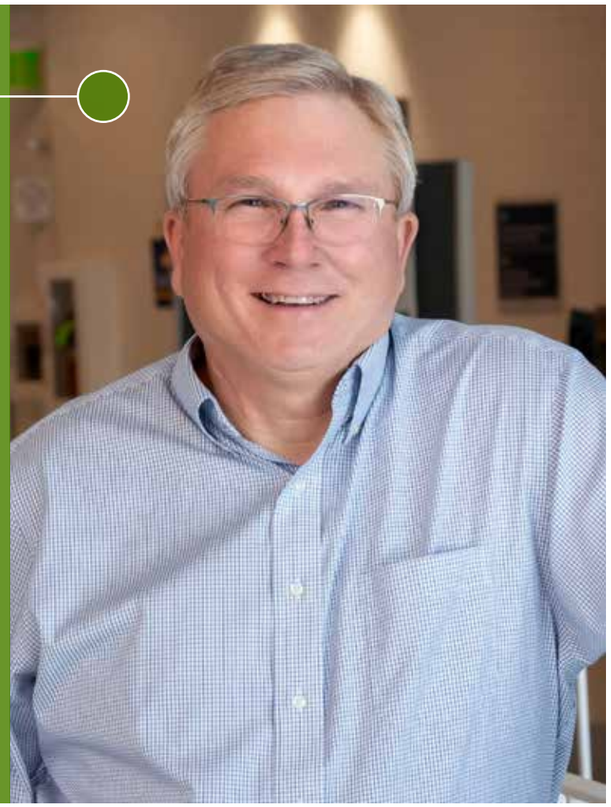
Department/College: Industrial Technology & Cyber Systems, College of Business and Technology

Education: Ph.D., Colorado State University, 1991; Master of Science, University of Nebraska at Kearney, 1986; Bachelor of Science, Kearney State College, 1983.

Years at UNK: 29

Areas of research/specialization: Rural / urban digital divide. Broadband capacity and cost. Information networking law and public policy.

Research in My Own Words: The research being conducted by Dr. Hollman and myself through the Rural Measures project started with the basic question "Can we accurately measure internet bandwidth at the customer premise?" This led to a one-of-a-kind project in the nation that collects data at the customer premise to assist regulatory agencies and internet providers with resolving the digital divide in rural America. The data we collect visually depicts the bandwidth deficit suffered by rural residents, farms, businesses and education. We also collect quality of life indicators through a connected survey mechanism.



HOLLMAN

ANGELA

Title: Associate Professor, Cyber Systems; Director, Honors Program

College: Business and Technology

Education: Ph.D., University of Nebraska-Lincoln, 2014; Master's in education, University of Nebraska at Kearney, 2009; Bachelor of Science, University of Nebraska at Kearney, 2001.

Years at UNK: 16

Areas of research/specialization: Cybersecurity and middle-level education. Visualizing the urban-rural digital divide (broadband & digital inclusion).

Research in My Own Words: The Rural Measures project started a couple of years ago when my colleague, Tim Obermier, pondered how broadband connection speed could be more accurately analyzed from the customer premise. I worked with Tim to create a mechanism that can be used to accurately measure a point-of-view from the bottom-up, from the customer and small business perspective. With both Tim and I living and raising families close to rural communities, we have experienced a difference in internet speeds and choices than our in-town brethren. And during the pandemic, I have heard and witnessed students struggling in these very similar rural areas with what seem like simple problems. These students lack the ability to access a high enough speed to stream lectures for their classes. I also talked with one student who frequently traveled to a nearby library to get a good enough Wi-Fi connection to upload a research paper on their phone (which they had also just written on their phone). Disparities like these mentioned, and our aforementioned passion, have led to the Rural Measures mission, which is to visualize these discrepancies that make up our rural-urban digital divide.

HIGH-TECH HEALTH

Adkins using technology to motivate, involve PE students

By JAN TREFFER THOMPSON

When they walk in the gym for PE class, students' first stop is a projection screen. "Shoot baskets or walk the track," it tells them; some head toward the hoops, while others set a brisk pace around the room.

Later, students will visit a series of movement stations, recording their cartwheels and somersaults on mobile devices and reviewing the videos to see how well they did.

At the end of class, they'll read a question that checks their knowledge of the day's lesson and respond using cards with unique QR codes, so their answers can be scanned later.

Where's the PE teacher during all this? Taking attendance with a computer app, using data to assess individual effort levels and watching for chances to give students the help or encouragement they need.

Definitely not at the front of the room, blowing on a coach's whistle.

This scenario features a lot more technology (and a lot less dodgeball) than people might expect, but it demonstrates the atmosphere Megan Adkins-Bollwitt said physical education teachers are now trying to create.

"There's a connotation of health and physical education teachers that we throw out the ball and don't have to do too much more," said Adkins, an associate professor at the University of Nebraska at Kearney and coordinator of the health and physical education program. But that stereotype isn't even close to today's reality.

"A successful class is one where you barely notice the teacher is in it, because it should be student-centered enough that the students understand the expectations and are willing to follow those with just a little bit of teacher guidance, compared to being the teacher as the star of the class," she said.

UNK EXCELLENCE

Adkins' research and teaching promotes an expanded definition of physical education – one that engages all students, focuses on children's entire well-being rather than just athletic skill, and takes lessons beyond gymnasium walls. And though technology has long been seen as the enemy of an active lifestyle, Adkins has embraced it as a tool that can get and keep students moving.

Since coming to UNK as a lecturer in 2008, Adkins has pushed the health and physical education program toward the profession's cutting edge. The Home School Physical Education Teaching Lab, in which area home-schooled children visit campus for weekly classes, was just the second in the nation when Adkins developed it in 2015. Her students teach STEM-based physical education lessons at an after-school program and have led supplementary physical activities in local schools. These experiences regularly yield research data, for Adkins as well as her students. Her mentorship list is long, and she was honored in 2020 as UNK's Undergraduate Mentor of the Year.

Adkins has been recognized with awards from the Apple Distinguished Educators program, the state and national levels of the Society of Health and Physical Educators, as well as multiple university honors.

Adkins said UNK's program has earned a solid reputation for the way it uses – and teaches its graduates to use – technology.

"I get calls from a lot of other universities to ask how we're doing the (technology) integration, what we're doing. I give presentations about technology all the time. I would say our health and physical education program has worked to stay at that top level and make sure that our students understand that excellence is at a high bar," she said.

> "Some of the kids who were lethargic and didn't really want to do physical education … all of a sudden were my rock stars."

IMPROVING LIVES

Athletic and energetic, Adkins grew up as one of those kids who loved PE class. She planned to play college volleyball until back and knee surgeries forced a change. But when she graduated from the University of Nebraska-Lincoln in 2002 with a teaching degree in K-12 health and physical education, Adkins entered a profession under pressure.

Students and teachers were racing to keep up with how technology was changing the learning process. Researchers were seeing a connection between increasing screen time and childhood obesity, yet technology was becoming a part of everyday instruction.

Adkins saw the challenges technology posed, but she also saw opportunity. A few years after starting work at Kearney's Horizon Middle School, she brought in a Dance Dance Revolution video game, which challenges players to replicate the dance steps they see displayed. She was simply hoping to give students something new and interesting, but the results were surprising.

