Charting New Courses in Health Science

Graduate Studies
Postdoctoral Education

ANNUAL REPORT 2023-24

UNMC

A Message
from the Dean

As we reflect on another remarkable academic year, it is my pleasure to share this annual report, featuring the many accomplishments made by our graduate students, postdoctoral scholars and faculty members.

This document serves as a testament to the collective achievements, growth and spirit that define our vibrant UNMC community and embody the true essence of our educational mission.

From groundbreaking research and transformative inventions to outstanding initiatives, our trainees and mentors continually made an impact inside and outside the classroom and laboratories.

They excelled in scholarly activities, with nearly 1,900 publications, book chapters or government reports and more than 1,650 conference presentations. Finally, our students, postdocs and faculty remain a driving force behind UNMC innovations by holding approximately 59 patents.

I extend my deepest gratitude to our entire Graduate Studies and Postdoctoral Education community for your tireless efforts and passion. Together, we continue to elevate health science education and soar
toward a future marked by innovation, academic distinction and societal impact.

Join us in celebrating the journey of some of our extraordinary faculty and trainees over the past year.

H. Dele Davies, MD, MS, MHCM
Senior Vice Chancellor for Academic Affairs
Dean of Graduate Studies

table of contents

Training the next generation of scientists

10 doctoral degree programs

12 master's degree programs

14 specializations in 2 interdisciplinary umbrella programs

4 certificate programs

our mission

GRADUATE STUDIES

Our mission is to be the best place in the nation for training graduate students through exceptional health science education and research programs, faculty mentoring and professional skills development.

POSTDOCTORAL EDUCATION

Our mission is to promote and facilitate outstanding training and education of postdoctoral scholars and their timely transition toward independent careers.

Support for Graduate Studies

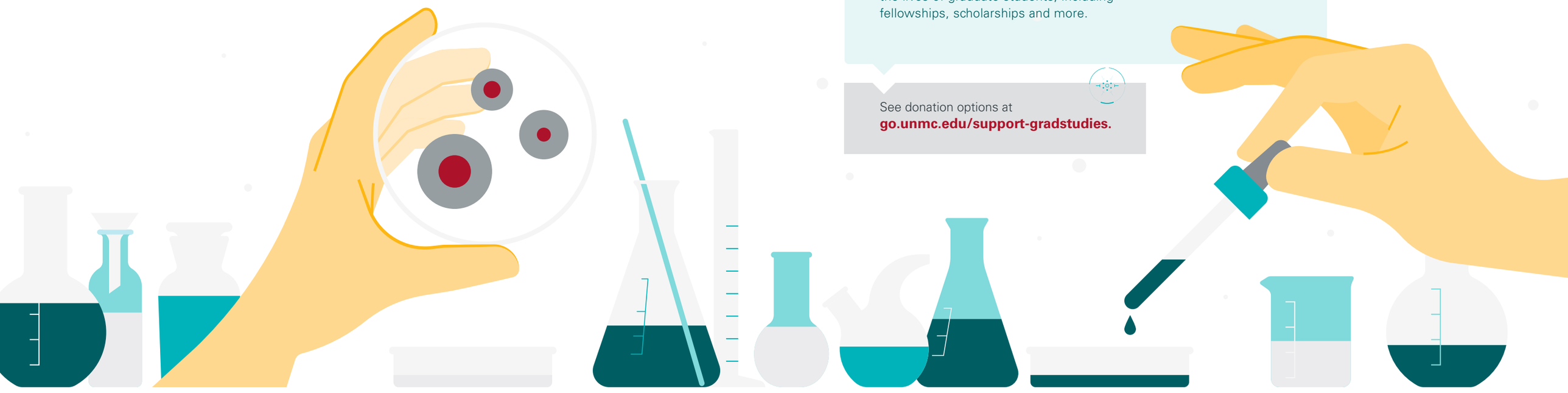
Be the catalyst to turn ideas into cures

Graduate students are the backbone of UNMC's research. Whether they are helping faculty design clinical trials for new medicines, exploring cures for cancer or developing new diagnostic tools to transform health care, the energy of our graduate students propels discoveries that will change and save lives.

The generosity of donors empowers Graduate Studies to compete for and support the best students, as well as allow them the opportunity to focus on conducting research that leads to life-changing breakthroughs.

The University of Nebraska Foundation offers many opportunities to make a difference in the lives of graduate students, including fellowships, scholarships and more.

See donation options at **go.unmc.edu/support-gradstudies.**



leadership

H. Dele Davies, MD, MS, MHCM
Senior Vice Chancellor for Academic Affairs
Dean of Graduate Studies

Kendra K. Schmid, PhD, MA
Executive Associate Dean

Iqbal Ahmad, PhD
Associate Dean of
Postdoctoral Education & Research

Karen A. Gould, PhD, MEd
Assistant Dean of
Graduate Student Success

Terri A. Vadovski
Director

GRADUATE COUNCIL MEMBERS & STAFF

The Graduate Council, in conjunction with the dean, is responsible for Graduate College activities at UNMC.

H. Dele Davies, MD
Dean

Kendra K. Schmid, PhD – CHAIR
Executive Associate Dean

Karen A. Gould, PhD
Assistant Dean

Iqbal Ahmad, PhD
Associate Dean

Sophia Kisling – STUDENT
Graduate Student Association

Mark D. Shriver, PhD
Applied Behavior Analysis (MS)

Moorthy Ponnusamy, PhD
Biochemistry & Molecular Biology (MS)

Jenenne A. Geske, PhD
Biomedical Informatics

Christopher S. Wichman, PhD
Biostatistics

JoEllyn M. McMillan, PhD
Environmental Health, Occupational Health & Toxicology

Edward S. Peters, ScD
Epidemiology

Tammy L. Webster, PhD
Health Professions Teaching & Technology;
Healthcare Delivery Science;
Applied Health Informatics (Certificate);
Quality Improvement (Certificate)

Tzeyu Michaud, PhD
Health Promotion & Disease Prevention Research

Hongmei Wang, PhD
Health Services Research, Administration & Policy

Matthew C. Zimmerman, PhD
Interdisciplinary Graduate Program in Biomedical Sciences (IGPBS);
IGPBS – Integrative Physiology & Molecular Medicine;
Medical Physiology (MS)

R. Katherine Hyde, PhD
IGPBS – Biochemistry & Molecular Biology

Jordan Rowley, PhD
IGPBS – Bioinformatics & Systems Biology

Joyce C. Solheim, PhD
IGPBS – Cancer Research

Rakesh K. Singh, PhD
IGPBS – Immunology, Pathology & Infectious Disease

Erika Boesen, PhD
IGPBS – Integrative Physiology & Molecular Medicine;
Medical Physiology