"Some of the kids who were lethargic and didn't really want to do physical education, weren't really interested in it, all of a sudden were my rock stars," she said. "I could see that health and physical education, to continue to stay on the map, had to transition a little bit to make it interesting to 21st-century students. They're used to having mobile devices, they're used to multitasking, they're used to all those different elements."

With such a positive response to the game, Adkins started incorporating more technology into her teaching and made it her research focus as a graduate student.

Adkins recalls one particular group of middle schoolers who helped change her ideas about physical education. When she had the group run or play a sport, those who looked like they were physically fit always seemed to give a lot of effort, while those who appeared out-of-shape didn't seem to work as hard.

Then one day, she put heart rate monitors on the whole class.

"The kids who looked like they were in shape looked like they were giving a lot of effort, but when we put the technology on

them, they weren't giving any type of effort, and the kids who looked like they weren't giving any effort, they were really trying hard," Adkins said.

That experience helped Adkins see that PE should be about more than athletic prowess. Today's health and physical education programs are about improving lives, Adkins said, and her research has looked at ways to expand their impact.

In the last 10 years, national initiatives such as Michelle Obama's Let's Move! campaign and Every Student Succeeds Act have highlighted the importance of health and wellness. The latter, signed in 2015, also freed up federal funding by designating physical education as part of a "well-rounded education."

"We are helping (physical education) become a quality curricular area that assists in childhood obesity, social and emotional well-being and increases brain activity. All those things are research based. Physical movement can help that. The physical education teacher is becoming a prominent figure in being able to enhance those skills for any age group, as well as the staff at a school," Adkins said.

> "A successful class is one where you barely notice the teacher is in it …"

Access to those benefits, though, isn't equal. Schools with more low-income students may not have the resources for strong physical education programs, and Adkins said that can have long-ranging effects. With fewer chances to develop physical skills, low-income children are less likely to reap the rewards of a healthy lifestyle.

"All my work right now is related to either low socioeconomic or rural populations," she said, and bringing the benefits of physical activity to those students.

AFTER–SCHOOL PROGRAMS

Finding new ways to incorporate physical education may help. In two studies published in 2017, Adkins wrote about a supplemental activity program in local schools. UNK education majors worked at elementary schools with a lot of low-income students. On days when the children didn't have their regular physical education class, the UNK students led 20-minute activity sessions.

Measurements of the children's fundamental movements and motor skills – skipping, running, jumping, throwing – showed these sessions made a big difference. In fact, Adkins said, one principal continued the program after the study ended because classroom behavior problems decreased and participation in middle school sports increased.

"That made me super-excited … proving just a small amount of physical activity to teach motor patterns to low socioeconomic students could make a difference that could change their physical well-being down the road," Adkins said.

As physical education moves away from old models, it's also moving into other classrooms. Adkins said a lot of her recent work connects to the national push for more instruction in science, technology, engineering and mathematics, or STEM. For example, as the Kearney coordinator for the NE STEM 4U program, Adkins creates activities for after-school programs.

"What we've done is integrate a lot of the STEM activity into movement," she said, such as a recent session that used rubber balls to demonstrate Isaac Newton's laws of motion. Third graders threw objects at balls of different sizes and quickly learned that it was easier to move the smaller balls. To make the larger balls move, they had to throw harder.

STEM is also a key part of several projects Adkins has in the works. She has applied for a $1.5 million grant from the National Science Foundation to develop "immersive technology experiences" – activities for teachers to use in conjunction with their existing lessons.

A class learning about fingerprinting, for example, may get a "Who Did It?" activity, in which they would have to perform physical tasks to correctly identify a fingerprint.

Prepared activities teachers can integrate into existing curricula are just another way to help students develop their bodies and their minds, Adkins said. Throughout her career, that's been her goal.

"The main reason that I came to teach at the college level was I thought I was doing a good job of having an impact with my middle school students, but it was just a few kids. And if I could come to the university and assist in all these teachers going out to all these schools, then I felt I could have a bigger impact on the world of health and physical education."

COVID-19 challenges push PE teachers to expand strategies, ideas

By JAN TREFFER THOMPSON

Megan Adkins-Bollwitt has been making technology work for the learning environment, rather than against it, for almost two decades. But it's a challenge many teachers faced for the first time in 2020.

School lockdowns and directed health measures due to the COVID-19 pandemic brought especially big challenges for PE teachers. Adkins, program coordinator of health and physical education at the University of Nebraska at Kearney, said many have adopted technological tools and strategies that were unfamiliar before, but will change their classrooms going forward.

One of Adkins' current research projects looks at the impact of the pandemic on physical education programs. She interviewed health and PE teachers over the summer, asking not only how their instruction changed but how they felt about the experience.

She found the teachers faced a gamut of situations and expectations. Some ran their regular classes remotely, while others couldn't have their students do any physical activities over Zoom because of liability issues. Some were not given a designated time for their classes in the online environment but were simply expected to "jump on" during other instructors' Zoom sessions to check in with their students.

The changes have continued into the current school year. Many teachers developed videos for online instruction. Classes had a combination of online and face-to-face students; adaptations to meet health guidelines were in some ways more challenging for physical education than for other classes.

"Teaching in the gymnasium, when you're moving around all the time and it's a large space, having some kids online and some face-to-face is really a huge struggle. Then you add the masks on top of that and the 6 feet (separation), so the type of activities had to completely change. You couldn't have kids playing basketball games, because they're within that 6 feet apart," Adkins said.

Those challenges required teachers to expand their strategies and ideas. Fortunately, Adkins said, health and physical education professionals were able to connect online, with their students and with each other.

"The physical education health community came together to provide huge amounts of ideas. If you go onto any social media site, you'll see numerous YouTube videos, use of PowerPoints doing fitness activities that were engaging. The sky was the limit of different things people were starting to share because they knew people were struggling," she said. "Just giving ideas like, 'Well, I tried this today, you can have your student pulling another student on a scooter because that's 6 feet apart.' Even just small things like that."

Through her interviews, Adkins found that even teachers who ran strictly offline classrooms previously have become more comfortable with technology, and more open to its integration in their curricula. While they may not keep all the adaptations when the pandemic is over, they intend to make some changes permanent.

"There were about 50% of them who said they did not do technology before this, and now they can see that there are some benefits, and they'll continue on with x, y and z," she said.

ADKINS-BOLLWITT

MEGAN

Title: Associate Professor, Kinesiology and Sport Sciences; Program Coordinator, Health and Physical Education

College: Education

Education: Doctor of Philosophy, teacher education with emphasis in instructional technology, University of Nebraska-Lincoln, 2011; Master of Science, teacher physical education with emphasis in special populations, University of Nebraska at Kearney, 2004; Bachelor of Science, health and physical education K-12 and community health with a coaching endorsement, University of Nebraska-Lincoln, 2002.

Years at UNK: 12

Areas of research/specialization: 1) School physical activity/physical education cross-curricular interventions, specifically in the area of STEM. 2) Technology integration and curriculum development, immersive technology experiences in STEM. 3) Analysis of diverse youth populations and physical activity, specifically beginning fundamental movement patterns in Title 1 schools and among home school students. 4) Behavior change determinants of physical activity and nutrition, including psychological, physiological and social influences (Social, Emotional, Learning) for students and teachers.

Research in My Words: "STEMulating Equity in Rural Schools Through Immersive Learning Experiences" focuses on developing and testing innovations to advance efforts of technology experiences for students and teachers in hopes of increasing matriculation rates of students who pursue STEM careers.

Quality physical education research focuses on evaluating effective teaching strategies and implementation of programs to prepare physical education, teacher education majors to guidelines set forth through the integration of technology applications and teaching opportunities.

Motivation is a valuable tool in understanding human behavior. Technology today is a strong motivator for students (Pk-12+), especially when utilizing technologies in the learning process. My research relates to the implementation of instructional technology into the classroom, and behavioral change in students.

My "UNK-NE STEM 4U-Physical Activity" research focuses on creating cross-curricular STEM learning opportunities where youth learn complex ideas in the areas of STEM and topics through kinesthetic movement using inquiry-based lessons.

“MY PRIMARY RESEARCH DEALS WITH SOCIAL MEDICINE, DISASTER MEDICINE AND PUBLIC HEALTH PREPAREDNESS”

By TYLER ELLYSON

Liaquat Hossain takes a multidisciplinary approach to teaching and research.

He’s always looking for ways to solve real-world problems through collaborations with academic colleagues and business partners.

“I have a natural inclination to step outside the boundaries of the traditional faculty-school-college structure and explore formal and informal academic partnerships with other colleges and industry partners, including employers and community outreach programs, to create and implement innovative degree and research programs,” said Hossain, who joined the University of Nebraska at Kearney in May 2019 as a Ron and Carol Cope Professor and chair of the cyber systems department.

Hossain is a firm believer in promoting “collective sense-making” to achieve institutional goals.

“Establishing a positive environment for collaboration by developing collective interests among academic units and key external constituents is pivotal to successful innovative academic program development,” he said.

As chair of the cyber systems department, Hossain sees an opportunity to partner with academic programs across UNK’s three colleges to pursue research and create new degrees, minors or specializations that combine technology with areas such as business, social science, teacher education and health care. He’s also focused on strengthening the College of Business and Technology’s relationships with businesses and organizations across the state.

“Recent unprecedented challenges brought to our society and corporations at all levels require us to rethink many aspects of the functioning of our educational institutions,” he said.

To address these challenges and take advantage of future opportunities, Hossain believes universities must:

- evaluate existing educational models and modes of delivery;
- establish interdisciplinary programs that provide students, business professionals and faculty members with the critical skills needed to drive societal and business outcomes; and
- increase diversity and gender balance in STEM education through curriculum innovation and school and community partnerships.

In his own research, Hossain uses a complex systems approach to bridge disciplines such as social, behavioral and information science, business and economics, physical and human geography, public health and engineering systems to

address communication and responses related to natural and man-made disasters.

"My primary research deals with social medicine, disaster medicine and public health preparedness, for which I am interested in exploring communications and responses to bio-related threats, food, animal and public health disease outbreak responses and other types of natural and man-made disasters requiring multijurisdictional, coordinated responses," Hossain explained. "My secondary research is in the area of health systems, health promotion and risk reduction for vulnerable populations."

Hossain is currently leading a number of National Institutes of Health and National Science Foundation proposals related to COVID-19, including resilience networks for pandemic preparedness and response coordination, social resilience networks for emotional contagion during the pandemic and digital mental health interventions for adolescents and youth. He's also looking at the use of social networks to improve diabetes and prediabetes care.

Hossain has secured more than $10 million in competitive research funding during his academic career and published over 200 international peer-reviewed research papers. He is specialty editor-in-chief of Frontiers in Psychology, the second-most-cited psychology journal, and Frontiers in Communication, with a focus on disaster communication. He's also been appointed associate editor for BMC Health Services Research, an open-access health care journal.

What sets your research apart from others?

My work in the multidisciplinary information field helped in providing very significant advancement to the field of disaster coordination, as well as exploring multijurisdictional coordination challenges for dealing with emerging areas such as the spread of infections, disasters related to floods and tsunamis, fires and biosecurity and humanitarian-related disasters. My research in disasters incorporates both challenges of hierarchical structures and emerging community-based networks required to develop effective preparedness and response for dealing with large-scale disasters related to environmental, food, animal, human and biosecurity threats and humanitarian disasters.

What are your biggest discoveries?

My theoretical and methodological work on social networks and complex systems provided new directions to interdisciplinary educational and research programs related to computational and information sciences, complex health emergencies, global disease epidemiology and control, disaster medicine, immunity building/capacity development for organizations and communities and university wide transdisciplinary research initiatives in complexity, resilience and systems with wider theoretical, methodological and translational research and education related to population health, data and society. I have been investigating the functioning and robustness of hierarchical structures and potential problems leading to disruption or delay in the adaptation of behaviors for optimal functioning.

My theoretical work on the examination of feedback systems leading to effectiveness and efficiency in learning and correcting or intervention to changed behavior in complex systems provides an important step toward understanding how different systems function and self-organize, which is an important step toward understanding the performance outcome of disaster preparedness and response. My methodological and analytical techniques drawn from mathematical sociology, social anthropology and computer science in exploring coordination problems in chaotic systems could have application in supporting and further building large-scale, transdisciplinary research clusters for disaster preparedness and response.

How do you measure success as a researcher?

Research that matters to science and society through developing new theoretical and/or methodological perspectives or refuting existing theories/methods or even providing significant extension to add value to existing theories and methodologies. Research that offers translational societal/business/governmental outcomes. Kind of like solving grand societal challenges.

What are the qualities of a good faculty researcher?

Curiosity, curiosity, curiosity. Ambitious, inquiry mindset, inquisitiveness, disciplined, methodological use of theoretical/methodological lens and its application in offering solutions to not only scientific discoveries but also translational societal outcomes.

What is your biggest strength as a researcher?

I have a huge appetite for being a strong theoretician, as well as well-grounded methodological expertise. I am a bit agnostic about solving trivial practical/fewer complex problems, rather I focus on maintaining perhaps a singular theoretical and methodological focus that can be used to offer solutions to scientific inquiries in many domains and also for translating the scientific discoveries to societal outcomes.

How do you balance research and teaching? Do they benefit each other? In what way?

This is very important for me personally as an educator. I am sure many of my fellow academics also share a similar view that engaging students in theoretical discussions and its application to practice and creating experiential learning opportunities through problem-based learning in a lab setting is critical to lifelong education. Also, incorporating experiential learning through empirical, case-based discussions about real-world challenges and inviting students to conduct organizational and community-based case studies as a pilot project to demonstrate their theoretical and methodological understanding gained from the course in a real-world setting.

How do you involve students in your research?

I like to engage and cultivate students, as well as junior and mid-career faculty members, through informal research group meetings that offer an avenue for theoretical and methodological discussions of seminal work and its application to solving problems in a different domain, as well as seminar series like brown bag discussions. I also invite honors students and junior faculty members to work on projects, papers and grants.

> "I have a huge appetite for being a strong theoretician, as well as well-grounded methodological expertise."

Describe a perfect day in the classroom/lab/field researching.

Having fun with students, discussing classical theoretical and methodological work, relating that to the current environment and engaging students in debate/dialogue.

What role did education/mentors/teachers in your youth play in leading you down this career path?

Huge! Early career mentorship is critical to develop a solid theoretical and methodological focus, plus being able to work with a number of world leaders from diverse fields helped shape my research trajectory.

Who has helped you the most in your career? What's the best advice they gave you?

Professor Rolf T. Wigand is a world-recognized leader in the information and communications science field. He was also trained by professor Everett M. Rogers, who originated the diffusion of innovations theory.