Andrew T. Dudley, PhD
IGPBS – Molecular Genetics & Cell Biology

Keshore R. Bidasee, PhD
IGPBS – Neuroscience

Justin L. Mott, MD, PhD
MD-PhD Scholars

Samantha M. Simet, PhD
Medical Anatomy

Gargi Ghosal, PhD
Molecular Genetics & Cell Biology

Laura D. Bilek, PhD
Medical Sciences Interdepartmental Area (MSIA)

Nicole M. Rodriguez, PhD
MSIA – Applied Behavior Analysis

Joshua L. Santarpia, PhD
MSIA – Biological Defense & Health Security

Jennifer Larsen, MD
MSIA – Clinical & Translational Research Mentored Scholars Program

Carol A. Casey, PhD
MSIA – Clinically Relevant Basic Research

Sharon J. Medcalf, PhD
MSIA – Health Practice & Medical Education Research

James K. Wahl, PhD
MSIA – Oral Biology

Ka-Chun (Joseph) Siu, PhD
MSIA – Patient-Oriented Research

Roxanne Vandermause, PhD
Nursing

Luis A. Marky, PhD
Pharmaceutical Sciences

STAFF

Terri A. Vadovski
Director

Emily E. Brandt, MA
Specialist

Trent Ballard
Specialist

POSTDOCTORAL EDUCATION ADVISORY COUNCIL & STAFF

The Postdoctoral Education Advisory Council examines issues related to postdoctoral education at UNMC and provides guidance in matters related to training and recruitment.

Iqbal Ahmad, PhD – CHAIR
Associate Dean

Kaustubh Datta, PhD
Biochemistry & Molecular Biology

Neha Dhyani, PhD – POSTDOC
Cellular & Integrative Physiology

Kusum Kharbanda, PhD
Gastroenterology & Hepatology

Keith Johnson, PhD
Oral Biology

Luis A. Marky, PhD
Pharmaceutical Sciences

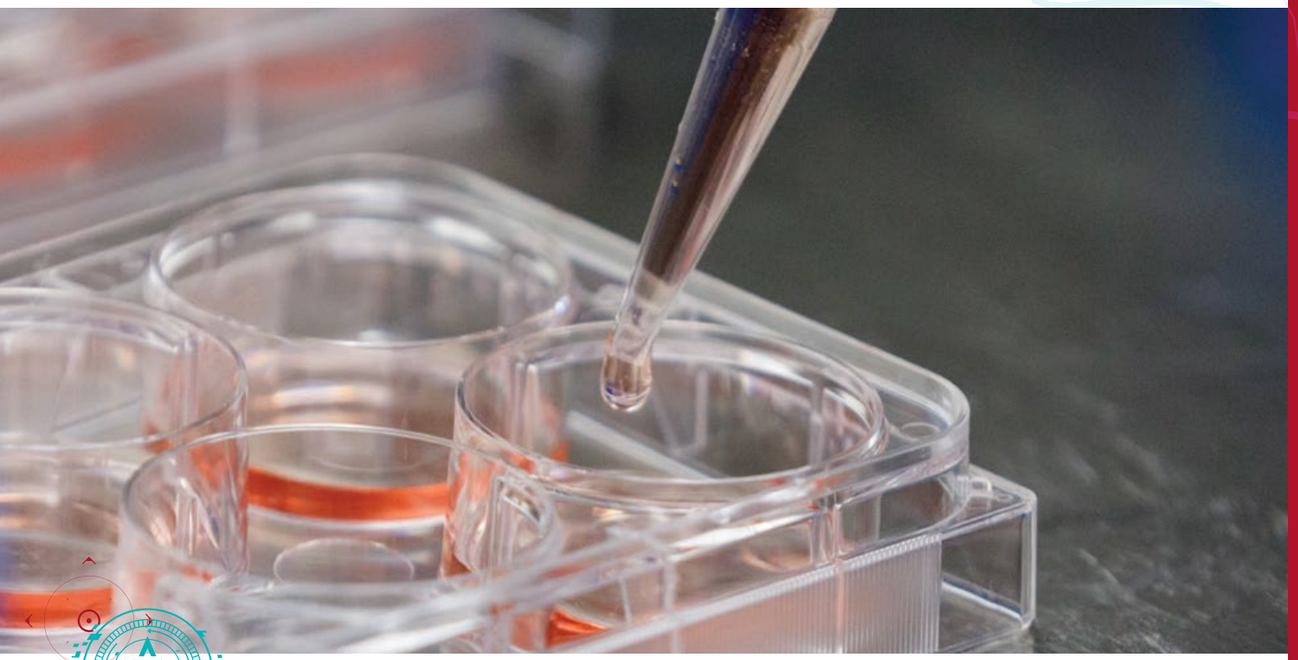
Kaushik P. Patel, PhD
Cellular & Integrative Physiology

Rakesh K. Singh, PhD
Pathology & Microbiology

Daniel Villageliu, PhD – POSTDOC
Pulmonary, Critical Care & Sleep Medicine

Huangui Xiong, MD, PhD
Pharmacology & Experimental Neuroscience

Mary Gomez – STAFF
Education Coordinator



students rising above the rest

771

students enrolled in fall 2024

This is an increase of 7% over 2023, making Graduate Studies the third largest student body at UNMC.

46

different countries represented

Students come from all over the world, with 37% of students being international; 46% of domestic students are from Nebraska.

144

students graduated

82 students earned a doctorate and 62 earned a master's degree

STUDENT *Accomplishments* AT A GLANCE

SUCCESS THROUGHOUT THE YEAR

$1,430,000 in intramural fellowship funding, including supplements

$1,849,459 in external fellowship funding

$84,025 in travel awards

443 peer-reviewed publications, book chapters or government reports
33% of publications listed students as first author

1,413 hours of service-learning activities

659 conference presentations
32% increase over last year

157 national, regional and local honors
15% increase over last year

9 patents applied for or approved

Honors & Recognition

NEW GRADUATE STUDENTS **OF DISTINCTION**

Total # of Students who have been recognized as New Graduates of Distinction since 2013:
96

Students who received national or international recognition

Morgan T. Busboom

MSIA – Patient Oriented Research

Honor: NIH Ruth L. Kirschstein National Research Service Award Individual Predoctoral Fellowship (2023-2025)

Amanda Macke

IGPBS – Biochemistry & Molecular Biology

Honor: NIH Ruth L. Kirschstein National Research Service Award Individual Predoctoral Fellowship (2023-2024)

Abi Heller-Wight

MSIA – Patient Oriented Research

Honor: NIH Ruth L. Kirschstein National Research Service Award Individual Predoctoral Fellowship (2024-2028)