He suggested to aim high and focus on looking at the practical problems with a solid theoretical lens and rigorous methodological approaches. He made me realize that Einstein's notion of nothing is as practical as theory as theories are developed/proposed/refuted through years of collection and analysis of empirical data.

Tell us about a time in your life when you worked the hardest.

Even as a junior faculty, it was expected that we would work 80 hours a week. I am not joking. Senior faculty used to tell us that if you want to build your work, you will need to work 70-80 hours a week for the first 10 years of your career.

What stands out about UNK's research programs?

Research support and encouragement for undergraduate research.

HOSSAIN LIAQUAT

Title: Ron and Carol Cope Professor and Department Chair, Cyber Systems

College: Business and Technology

Education: Ph.D., Information Technology and Computer Science, The University of Wollongong Australia, 1998

Years at UNK: 2

Areas of research/specialization: Disasters, Disaster Medicine, Social Medicine, Biosecurity, Resilient Systems

Research in My Words: I draw theoretical and methodological foundations from information and computational sciences, mathematical organizational theory and sociology, non-linear dynamical systems theory, mathematical psychology and sociology, theoretical physics and statistical mechanics for exploring resilience across systems in dealing with adverse events such as tsunami, flood, fire, disease outbreaks (both foodborne and zoonotic) and bio-security threats.

Currently, I am leading a number of National Institutes of Health and National Science Foundation proposals related to COVID-19:

- COVID-19 Resilience Networks for Pandemic Preparedness & Response Coordination
- Social Resilience Networks for Emotional Contagion during Coronavirus Disease 2019 (COVID-19) Pandemic
- Digital Mental Health Interventions for Adolescent & Youth during COVID-19 Pandemic
- Harnessing Social Networks for Improving Diabetes and Prediabetes Care

FISH FINDER

Wuellner's research improves angling opportunities

By TYLER ELLYSON

When Melissa Wuellner takes her daughter Lily fishing, they aren't too concerned about the size of their catch.

Small bluegill, crappie and bass are enough to excite the 8-year-old.

"More than anything, what she really likes is seeing the fish nibble on her worm," Wuellner says with a smile.

For Wuellner, an associate biology professor at the University of Nebraska at Kearney, these trips aren't about landing a trophy fish to display on the wall. She's happy making memories with her daughter while passing along her passion for the outdoors.

"I'm hoping that we can kind of grow together in fishing and we can try new things together," Wuellner said. "It's definitely brought more meaning to my career to share that with her."

As a fisheries biologist – or "fish doctor" if you ask Lily – Wuellner works with the Nebraska Game and Parks Commission and South Dakota Department of Game, Fish and Parks to ensure these experiences are available for anglers of all ages. She provides the information these agencies need to effectively manage public waters and fisheries in the two states.

"They're managing these fisheries based on science, and there's a lot more science to it than people realize," said Wuellner, an Illinois native who holds a doctorate in wildlife and fisheries science from South Dakota State University, where she taught for seven years before joining the UNK faculty in fall 2017.

> "It's a lot of fun thinking about how we all work together to create this experience for people."

There's also a lot of pressure to get things right, because a nibble here and there won't satisfy everyone.

"When catch rates go down and the number of fish being caught goes down, it can really impact angler satisfaction," Wuellner said. "Maybe they don't come back to that particular location the next year. Maybe they don't buy a fishing license the next year."

BIG MAC

At 30,000 surface acres, Lake McConaughy near Ogallala is Nebraska's largest reservoir and its most popular fishing destination, luring anglers from states across the region.

Walleye and white bass, two sought-after species, are stocked annually by the Game and Parks Commission, which turns to Wuellner for assistance.

"That's a huge investment the state makes, and they want to know that what they're doing has a good return," she said. "Ultimately, that return on investment is getting fish to the harvestable size anglers want to catch."

A major obstacle when stocking young fish is predation. "We don't want them to be eaten right away," Wuellner notes.

So, it's critical to find stocking locations where a food source is easily accessible, and predators are in short supply.

By studying characteristics such as bank slope, water clarity and zooplankton concentration, Wuellner and her students can identify the areas where fish should or shouldn't be stocked. They also look at the stomach content of predator fish to determine which species are eating the walleye and white bass within the first 20 hours.

"Even something as simple as wind can make it difficult to stock a specific location on any given day," Wuellner explained.

Wuellner is using the data they collect to create "heat maps" that will help the Game and Parks Commission decide where to stock fish.

Another Lake McConaughy project takes a closer look at the natural reproduction of white bass to determine where these fish are spawning.

Similar to aging a tree, these fish have pairs of inner ear bones that grow rings over time, creating a record of the fish's entire life. Using a technique called otolith microchemistry, researchers can track where a fish has been by comparing the concentrations of various elements and isotopes in these bones to those in the water.

The challenge, though, is that the water chemistry changes frequently.

"We're trying to find the needle in the haystack," said Wuellner, who is working on the project with graduate student Thyme Cooke of Cheyenne, Wyoming. "Every year is telling us a slightly different story, and we're hoping to build this larger library of different chemistry signatures."

If they can identify the bass' spawning ground – whether it's somewhere in the reservoir or in the North Platte River above Kingsley Dam – the Game and Parks Commission can focus on removing any barriers to this location or creating new spawning sites through habitat restoration.

"If we have high enough natural production, we may not always need the hatcheries to provide additional fish. The hatcheries can then work to meet other stocking demands across the state," Wuellner said.

> "They're managing these fisheries based on science, and there's a lot more science to it than people realize."

ARTIFICIAL HABITAT

Wuellner and her students cast a net that extends far beyond Lake McConaughy.

Their artificial habitat research has the potential to impact reservoirs across the country.

When a reservoir is created, the flooded trees and vegetation provide plenty of habitat for aquatic life. However, this habitat breaks down over time, leaving less cover around the lake margins.

"There's been a huge focus on habitat in reservoirs for some time," said Wuellner, noting the increased interest in man-made structures, which last much longer than Christmas tree piles or sunken timber.

The UNK researchers – including graduate students Logan Dietrich of Alliance and William Schriener of Wright City, Missouri – are concentrating on the Georgia cube, a design originally developed by the Georgia Department of Natural Resources that has since been utilized in several other states. The 3-foot structure is constructed with PVC pipe and about 50 feet of corrugated drain pipe that's wrapped around and through the frame. It's anchored to the lakebed using either gravel or cinder blocks, providing a spot for fish to feed and find cover.

"When we put these structures in, we don't know how many we need and we don't know exactly what benefits they're providing fish," Wuellner said. "Is it simply a nice way to congregate fish so anglers can fish right at these locations or do the benefits extend beyond these structures?"

To answer those questions, Georgia cubes were installed last fall at Cheyenne State Recreation Area and Wood River West State Wildlife Management Area. This summer, Dietrich will begin analyzing the structures to see how they stack up against natural habitat.

He's using a different configuration of the Georgia cube to measure the benefits for young bluegill at Fort Kearny, Sandy Channel and Windmill state recreation areas.

Schriener is studying the addition of Georgia cubes and sunken cedar trees at Harlan County Reservoir, Lake Minatare, Red Willow State Recreation Area and East Twin Lake to determine which fish species use the different types of habitat.

"That will help inform the state when they're doing any future reservoir habitat projects. You might put in different structures depending on what species you're hoping to benefit," said Wuellner. She believes this research can influence habitat management decisions throughout the U.S.

"Hopefully our work extends beyond Nebraska," she said.

Wuellner also has students studying cove characteristics at Harlan County Reservoir, as well as muskie movement and habitat use and the survival of stocked Chinook salmon in South Dakota.

STUDENT WORK MATTERS

As a researcher, educator and mentor, Wuellner encourages her students to take the lead on projects.

She wants them to pursue their own passions while preparing for future careers in the field.

"That's how it should be, because once they graduate, they're going to be the leaders. And hopefully they'll have long careers where they'll make an impact," said Wuellner, who enjoys watching her students' growth and development as a research project progresses.

"They can see that their work matters, and that's what I really like," she said.

In addition to fisheries management, Wuellner's research focuses on natural resource conservation and land-use practices. She's a fellow in the Center for Great Plains Studies and a member of the International Association for Society and Natural Resources, Great Plains Natural Science Society and American Fisheries Society, which has recognized her with numerous awards and honors.

Above all else, she's a mother who cherishes those moments at the lake with her family.

"It's a lot of fun thinking about how we all work together to create this experience for people. And it's an experience people are looking at more and more right now," Wuellner said. "We need a reason to get out and enjoy the outdoors and reengage with nature, because we're all tired of Zoom at this point."

> "If we have high enough natural production, we may not always need the hatcheries to provide additional fish."

WUELLNER

MELISSA

Title: Associate Professor, Biology

College: Arts and Sciences

Education: Ph.D., wildlife and fisheries science, South Dakota State University, 2009; Master of Science, fish and wildlife management, Montana State University, 2007; Bachelor of Science, biology, Ball State University, 2002.

Years at UNK: 3

Areas of research/specialization: Fisheries ecology and management. Scholarship of teaching and learning. Systems thinking and systems dynamics.

Research in My Words: Most of the work that I do with my students involves working with state agencies such as the Nebraska Game and Parks Commission and South Dakota Department of Game, Fish and Parks to provide information they need in order to provide fishing experiences for the public. However, I am also interested in other fish and natural resource conservation issues as well, especially those that are complex in nature. This is where my collaborations in systems thinking and systems dynamics come into play.

POWER OF PLACE

Nebraska settings integral part of Hollander's storytelling

By KIM HACHIYA

When she moved to Kearney, Nebraska, seven years ago, Jessica Hollander faced her anxieties about her new community, new life and new realities by observing and writing.

She had just won the prestigious Katherine Anne Porter Prize for excellence in short story writing for her collection "In These Times Home Is A Tired Place." Now a second collection of short stories, "Mythical Places," builds on the foundations laid by earlier work, and Hollander is a rising star in the short story writers' galaxy.

Now an associate professor of English at the University of Nebraska at Kearney, she teaches creative writing and pursues her own work as a writer. In 2020, The Sonder Press published her collection "Mythical Places," a 46-page chapbook collection of six stories and essays. They are an exquisite, hyper-real look at life. And while most of the pieces are fiction, they do draw from what she's observed and felt during her time in Kearney, and they explore the feelings of building an identity in a new setting.

Hollander is an "outsider" in Kearney; it's a feeling she's had since leaving her hometown of Ann Arbor, Michigan, after earning her undergraduate degree from the University of Michigan in 2004. She moved to another college town,

Chapel Hill, North Carolina, where she worked in a bank, and then to a third college town, Tuscaloosa, Alabama, where she earned her Master of Fine Arts in creative writing from the University of Alabama, teaching in its English Department.

Each community provided the observant Hollander with details, moods and themes that enrich the settings for her stories.

"Living in Alabama got me interested in drawing inspiration from the landscape, which was so different from Michigan," she said. "Masses of kudzu vines grew over everything, summers were so hot you couldn't leave the house until dusk, and there were these giant ant mounds everywhere. And if you wandered into one, the ants swarmed up your legs in seconds.

"And the humidity. We didn't realize it, but the crawl space under our house was expanding from the humidity, and then one day there was a large crack and two of the floorboards in our bedroom had raised up like a ramp."

While in Tuscaloosa, a tornado ripped through the city. It did not affect her family, but it affected friends. And the historical, racial and socioeconomic tensions of Alabama were foreign to her Midwest upbringing. The house, the weather, the history, even the tornado, led her to explore the genre of Southern Gothic, and she wrote many stories while living there that drew from the contrasts of that landscape, its oppressions and luscious abundance.

> "A writer has to pay attention to place. Setting is often overlooked by beginning writers."

"A writer has to pay attention to place," she said. "Setting is often overlooked by beginning writers. They view it as filler or background. But setting is tonal. It's a perception and worldview. It's landscape. It creates, as John Gardner famously says all stories should do, a vivid-continuous dream so that the reader forgets a world exists outside the story."

STORIES SET IN KEARNEY

Kearney was a welcome change to the humidity and tensions of Alabama. "I am still an outsider. It's not the place I grew up. But I always want to write about where I am living."

And now that she's in Kearney, the idea of Nebraska has taken hold.

Though Hollander now sets her stories in Nebraska, she has continued to take risks and experiment with her stories. The opening piece of "Mythical Places," titled "Nebraska," is an example. The main subject is unnamed, but identified as "The Young Mother," who with her spouse and toddler son has moved to Kearney for her husband's job. She struggles to find her identity, takes up running and eventually seems to find her bearings. The Kearney Archway plays a role – its winged silver steel horses seem to be attempting to flee, as is perhaps the young mother.

"Here is the middle of the country, where all things crossing must pass. Now driving beneath an archway anchored with winged horses signals home. The young mother has read about this Great Platte Archway: three hundred feet straddling the interstate, its redorangeyellow resembling a Nebraska sunset. Inside, Westward Expansion is presented in an extravagant multimedia display, already once bankrupt and revived. She is not prepared for the silver horses, one at each end of the arch, posed midleap. The metal wings are three times the horses' size and not attached to their backs but buttressed above and away from them, an artist's vision of dimensionality. The feathers spread and flutter out like blades. Maybe they aren't wings but something pursuing the horses, clawing at their backs. The horses are escaping. They leap from either end of the Archway, fleeing history."

– Excerpt from "Mythical Places" titled "Nebraska"

"Mythical Places" links themes and locations. Another story, also set in Kearney, explores the idea of others who lived in a home before us. One story examines the anxieties, dreams, hopes and dreads of pregnancy; another the dreams of her brother and his girlfriend who are heading to their idea of nirvana, Seattle. They have no jobs lined up but know they will find happiness in the land of coffee shops and grunge music. A final story muses on Disney World and its role as a place of fun, culture and world travel – the "ideal" location that's met with scorn but still so beloved.

The stories examine roles women take on, such as pregnancy or motherhood, and the characters' reactions as they bump up to the culture's idealized or romanticized versions of those roles, even as those roles don't play out exactly as envisioned.

For example, in "Third Pregnancy" the woman runs well into her ninth month. Her swollen body and legs hurt, but yet she runs. Is it to prove some point that she's got stamina, that she's a martyr, that women are warriors, that the tut-tutting of neighbors doesn't bother her? "Part of the pleasure," she writes, "is looking forward to the ending." The ending seems to encompass many things: the pregnancy, the run, this phase of her life.