Delia Omar

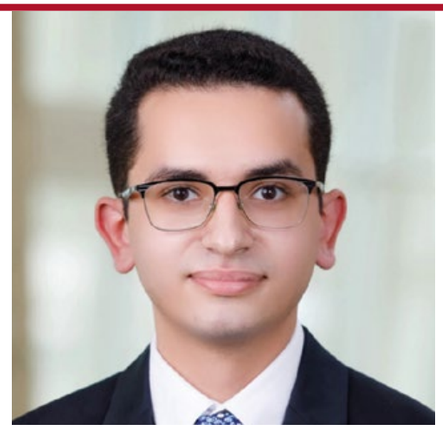
IGPBS – Integrative Physiology & Molecular Medicine

Honor: American Heart Association Predoctoral Fellowship (2024-2025)

Louise Dow

Pharmaceutical Sciences

Honor: American Chemical Society, Medicinal Chemistry Division predoctoral fellowship (2024-2025)



Flobater Gawargi

IGPBS – Integrative Physiology & Molecular Medicine

Honor: American Heart Association Predoctoral Fellowship (2024-2025)

Aaron Schwab

MSIA - Clinically Reevent Basic Research

Honor: NIH Ruth L. Kirschstein National Research Service Award Individual Predoctoral Fellowship (2023-2028)

Gabrielle Watson

IGPBS – Immunology, Pathology, and Infectious Disease

Honor: American Heart Association Predoctoral Fellowship (2024-2025)

Linda Huynh, PhD

MSIA-Patient Oriented Research

Praesto Award

Given to the most outstanding or exceptional graduate for the academic year

Yunfan Kong, PhD

MSIA-Regenerative Medicine and Biomaterials Design

Thomas Jefferson Ingenuity Award

Given for unmatched creativity and ingenuity in doctoral research

Corrine Monaco, PhD

MSIA-Integrative Physiology and Molecular Medicine

Thomas H. Rosenquist Graduate Student Award

Recognizes a student who has inspired others through teaching and mentoring activities in the classroom, laboratory or community environment

HONORS FROM THE *UNMC Alumni Association*

DISTINGUISHED ALUMNUS

Kathy Kay Hartford Svoboda MS, PhD, Regents Professor, F(AAA), F(ARVO), F(AAS)

MS: 1979; PhD: 1982

Regents Professor, Baylor College of Dentistry

MID-CAREER ACHIEVEMENT

Elizabeth Beam, PhD, RN

PhD: 2014

Associate Professor, College of Nursing

Education Researcher, UNMC Interprofessional Academy of Educators

EARLY CAREER ACHIEVEMENT

Chun-Kai Huang, PhD, MS, PT

PhD: 2015

Assistant Professor & Graduate Faculty, Department of Physical Therapy, University of Kansas Medical Center

Adjunct Assistant Professor, School of Physical Therapy, Chang Gung University, Taoyuan City, Taiwan

DR. LINDA HUYNH
A DECADE OF DEDICATION
to Prostate Cancer Research

Turning Passion into Progress

Linda Huynh, PhD, embodies persistence, consistently demonstrating the drive to overcome challenges and achieve her goals. A California native, Dr. Huynh completed her undergraduate degree at the University of California Irvine. To fund her education and graduate in just three years, she took on multiple jobs, including working in an emergency room. This period ignited her passion for research science and she went on to work as a clinical trials manager and earn a master's in biomedical translational science. Driven by her dedication to medicine, Dr. Huynh selected UNMC for her MD-PhD program, recognizing it as the "perfect place" due to its supportive community.

Dr. Huynh's entry into prostate cancer research in 2015 was, in her words, "pure serendipity." She noted, "Never would I have imagined that my cold email to a professor would end up launching a ten-year experience in prostate cancer research."

Dr. Huynh's PhD dissertation project stands as one of her proudest moments at UNMC. This project integrated her undergraduate and master's research with new work from UNMC's College of Medicine and the MSIA PhD program. It was made possible through collaboration with colleagues from her previous institution in California, resulting in the largest series of its kind, involving three institutions and five different urologic surgeons. Dr. Huynh's doctoral work focused on developing and testing a new method to predict prostate cancer recurrence using radiomics. Her research involved analyzing patterns from MRI scans, identifying 18 features linked to the likelihood of cancer recurrence. Notably, Dr. Huynh's findings indicated the new radiomic model outperformed other risk assessment tools in predicting cancer recurrence.

In recognition of her accomplishments, Dr. Huynh was awarded the Praesto Award. The highest honor endowed by Graduate Studies upon a graduating student, the Praesto Award is presented to the most outstanding graduate in recognition of exceptional accomplishments spanning multiple areas – academics, research, leadership, service and outreach. She described receiving the award as "a surprise, a blessing and a confirmation of my journey through graduate school."

Dr. Huynh attributes her ability to balance academics, research and personal life to an "amazing support system," including her husband, Hans, and parents, Sam and Kim. During her demanding five years at UNMC, she fully embraced life, noting she continued competitive powerlifting, got married, built a home and welcomed her daughter, Jade.

Dr. Huynh hopes her journey at UNMC inspires others. She sees her achievements as a culmination of her family's hopes and hard work, especially her parents, who were Vietnam War refugees and believed in the transformative power of education despite limited access themselves. "Because I navigated unfamiliar systems and committed to academic medicine without a clear roadmap, I remain committed to the values of mentorship and leadership for others seeking to do the same."

Her advice to future graduate students is: "Find your why." While her PhD journey extended previous research, she approached her training as an opportunity to acquire skills to contribute meaningfully to both science and patients' quality of life. "As a first-generation college student, this end goal has always been a personal one and on those tough days, serves as a key reminder to remain persistent."

Key Accomplishments

40+ publications | 40+ presentations

Bukey Memorial Fund

American Society of Clinical Oncology, Conquer Cancer Foundation

Dr. Debra Romberger Dedicated Student Award

Conquer Cancer ASCO Foundation Merit Award

Service Learning and Professional Development Badge

Praesto Award

SERVICE

Peer Academic Wellness Mentor

President, Radiation Oncology Interest Group

Supplemental Instructor

Community Engagement Liaison, Student Senate

Co-Director, Midwest Student Biomedical Research Forum

David Crouse, PhD, and wife Sara with Dele Davies, MD, senior vice chancellor for academic affairs and dean of graduate studies

DR. CROUSE

Establishes Endowed Fund

TO SUPPORT UNMC GRADUATE STUDIES

Known as UNMC's ultimate team player

David Crouse, PhD, professor emeritus, and his wife, Sara, created an endowed fund through the University of Nebraska Foundation to benefit UNMC Graduate Studies.