Short stories are special, Hollander said, because they are like small pieces of art that can be perceived all at once. "Mythical Places" can be read entirely in one sitting. But each story can be savored, like a small, perfectly ripe summer peach enjoyed all by itself or mixed into a larger, artful pie. The stories showcase Hollander's deft and spare use of words to precisely describe a mood or place. Reviewers of both her collections comment on her abilities to evoke emotion in so few words.

MAKING CONNECTIONS

A professional writer for 20 years, Hollander has settled into some routines now that her teaching and family life have less chaos. She does most of her writing during the summer, when she has larger blocks of time to think and reflect about that work rather than devoting creative energy to her students.

"I find myself needing periods of gathering. Like a squirrel, I gather. I see what's happening around me, I live my life, I read, I pay attention to things and think about things I'm interested in. And then when it's time, I have these 'stories' I've accumulated," she said. "Sometimes there's something that I've observed or experienced or read that I know ahead of time I want to write about. But often this is not how it works.

"I usually sit down with a small image, dialogue exchange or a character's voice in mind, and as I write, some of the observations, ideas and lived experiences that I've gathered over months of not writing come out in my writing in unexpected and useful ways. I like to think that my subconscious has been working the whole time I wasn't writing, piling things in corners, making connections for me."

She says she has learned to "trust the subconscious" and "surrender control" as her mental filing cabinet of gathered ideas coalesces into a piece. "Usually, my stories start from small places, a launch point or trigger, some phrase or image or voice that my mind has been circling for a while without me consciously realizing it."

Hollander enjoys experimenting in her fiction, such as creating a piece with an unnamed character, incorporating fairytales or other mythologies, or organizing fragments of prose into a mosaic.

"I like thinking of stories as puzzles I need to solve, and I just start doing weird things and putting weird things together and then see how I can make those things work together in meaningful ways. I say they are 'weird things,' but really they are already connected because they're coming out of my mind next to each other; I just don't know right away why my mind is deciding to put these things together yet. I think writing is always a process of self-discovery in this way."

NEIGHBORHOOD INSPIRATION

Hollander's most recent works are coming from what she called a "neighborhood watch collection."

"I've been working on a lot of what I see as neighborhood stories inspired by Kearney: people I see when I'm out walking, neighbors I've interacted with, the fields, the train tracks, the university, the parks, the splashpads, different locations around town," she said.

"I want to explore my own sense of unease in living here, in this place that feels safe and sheltered from many of the troubling aspects of dense urban living and heightened conflicts in certain regions. But there's this tension I feel living in Nebraska where I can't settle down. Sometimes it's almost like I make up things to worry about. I want to think about the unseen dangers lurking at the edges of our lives, the edges of our landscape, the edges of our community, the edges of our minds."

Hollander has written a lot during the COVID-19 pandemic. She had hopes that 2020 would be the year she and her family would travel more, explore the wider Nebraska landscape, see what's happening out here in the corn. But with those avenues shut down, she recently purchased several books by Nebraskan authors Willa Cather, Tillie Olson, Wright Morris and more contemporary authors such as Kwame Dawes, Ted Kooser, Bryan Jones, Carson Vaughan and Ladette Randolph; and other works that explain the geography and history of the state. And the pandemic itself has given her a new perspective on her life in Nebraska.

"I've already written a piece set in Kearney about the pandemic and its isolating effects," she said. "It's interesting how while I've been even more isolated from my extended family and my hometown in Michigan, I've also kind of embraced my community in Kearney more than I ever have before, when it was easy to travel and be away from here."

She says her fondness for this place has grown. That her feelings are more complicated.

"There is so much rich material to mine from my immediate community. I can't wait to explore the state more, but I feel like I have plenty here in Kearney to keep me busy for a while."

HOLLANDER

JESSICA

Title: Associate Professor, English

College: Arts and Sciences

Education: Master of Fine Arts in creative writing, University of Alabama, 2011; Bachelor of Arts in English literature, University of Michigan, 2004.

Years at UNK: 6

Areas of research/specialization: Fiction writing, creative writing

Research in My Words: While I have spent most of my life living in places other than Nebraska, I am striving to become a Nebraskan writer. My recently published chapbook "Mythical Places" contains all stories set in Kearney, and I am currently working on a longer linked short story collection with all stories set in Nebraska. However, most of my stories up until now are about Nebraska outsiders: recent transplants who are trying to figure out the particularities of the people and the landscape. My goal for future research is to stretch beyond Kearney and beyond the perspective of an outsider and be able to write as an "insider" as well, to demonstrate an increased knowledge about our state, its diverse cultures and landscapes, and its rich literary history.

"THE MOST ENJOYABLE PART OF RESEARCH IS THE INTERPRETATION OF THE RESULTS AND INTERACTION WITH PEERS"

By TYLER ELLYSON

For Ladan Ghazi Saidi, working at the University of Nebraska at Kearney is a dream come true.

Both of her parents were university professors in Tehran, and she spent a lot of time hanging out on campus as a child.

"That interaction with their colleagues, students and other staff really shaped my personality and goals in life," said Ghazi Saidi, who knew at a young age that she wanted to follow in her parents' footsteps.

She got that opportunity in August 2017, when Ghazi Saidi joined UNK as an assistant professor in the department of communication disorders.

As a researcher, Ghazi Saidi specializes in cognitive science, neuropsychology, neuroscience, neuroimaging, aging, language processing and bilingualism. Her father Kiumars was a well-known researcher who studied tuberculosis and leprosy, two deadly bacterial diseases.

"I was inspired by his work and how research is important in the advancement of science," Ghazi Saidi said.

Now, she's the one making a name for herself in academia.

Her research team is investigating the benefits of bilingualism and its effects on healthy aging. Specifically, they're looking at whether learning a new language at an older age can help maintain cognitive health and delay the onset of dementia.

"The most important lifetime advantage of speaking a second language is perhaps postponing the signs of dementia related to Alzheimer's and Parkinson's disease," Ghazi Saidi said.

"… Have an open mind, be flexible, be perseverant, work hard and for long hours and be rigorous and meticulous in the work you do."

Why were you attracted to this research?

As a part-time job during my undergraduate studies, I worked as an English as a second language instructor. In my senior undergraduate year, during a session in my neuroscience course, my professor talked about how the brain functions when you speak a second language. I was just fascinated by what I heard. That talk inspired me to learn more about the subject and pursue my graduate studies in the field.

What are your biggest discoveries?

I am not sure if I can call them discoveries, but let's say significant findings. My work showed for the first time that there is a dynamic interaction between the language network and the control network.

Also, I brought evidence that the insula is an important part of processing accent. Also, for the first time our team brought neuroimaging evidence that the brain of long-term bilinguals functions more efficiently than monolinguals in some cognitive tasks. Some examples are tasks such as those that require conflict management, inhibition of the inappropriate options and selection of the appropriate ones, and task switching.

How do you measure success as a researcher? What motivates you?

I have two measures. One is how close have I gotten to answering my research question. In research, sometimes we get to the answer pretty quickly – we conduct an experiment or survey, or measure a few outcomes, and within a few months we find the answer. An example is a summer project where we needed to know what percentage of older adults in Nebraska had access to the internet. It took a quick survey and less than two months to find almost 50% had access, which was more than we initially thought. But sometimes it takes years to answer important fundamental questions such as, "What factors contribute to healthy aging?" and over time you realize the question is more complicated than you had initially assumed it to be, and you come up with more questions than answers.