"His decision, along with his wife, Sara, to provide this endowment and continued gifts is merely the latest testament to Dr. Crouse's commitment to the program," said Dele Davies, MD, senior vice chancellor for academic affairs and dean of graduate studies. "And this is a gift that will benefit generations of graduate students for years to come."

Dr. Crouse, who led UNMC Graduate Studies three separate times on an interim basis, said that graduate studies may often be overlooked or misunderstood. Many people think of PhD students and graduates as being under the auspices of their mentors' respective colleges, rather than the UNMC Office of Graduate Studies and Postdoctoral Education. The postdoctoral and graduate community grows every year and is now UNMC's third largest student population. He and Dr. Davies now are longtime friends with a shared dream of continued success for UNMC Graduate Studies.

Dr. Davies said: "I benefitted immensely from his wisdom and counsel during my transition here to UNMC, when he preceded me as interim vice chancellor for academic affairs and interim dean of graduate studies. Even in retirement, David has continued to give back and always answers the call when needed."

When he was in a position to do so, Dr. Crouse decided to create a permanent endowment that would provide support in perpetuity for UNMC Graduate Studies. He and Sara established the Derry-Crouse Fund for UNMC Graduate Studies (the Derry is for Sara's family) with a gift two years ago, and then made a subsequent gift in late 2023.

The fund created two awards to honor exceptional student leaders. The Derry-Crouse Emerging Campus Community Leader Award honors a graduate student who creates a welcoming environment for students on campus, advocates for the needs and interests of various student communities and displays leadership in promoting a sense of belonging among students. The Derry-Crouse Emerging Student Organization Leader Award recognizes graduate students who are aspiring leaders and whose commitment has made a positive impact on a registered student organization, student group at UNMC or in the broader community. The awards will be distributed annually at the Graduate Studies matriculation ceremony.

Dr. Crouse said he's pleased to see graduate studies' momentum in recent years under the leadership of Dr. Davies and others.

"It's exploded," Dr. Crouse said. "That's thrilling to me – to see all these new graduate programs arise from a core of programs that were doing very well."

Dr. Crouse, known as UNMC's ultimate team player, continues to serve. He keeps office hours as one of two wellness advocates for UNMC Graduate Studies and postdoctoral students.

Candidacy Jackets Celebrate a Major Milestone for UNMC PhD Students

Passing the comprehensive exam is more than just a step on the path to PhD candidacy for UNMC graduate students—it's a rite of passage. Since 2023, the Office of Graduate Studies has celebrated this important milestone by recognizing new PhD candidates with personalized fleece candidacy jackets. Annant Kaur, PhD, proudly wears her candidacy jacket as a reminder of the hard work and determination it took to pass her exam in October 2024. Her experience, while "intense and challenging, was intellectually rewarding," she said. "You level up your critical thinking during this process."

The 6 to 8 month candidacy process sharpens students' skills in literature review, hypothesis development, study design, and more. It requires close collaboration with a faculty committee to develop a research proposal and pass a rigorous oral defense—covering everything from basic scientific techniques to the finer details of their project.

Kaur emphasizes the importance of starting early, setting timelines, and leaning on others for support. "It's an exponential learning curve—don't underestimate your time," she advises. After candidacy, students begin full-time dissertation research. "The jacket means you've made it through one of the hardest parts," Kaur says. "You're moving from one stage to the next."

Since this recognition program began, Graduate Studies has presented candidacy jackets to 78 students.

Virtual Mock Interview Week Boosts Career Readiness

Preparing students for the workforce was front and center during UNMC's week-long Virtual Mock Interview event, held November 1–3 and 8–10, 2023, designed to sharpen professional skills and build confidence. The event brought together students from UNMC Graduate Studies and the colleges of nursing, public health, pharmacy and allied health for virtual interviews with alumni and faculty.

Participating students engaged in a realistic interview experience while receiving personalized, constructive feedback using a structured evaluation from interviewers. They were rated across key competencies, from communication and technical skills to collaboration and enthusiasm.

Approximately 20 graduate students participated, supported by a strong turnout of faculty and alumni interviewers. The event was a strong step forward in enhancing career readiness for UNMC graduate students and promises to become a valuable event for students preparing to enter the professional world.

postdocs leading new discoveries in health science research

128

postdocs trained

Postdocs contributed to the research in 35 different disciplines

2.1 years

in training

The average time our postdocs spend training at UNMC is between 1.6 – 2.6 years

85

faculty mentor postdocs

Faculty across colleges and institutes provide training to postdocs

Inventors *Postdocs who have applied for or been awarded patents for their innovations*

Shixuan Chen, PhD
College of Surgery
PATENT: Nanofiber Structures and Methods of Use Thereof
PATENT: Expanded Nanofiber Structures Comprising Electrospun Nanofibers and a Plurality of Holes and Methods of Making and Use Thereof

Mohtadin Hashemi, PhD
Pharmaceutical Sciences
PATENT: Compositions and Methods for Modular Vaccines

Shirisha Jonnalagadda, PhD
Pharmaceutical Sciences
PATENT: Pyridine-Piperazine-Based Scaffolds as Highly Potent and Selective Neurolysin Activators

Lee Korshoj, PhD
Pathologyh, Microbiology & Immunology
PATENT: Refillable Tissue Engineering Scaffold

Katherine Olson-Johnson, PhD
Pharmacology & Experimental Neuroscience
PATENT: Biomarkers for Parkinson's Disease

Wen Shi, PhD
Internal Medicine
PATENT: Refillable Tissue Engineering Scaffold
PATENT: Dual-Network Tissue Adhesive for Biomedical Applications
PATENT: 3D Bio-printable Hydrogel and Bioink for Light and Laser-Based Printing

Johnson Vitharikunnil John
Department of Surgery
PATENT: Porous Nanofiber Microspheres and their Composites for Wound Healing and Tissue Regeneration

Wangbin Wu
Pharmaceutical Sciences
PATENT: Compositions and Methods for the Treatment of Diseases

POSTDOC *Accomplishments* AT A GLANCE

SUCCESS THROUGHOUT THE YEAR

$388,448 in new or continued grant funding

56 peer-reviewed publications, book chapters or government reports

45% of publications (28) had postdocs listed as first author

62 conference presentations given

18 national, regional or local honors

Dr. Herzog Honored with Young Investigator Award

creating resources to better understand and control parasites

Kaylee Herzog, PhD, a postdoctoral research associate in the epidemiology department in the UNMC College of Public Health, was awarded the Young Investigator Award at the American Society of Tropical Medicine and Hygiene meeting in Chicago on October 18–22.

Dr. Herzog's presentation, entitled "Benchmarking an accessible method for generating complete genomes from parasitic nematodes," placed first out of 11 competitors in her section.