The second way to measure success is if I have been able to achieve some conventional measurable outcomes: number of publications, conference presentation of results, number of grants submitted and number of grants funded, peer recognition of research and so forth.

What are the qualities of a good faculty researcher?

I think the qualities that are necessary to be a good researcher, apart from being knowledgeable on the area of expertise, are to have an open mind, be flexible, be perseverant, work hard and for long hours and be rigorous and meticulous in the work you do. Two things I really value in a good researcher are a passion to learn and motivation to pursue the answer. We also need reliable and caring mentors – mentors who have paved the path and have a much deeper understanding of everything. Mentors can inspire you, help you grow as a person and improve your work through a mix of constructive criticism and encouragement.

What is your biggest strength as a researcher?

I think it's perseverance. I don't get discouraged by failure. I try to learn from my mistakes and find an alternative way to do things when plan A doesn't work.

What's the most enjoyable part of research? And the least enjoyable/most challenging part?

For me, the most enjoyable part of research is the interpretation of the results and interaction with peers. The least enjoyable is filling out the IRB forms. The most challenging part is to secure funding for the research.

"The most important lifetime advantage of speaking a second language is perhaps postponing the signs of dementia related to Alzheimer's and Parkinson's disease."

How do you involve students in your research? Why is that important?

Students are an important part in progressing my research projects. I would not be able to do what I do without the help of student research fellows and student research assistants. Also, it is super important to train the next generation of researchers. In my field, there is a shortage of researchers.

How do you balance research and teaching? Do they benefit each other? In what way?

Well, with seven to eight courses a year, I have to be very diligent about my time management, even if research work creeps into my personal time. Teaching and research do benefit each other in my field. Also, training different students for research supports my own research work. I am lucky to teach in the area of my expertise, so my research and my teaching are as complementary as I can make them.

Describe a perfect day in the classroom/lab/field researching.

To be honest, I don't think I've ever had a perfect day. And that's OK. Life is full of imperfections, and that's what makes us motivated to make an effort to grow.

What stands out about UNK's research programs?

Faculty support. The awesome support from the Office of Research Development. They are beyond helpful and supportive. Also, the Undergraduate Research Fellows program is wonderful, and the office does an awesome job. My department chair is fabulous. She could not be more helpful and more supportive of her faculty. I consider myself very lucky to work at UNK.

GHAZI SAIDI

LADAN

Title: Assistant Professor, Communication Disorders

College: Education

Education: Ph.D., Biomedical Sciences: Neuropsychology, University of Montreal, 2012; Applied master's, speech pathology and language disorders, McGill University, 2014; Master's in translation studies, Azad University, Iran, 2004; Bachelor's in biology, University of Tehran, Iran, 1998.

Years at UNK: 3

Areas of research/specialization: Cognitive science, neuropsychology, neuroscience, neuroimaging, aging (intervention and prevention), language processing, bilingualism

Research in My Words: Learning a new language can have many benefits, including boosting some cognitive abilities. The most important lifetime advantage of speaking a second language is perhaps postponing signs of dementia related to Alzheimer's disease and Parkinson's disease. My research team is investigating if learning a new language at older ages can help maintain cognitive health, prevent from cognitive decline or even help with intervention at early stages of dementia.

JOURNEY TO FREEDOM

Graduate thesis addresses slavery in Nebraska Territory

By TYLER ELLYSON

Most Nebraskans have never heard of Celia and Eliza Grayson.

Unlike the man who owned them, Stephen F. Nuckolls, their names largely faded into history.

"A lot of people don't realize there were enslaved people in Nebraska," said Gail Shaffer Blankenau, a professional genealogist and researcher from Lincoln.

She's hoping to change that.

In her master's thesis – "Journey to Freedom from Nebraska Territory" – Blankenau shines a light on this dark part of early Nebraska history by addressing slavery through the eyes of Celia and Eliza, two young Black women who became "unlikely leaders" in the abolitionist movement when they fled the Nuckolls household in 1858.

"These two women did more than escape their particular circumstances. Celia and Eliza's choice to pursue their freedom was a challenge not only to their 'master,' but also to the territorial system established by the 1854 Kansas-Nebraska Act under the theory of popular sovereignty," Blankenau writes.

> "Reconstructing a history of enslaved people from this time period was difficult. We don't have any records from their point of view."

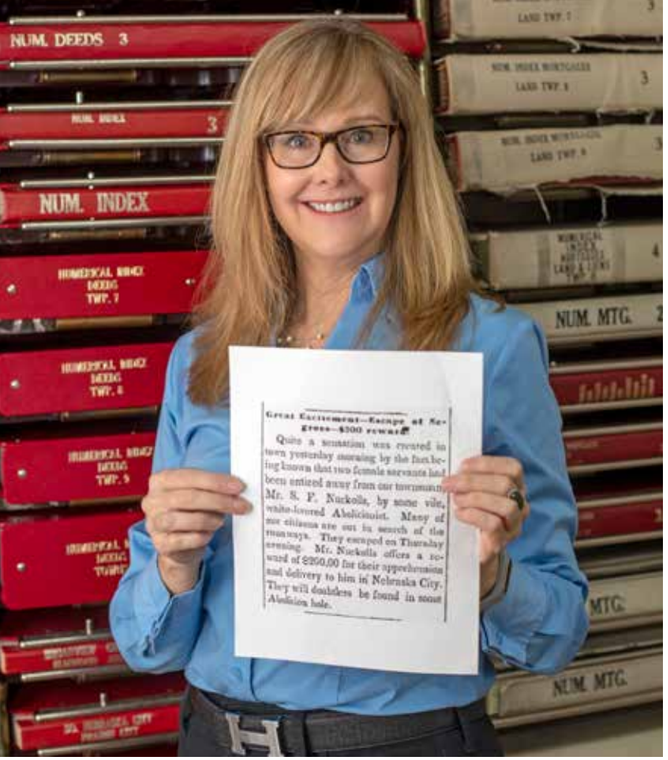
THE PROBLEM WITH POPULAR SOVEREIGNTY

Stephen Nuckolls is best known as the founder of Nebraska City, where Nuckolls Square Park still bears his name. He's also the namesake of Nuckolls County (located along the Kansas border about 140 miles to the west) and a former member of the Nebraska Territorial Legislature.

The native Virginian was one of the early settlers of Nebraska Territory, and one of its first slave owners. When he arrived in 1854, the nation's slavery debate was far from settled.

"If it hadn't been for the slavery question, I don't think it would have been that controversial to open up the Nebraska and Kansas territories," said Blankenau, who graduated in July 2020 with a Master of Arts in history from the University of Nebraska at Kearney's online program.

"The reason it was controversial was the prospect of expanding enslavement into western territories. As many people know, the 1850s, right before the Civil War, was a period of considerable upheaval over the question."



The Kansas-Nebraska Act, which created the two territories, used the popular sovereignty principle to address this issue, allowing the settlers of a territory to decide whether slavery would be allowed there. Drafted by U.S. Sen. Stephen A. Douglas of Illinois, this legislation overturned the Missouri Compromise's use of latitude as the boundary between slave and free territories.

Most people assumed that if slavery took hold, it would be in Kansas rather than Nebraska, but the act left the door open for slavery to enter both territories.