The award is given to recognize the work of young investigators and to encourage developing scientists to pursue careers in various aspects of tropical disease research. Dr. Herzog's presentation highlighted research she has been working on with her postdoctoral advisor, Joseph Fauver, PhD, since she joined his lab in June 2022. Dr. Herzog's work is aimed at creating resources to better understand and control parasites.

"Kaylee is an exceptional early career scientist who has been instrumental in developing our genomic pipelines that we are using to understand the selective pressures antiparasitic drugs pose on helminth populations," Dr. Fauver said. "We are excited about this work, as it is a step forward in improving our understanding on the efficacy of large-scale global health campaigns."

Dr. Herzog said, "We developed a protocol for quickly and inexpensively generating complete whole genome assemblies from parasitic roundworms that cause disease in humans. Sequencing parasite genomes is important because genomes are invaluable tools for identifying novel drug and vaccine targets, monitoring the effectiveness of parasite control campaigns and pinpointing genes associated with drug tolerance."

Understanding and controlling parasites can have a large impact on public health. This impact is what motivates Dr. Herzog to leverage her training as a biologist and parasitologist and find out more about the topic.

"Parasites exact a monumental cost in terms of global disease burden, impacting millions of people each year," she said. "As we, as a global community, move forward into an unprecedented age of climate change, this burden will only increase, highlighting a need for novel and creative global health solutions."

Dr. Herzog plans to continue her research on parasite biology following her work in this research lab.

"After my postdoc at UNMC, I hope to obtain a faculty position at a university to develop my own independent research program that unites my interests in parasitology, evolutionary biology and global health," she said.

POSTDOCTORAL EDUCATION

Honors Two *with* Awards

Murali Subramani, PhD and Sravan Jonnalagadda, PhD

From left: Vimla Band, PhD, Iqbal Ahmad, PhD, Murali Subramani, PhD, and Kaushik Patel, PhD

Murali Subramani, PhD, a postdoc research associate in the UNMC Department of Ophthalmology and Visual Sciences, received the 2023 Excellence in Research Award at the Nov. 3 Postdoctoral Education Annual Event.

Dr. Subramani was recognized for his research to treat glaucoma, where the degeneration of retinal ganglion cells (RGCs), the neurons that connect the retina with the brain, lead to irreversible vision loss. His work demonstrated that human RGCs generated from stem cells in a dish, when transplanted in the retina, can integrate and read the guidance cues necessary for making connections with the brain.

Dr. Subramani's mentor is Iqbal Ahmad, PhD, associate dean and director of postdoctoral education and research.

Sravan Jonnalagadda, PhD, a postdoc research associate in the UNMC College of Pharmacy, pharmaceutical sciences, was runner up for the 2023 Excellence in Research Award.
Dr. Jonnalagadda presented his achievement synthesis of a novel class of tetracyclic ketals. His mentor is Paul C. Trippier, PhD.

During the event's opening remarks, Ken Bayles, PhD, vice chancellor for research at UNMC, reflected on his postdoctoral days when, driven by the excitement of expected and unexpected results, he virtually lived in the lab. He advised postdocs to find their niche, just as he had found his in program cell death in bacteria, despite prevalent skepticism at the time.

During the keynote address, "Bringing Zen into Your Scientific Life," Dr. Ahmad highlighted how Buddha's seven principles of enlightenment can be adopted in the parallel universe of lab life for seeking truth with equanimity. He gave examples from the lives of Santiago Ramón y Cajal, the father of modern neuroscience, and Rita Levi-Montalcini, the 1986 Nobel Prize winner.

The postdoctoral education awards were presented by Vimla Band, PhD, chair of the UNMC Department of Genetics Cell Biology and Anatomy, and Kaushik Patel, PhD, professor in the UNMC Department of Cellular and Integrative Physiology.

faculty optimizing the learning experience for all

640

faculty teach graduate students

Faculty from all 6 colleges and 2 institutes teach and mentor graduate students

46

faculty newly appointed to the graduate faculty

36% of graduate faculty at UNMC have worked here for 10 years or more

2 out of 3

are senior-ranking faculty

43% of UNMC graduate faculty hold the rank of professor, while 24% are associate professors

FACULTY Accomplishments AT A GLANCE

SUCCESS THROUGHOUT THE YEAR

1,376 peer-reviewed publications

1,051 boards or committees on which faculty serve

936 conference or invited speaker presentations

165 international, national, regional or local honors

98 book chapters or government reports

50 patents applied for or awarded

From the Graduate Student Association

Distinguished Graduate Student Mentor

Ann Anderson Berry, MD, PhD

Professor, Division of Neonatology, Department of Pediatrics, UNMC College of Medicine

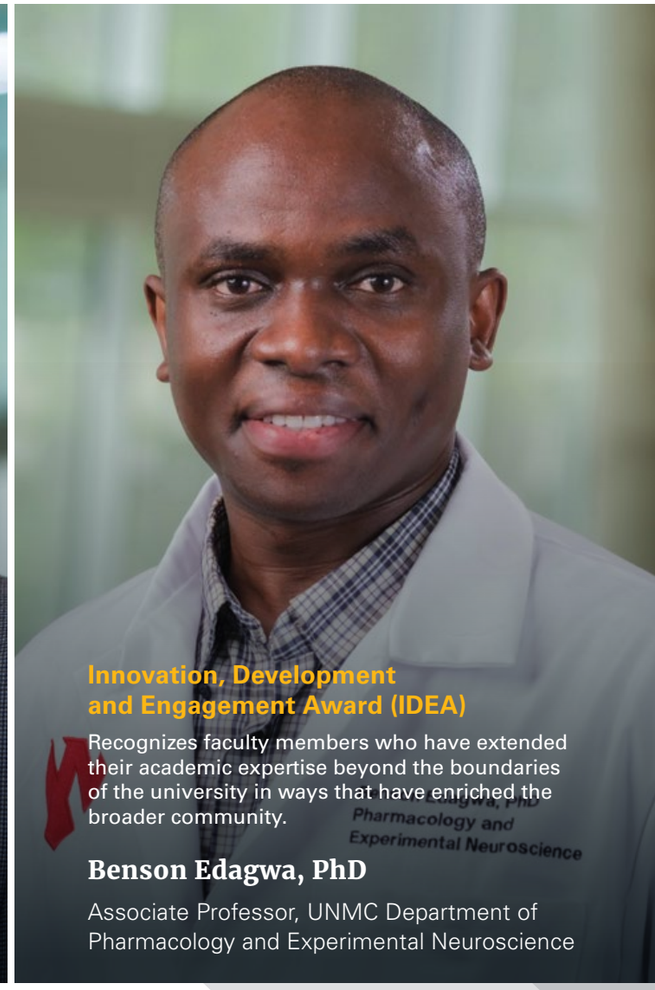
President's Excellence Awards

Outstanding Research and Creative Activity (ORCA) Award

Recognizes individual faculty members for outstanding research or creative activity of national or international significance.

Jonathan Vennerstrom, PhD

Professor in the Department of Pharmaceutical Sciences at UNMC



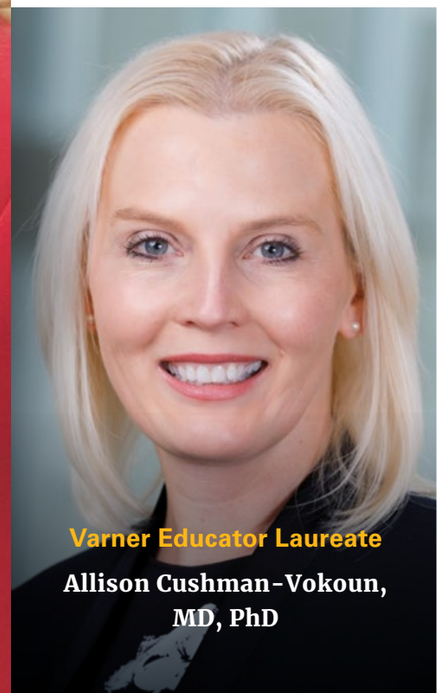
Innovation, Development and Engagement Award (IDEA)

Recognizes faculty members who have extended their academic expertise beyond the boundaries of the university in ways that have enriched the broader community.

Benson Edagwa, PhD

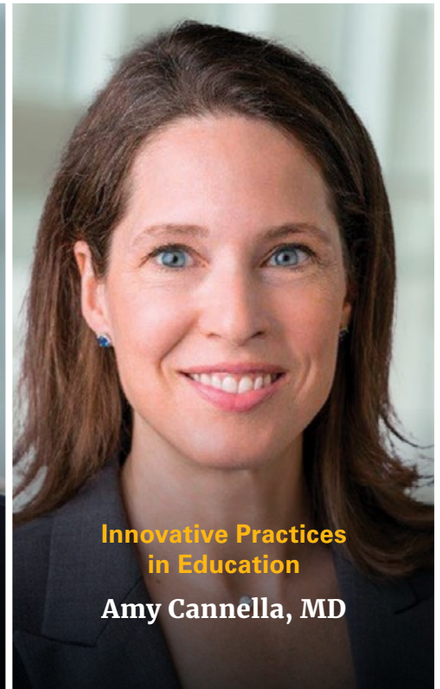
Associate Professor, UNMC Department of Pharmacology and Experimental Neuroscience

Impact in Education Awards 2023-24



Varner Educator Laureate

Allison Cushman-Vokoun, MD, PhD



Innovative Practices in Education

Amy Cannella, MD

Scholar in Education Research

Sue Schuelke, PhD

Marcia Shade, PhD, and team win

Innovation Award

Marcia Shade, PhD, UNMC College of Nursing assistant professor, earned a significant boost towards developing an app that allows patients to receive real-time assessment and evaluation of pain.

Dr. Shade's team and her small business, Voice-It, were one of six winners of the 2023 Start-up Challenge and Accelerator from the National Institute on Aging (NIA), which promotes innovation to support NIA's goal to improve the health of older adults in underrepresented populations. The honor earned her company a $60,000 cash prize.

Dr. Shade's team has worked to develop a conversational, AI-driven app that enables older adults to engage in a real-time holistic pain assessment and verbally share their pain experience within the natural environment. Dr. Shade said the goal of the app is to give patients an outlet and more control outside of clinical visits to monitor and share their symptoms while undergoing pain management.

"The interaction goes beyond just asking a scale of your pain level from zero to 10. That is just one aspect of pain," Dr. Shade said. "This is beneficial for older adults because you have clinic visits that may last 15, 30 minutes, and not much time is spent on pain itself, so you don't really have time to gather that much information.

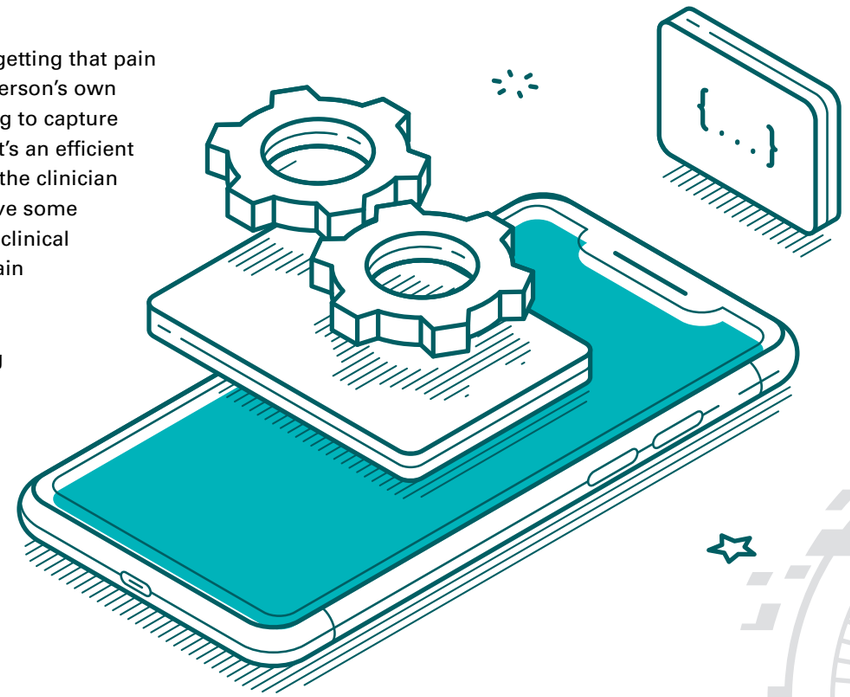
"What we're doing is getting that pain experience from the person's own words, and we're going to capture that narrative so that it's an efficient method or vehicle for the clinician or care provider to have some additional support for clinical decisions regarding pain management."