"One of the ambiguities of the popular sovereignty theory within the Kansas-Nebraska Act was the question, 'Are people free until the territory votes for enslavement or are they enslaved until the territory votes to prohibit it?' And that really wasn't clear," Blankenau said. "We'd talked about free states, but no court had ever said what happens in a territory where they hadn't voted one way or the other."

In Kansas Territory, conflicts between pro-slavery and anti-slavery settlers led to a period of violence known as "Bleeding Kansas" and helped pave the way for the Civil War.

Although violence never reached that level in Nebraska Territory, Blankenau argues that popular sovereignty didn't work particularly well there either. The Territorial Legislature made several unsuccessful attempts to prohibit slavery prior to 1861, but that legislation was either tabled by the Territorial Council or vetoed by the federally appointed governor.

"The question of whether slavery was legal or not during that early territorial period was never completely settled," Blankenau said.

SLAVERY IN NEBRASKA TERRITORY

Celia and Eliza Grayson were born in Grayson County, Virginia, where they either adopted or were given their last name. The children, who Blankenau believes were sisters, were enslaved by the Nuckolls family.

In 1846, when Celia was 11 and Eliza was 9, the Nuckolls family and their "property" relocated to Atchison County in northwest Missouri. Eight years later, Stephen Nuckolls brought four slaves with him, including Celia and Eliza, when he crossed the Missouri River to settle in the newly opened Nebraska Territory.

"They were on the ground as early as anybody, Black or white, in Nebraska territorial history," Blankenau said.

The former site of Fort Kearny, Nebraska City flourished as a transportation hub because of its location along the Missouri River and was a contender for the territorial capital.

It's also where most of the territory's enslaved people lived.

Censuses never showed more than 11 slaves in Nebraska Territory, according to Blankenau, but she believes the number was much higher.

"It was definitely an undercount," she said, noting that slaves at military forts often weren't counted. She also suspects many people living in or near Nebraska City kept slaves in Missouri to avoid controversy and property taxes.

"There was a lot more going on than I think prior historians have found in that southeast corner of Nebraska," Blankenau said.

Celia and Eliza were in Nebraska Territory for four years before they made their break for freedom.

A DARING ACT

It was a cold night in late November 1858 when the two women, ages 22 and 20, slipped away from the Nuckolls household.

John Williamson, a Black and Native American man from Iowa, guided them through the darkness to a Missouri River crossing about 6 miles north of Nebraska City. They boarded a skiff, crossed the icy waters and made their first stop on the Underground Railroad at Civil Bend, Iowa.

The following day's edition of the Nebraska City News declared that Nuckolls' "female servants" had been "enticed away" by "some vile, white-livered Abolitionist" and would "doubtless be found in some Abolition hole." He offered a $200 reward for their return.

"When they left, they challenged the entire system," said Blankenau, noting that the escape made national news because it highlighted the issues with popular sovereignty and the spread of slavery into western territories.

Nuckolls, however, wasn't going to let Celia and Eliza go without a fight. He brought a posse to Civil Bend to search for them.

"They tore that place apart looking for Celia and Eliza, but they never found them," Blankenau said. "Only later did some of the abolitionists who helped them talk about what happened."

It's unclear what became of Celia, but Eliza ended up working as a servant in a Chicago brothel. She was betrayed after sharing her story with a woman there and, in November 1860, Nuckolls went to Chicago to capture Eliza, who he valued at $1,200.


S.F. Nuckolls

The federal Fugitive Slave Act supported Nuckolls' effort, requiring law enforcement to assist him, but that's not what happened. Nuckolls and Eliza were both arrested for disorderly conduct, and Eliza was taken to an armory building. When sheriff's deputies attempted to transfer her to a nearby jail, a group of abolitionists whisked her away to safety.

Little is known about Celia and Eliza's lives after 1860 – Blankenau believes both women "almost certainly" fled to Canada – and there are no monuments recognizing their daring escape.

Nuckolls, meanwhile, filed lawsuits in Nebraska Territory and Chicago against the people who helped them find freedom.

"It was expected that both suits would make it to the Supreme Court to finally settle whether they were free or whether they were enslaved," Blankenau said.

That became a moot point in 1861, when the Nebraska Territorial Legislature voted to override the governor's veto and prohibit slavery. The Civil War, which ultimately decided the fate of slavery in America, also began that year.

Nuckolls, whose family back in Virginia fought for the Confederacy, went on to serve as a U.S. Congress delegate for Wyoming Territory and as a delegate to the Democratic National Conventions in 1872 and 1876.

PUTTING THE PIECES TOGETHER

Blankenau received UNK's Outstanding Thesis Award for her research project.

The recognition was an honor, but Celia and Eliza were her inspiration.

"I just became more and more amazed by these two women and their courage," she said. "This turned out to be an absolutely fascinating project and it continues to fascinate me. It touches on so many important issues from that time period that all kind of came to a head in Nebraska."

A charter member of the Great Plains chapter of the Association of Professional Genealogists and owner of Discover Family History, a genealogy and research business based in her Lincoln home, Blankenau leaned on her professional skills to tell the story.

"Reconstructing a history of enslaved people from this time period was difficult," she said. "We don't have any records from their point of view."

She found plenty of other primary sources, though.

Blankenau scoured the Nuckolls family papers at the History Nebraska archives in Lincoln, located online census data and land records, studied newspaper accounts, accessed records from county courthouses in Nebraska, Iowa and Missouri, contacted historical societies and drove to Des Moines to view the State Archives of Iowa. She also received family letters from a relative of Nuckolls' wife Lucinda.

Following a recommendation from her thesis committee, Blankenau plans to turn the 291-page document into a manuscript for publication. But first, she wants to do a little more digging.

Blankenau found a Civil War pension record for a man named Shack Grayson who served in the United States Colored Troops and fought for the Union Army. He is likely the same Shack Grayson who lived in the Nuckolls household in Nebraska City with Celia and Eliza.

She also believes Celia and Eliza had another sister, Edith, who was enslaved by the Nuckolls family in Missouri before moving to Nebraska City after the war.

"There's more to the story," Blankenau said, and she wants to finish telling it.

New Frontiers Through The Years

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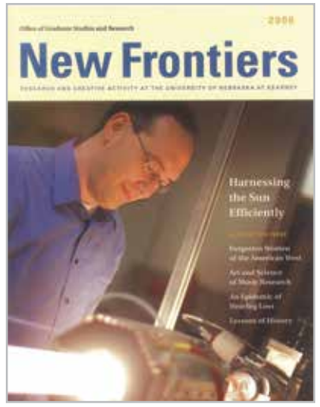

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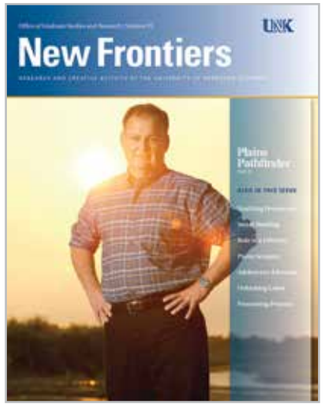

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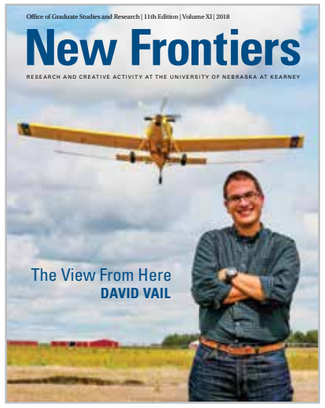

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