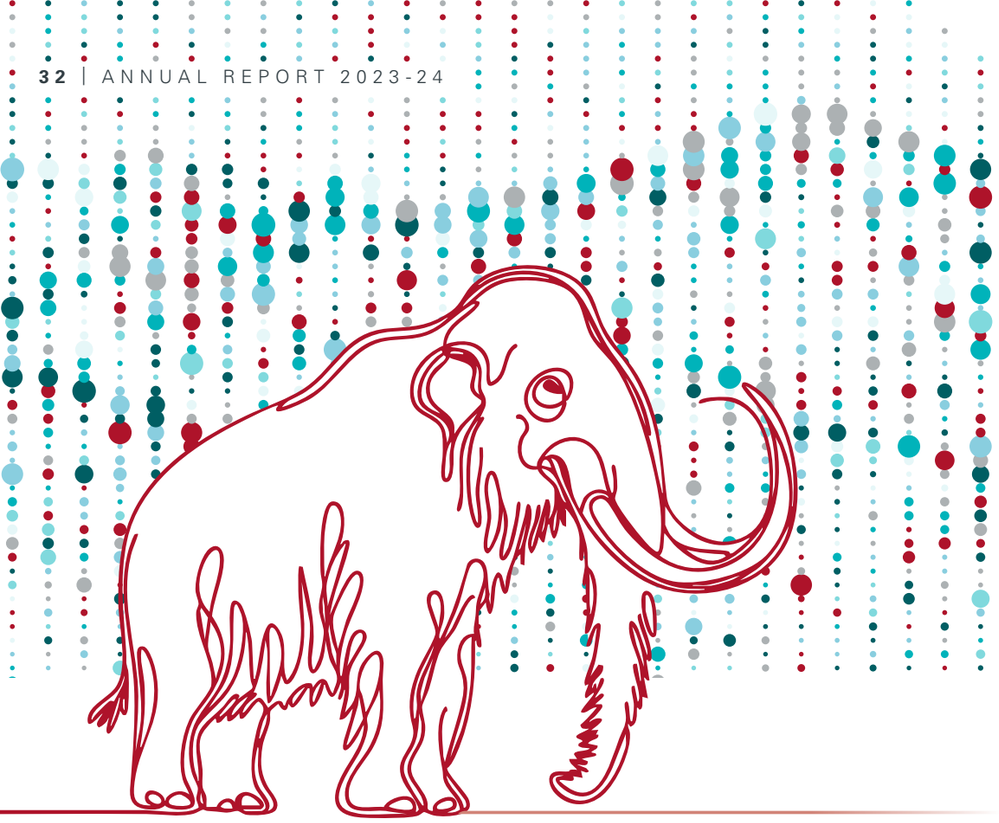
The app is undergoing testing in the proof-of-concept phase. To help move the app's development along, Dr. Shade applied for the 2023 NIA challenge cohort and was competitively selected from a pool of more than 200 applicants. Because of NIA requirements, Dr. Shade established Voice-It as a startup company to house the app and future technological developments.

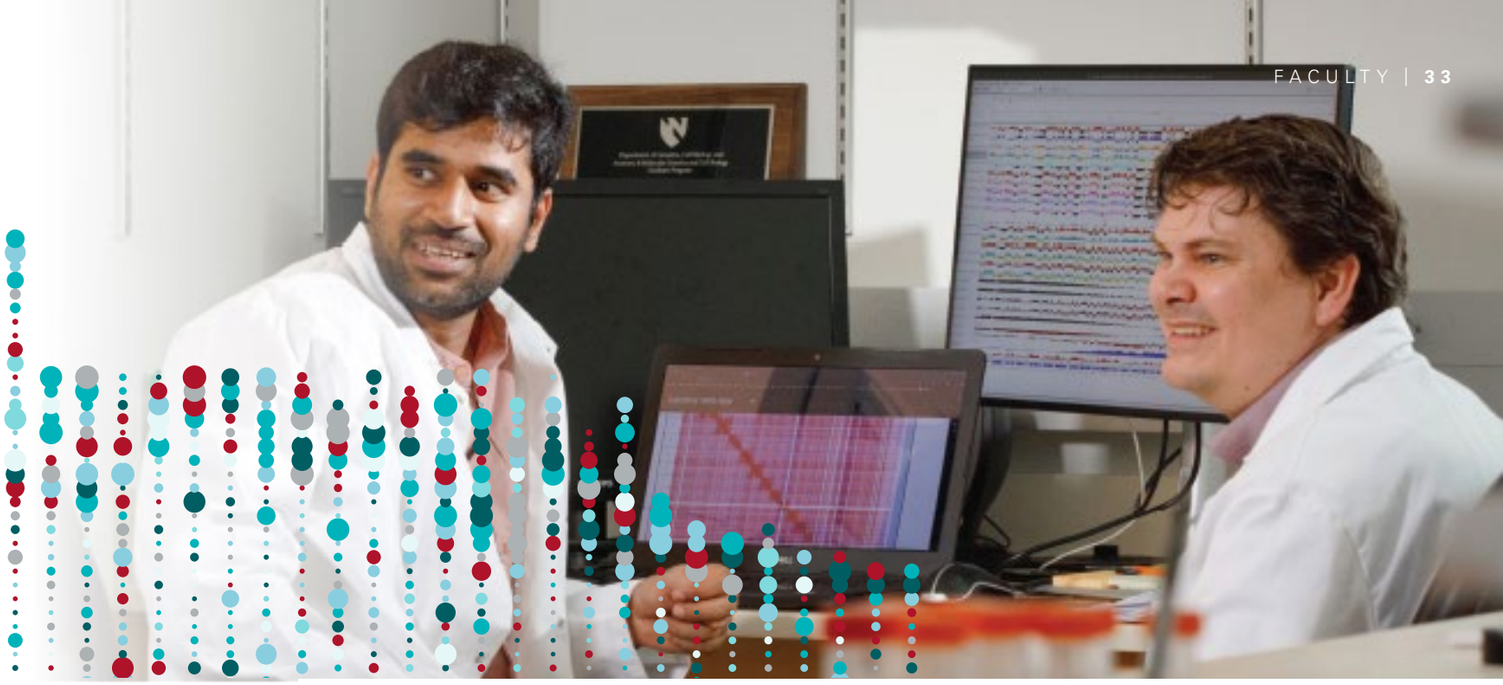
Throughout the five-month challenge, Dr. Shade and her team received mentoring and learned about value proposition, customer discovery, pitching to investors, marketing strategies, commercialization, IP regulations, revenue generation and financial practices.

"There were some transferrable skills that I used from presenting my research, but more from a business mindset and as an entrepreneur," she said. "It feels great that I can toggle in between the two now."

The 2023 NIA Challenge Accelerator program ended in December when all 20 finalists graduated and presented a final pitch and a one-page paper on how the program shaped the participants' growth as entrepreneurs and what they would do with the prize money. Dr. Shade and her team were selected as one of six winners of the $60,000 award. She said she will use the money to continue to build the infrastructure of her startup and further develop the app to the minimum viable product stage.







Achyuth Kalluchi and Jordan Rowley, PhD

UNRAVELING the Mammoth's Woolly Secret:

Insights from Ancient DNA

Two UNMC scientists, Jordan Rowley, PhD, and Achyuth Kalluchi, a doctoral candidate, were part of an interdisciplinary effort to reconstruct the fossil chromosomes of a 52,000-year-old woolly mammoth from skin cells recovered in Siberian permafrost in 2018. Their primary goal was to understand the genes responsible for the mammoth's woolly coat. In addition to uncovering this genetic mystery, the technology they developed opens new opportunities in ancient genomics.

Reconstructing ancient DNA presents significant challenges due to degradation and contamination with microbial DNA, unlike the pristine samples typically used in bioinformatic analysis.

Dr. Rowley, director of the bioinformatics and systems biology PhD program and an associate professor in genetics, cell biology and anatomy, collaborated with Kalluchi and Olga Dudchenko, PhD, a researcher from Baylor College of Medicine in Houston. They applied a technique called PaleoHi-C, an adaptation of the Hi-C method used to study three-dimensional genome architecture. This technique links DNA fragments that were spatially close within the original nucleus.

Rowley explained, "Importantly, 3D genome maps reveal that active genes tend to cluster in regions known as compartments, allowing us to infer which genes were active based on their spatial organization."

Upon analyzing the data, the team discovered that existing tools lacked the resolution to assign compartment and activity states to individual genes. To address this, Kalluchi led the development of a new model called CRUSH (Compartment Refinement for Ultra-precise Stratification of Hi-C), which extracts activity profiles from noisy or sparse data, enabling the assignment of gene activity states in the mammoth genome.

Traditional ancient DNA analysis typically focuses on identifying genetic differences between extinct animals and their modern counterparts at the sequence level. By using CRUSH, Dr. Rowley, Kalluchi and Dr. Dudchenko were able to infer gene activity based on spatial organization and determine which mammoth genes were active or inactive. Notably, the active genes were associated with hair growth and development, offering a possible explanation for the mammoth's thick fur.

"It showed that gene regulation—how DNA is organized and activated—played a major role in the expression of traits that defined the woolly mammoth, giving us deeper insight into the biology of an animal we've never seen alive," Dr. Rowley said.

Because existing bioinformatic tools are designed for uncontaminated samples collected under ideal conditions, they are not well-suited for ancient DNA preserved in permafrost for over 52,000 years. CRUSH effectively addressed the noise and sparsity of these ancient DNA fragments. The team validated their approach by comparing gene activity in the mammoth skin sample to modern elephant tissues, including skin, ovary, liver, blood, and brain. As expected, the mammoth sample most closely resembled elephant skin, confirming the accuracy of CRUSH.

As Dr. Rowley and Kalluchi continue to refine CRUSH, they have found that less data is required to accurately identify gene activity states. This expands its applicability to a broader range of samples and enhances efforts to define 3D genome compartments at the single-cell level.

"These findings not only enhance our understanding of the past but also identify candidate genes that could one day be targeted in efforts to revive extinct traits," Dr. Rowley noted. This work opens exciting avenues for future research and potential applications.

"Even more exciting, our latest improvements to CRUSH's resolution are allowing us to detect differences in the activity of regulatory elements—the switches that control whether specific genes are turned on or off," Dr. Rowley added.

This groundbreaking research by Dr. Rowley and Kalluchi exemplifies the innovative and interdisciplinary research culture of UNMC. By developing CRUSH, a novel tool for analyzing ancient DNA, the team has advanced our understanding of gene regulation in extinct species. Their work not only contributes to the field of ancient genomics but also lays the foundation for future applications in evolutionary biology.

News&Updates

UNMC Faculty Trained in National Mentorship Program

A cohort of graduate studies basic-sciences faculty were recently trained to facilitate a nationally recognized mentoring training program—and then brought it back to their graduate studies colleagues at UNMC.

The Center for the Improvement of Mentored Experiences in Research (CIMER) is recognized by the National Institutes of Health and others as the nation's premier mentor training program, said Karen Gould, PhD, assistant dean for graduate student success.

The initiative emerged from a previous UNMC Graduate Studies strategic planning retreat, Dr. Gould said. "One of the recommendations of the mentoring task force was to create a structure to provide more training for graduate faculty to enhance mentoring skills," she said.

"You can learn a lot from other participants."

The intensive two-day session was held at the University of Wisconsin-Madison.

"It was a facilitator training," said Erika Boesen, PhD, a faculty participant from cellular and integrative physiology, "which is interesting, because it's a different skill set than lecturing."

Dr. Boesen said the training was not didactic, but process-based. Learning often came through the stimulation of discussion and talking through different ideas and approaches.

"You can learn a lot from other participants," Dr. Boesen said.

"As a facilitator, you're guiding the participants through the material and that really allows the participants to engage with the material and also learn which techniques work best for them and their style of mentorship," said Lisa Rucks, PhD, a faculty participant from pathology and microbiology. One of the cornerstones of mentoring is understanding your mentee's communication style, Dr. Rucks said.

"Many of the scenarios we talked through and the problems we encountered where people have had a misalignment of expectations boil down to communication not being optimal," Dr. Boesen agreed.

Faculty may have had little formal training in mentoring. "A lot of it is trial and error and then learning from things that didn't go well," Dr. Boesen said.

Now the topic of mentoring is much more front-of-mind, not just at UNMC, but at the NIH. It is also a priority for mentees themselves. Potential recruits now ask about mentoring, Dr. Boesen said.

Dr. Rucks admitted she was not sure what to expect from the training initially, but said, "I came out a true believer in the process."

She continued: "This could benefit somebody that has been running a lab for three decades or somebody who is just starting their first faculty position."

CIMER facilitator peer mentorship training continues at UNMC, with training opportunities held multiple times a year.

Graduate Student

Wellness Hub

The Wellness Hub is a space exclusively for graduate students where they can relax, take a break, connect with friends or chat with a wellness advocate. Located in the Durham Research Center I, the hub includes:

- Flat screen TV
- Foosball table
- Kitchen area
- Study spaces
- Wellness advocates' office

New: Art installation featuring photographs taken by students, faculty and staff

New: Delivery site for the Maverick Food Pantry offering no-cost nonperishable grocery and personal hygiene products

WELLNESS ADVOCATES

David Crouse, PhD

Retired Associate Vice Chancellorfor Academic Affairs and Associate Dean of Graduate Studies

Alice Schumaker, PhD

Retired Associate Dean of College of Public Health and Graduate Studies Alumnus

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MANAGING EDITOR
Alexis Zgud, MA

GRAPHIC DESIGNER
Brandie Morales

OFFICE OF GRADUATE STUDIES
University of Nebraska Medical Center
987815 Nebraska Medical Center
Omaha, NE 68198-6710
unmc.edu/gradstudies

OFFICE OF POSTDOCTORAL EDUCATION
University of Nebraska Medical Center
985840 Nebraska Medical Center
Omaha, NE 68198-5840
unmc.edu/postdoced

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