

2022-2023

Annual REPORT



Columbine Health Systems
Center for Healthy Aging
COLORADO STATE UNIVERSITY

MISSION

We unite and facilitate research teams across CSU's colleges and programs to bring convergence to the grand challenge of global aging.

VISION

We are a transdisciplinary catalyst and nationally recognized resource for the discovery and application of research on biological, cognitive, psychological, social, and behavioral factors that lead to healthy and successful aging.

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ON THE COVER: This artistic portrayal of the cellular landscape is a tribute to the Center for Healthy Aging's Catalyst for Innovative Partnerships project, which was completed in 2023 and supported by both the Center for Healthy Aging and the Office of the Vice President for Research. Featured prominently in the upper right corner are extracellular vesicles, the minute heralds of cellular communication. Our CIP team of 14 scientists collectively showed that EVs are fundamental modulators of cellular aging in both humans and companion dogs and can serve as diagnostic and therapeutic targets in certain age-related diseases. These vesicles, secreted from cells into the bloodstream or tissues, possess the remarkable ability to seek out sites of injury and administer healing properties, or conversely, carry messages that are maladaptive. This high-impact translational research has led to numerous grant proposals and publications, driving forward the frontier of aging science. CHA scientists are truly pioneering the path to a healthier, longer life.

NICOLE



Ehrhart holds the Ross M. Wilkins, M.D. Limb Preservation Foundation University Chair in Musculoskeletal Biology and Oncology. She is a board-certified veterinary surgeon (Diplomate ACVS; ACVS Founding Fellow in Surgical Oncology), a professor of surgical oncology in the Department of Clinical Sciences in the College of Veterinary Medicine and Biomedical Sciences, and a research faculty member at CSU's Robert H. and Mary G. Flint Animal Cancer Center. In her research lab, the Laboratory of Comparative Musculoskeletal Oncology and Traumatology, Ehrhart conducts translational aging, limb preservation, tissue engineering, and sarcoma research. Ehrhart holds joint faculty positions in the School of Biomedical Engineering, the Cell and Molecular Biology program, the Gates Regenerative Medicine Center at the University of Colorado, and the University of Colorado Cancer Center.

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We engaged the community through multiple outreach events, such as the Healthy Aging

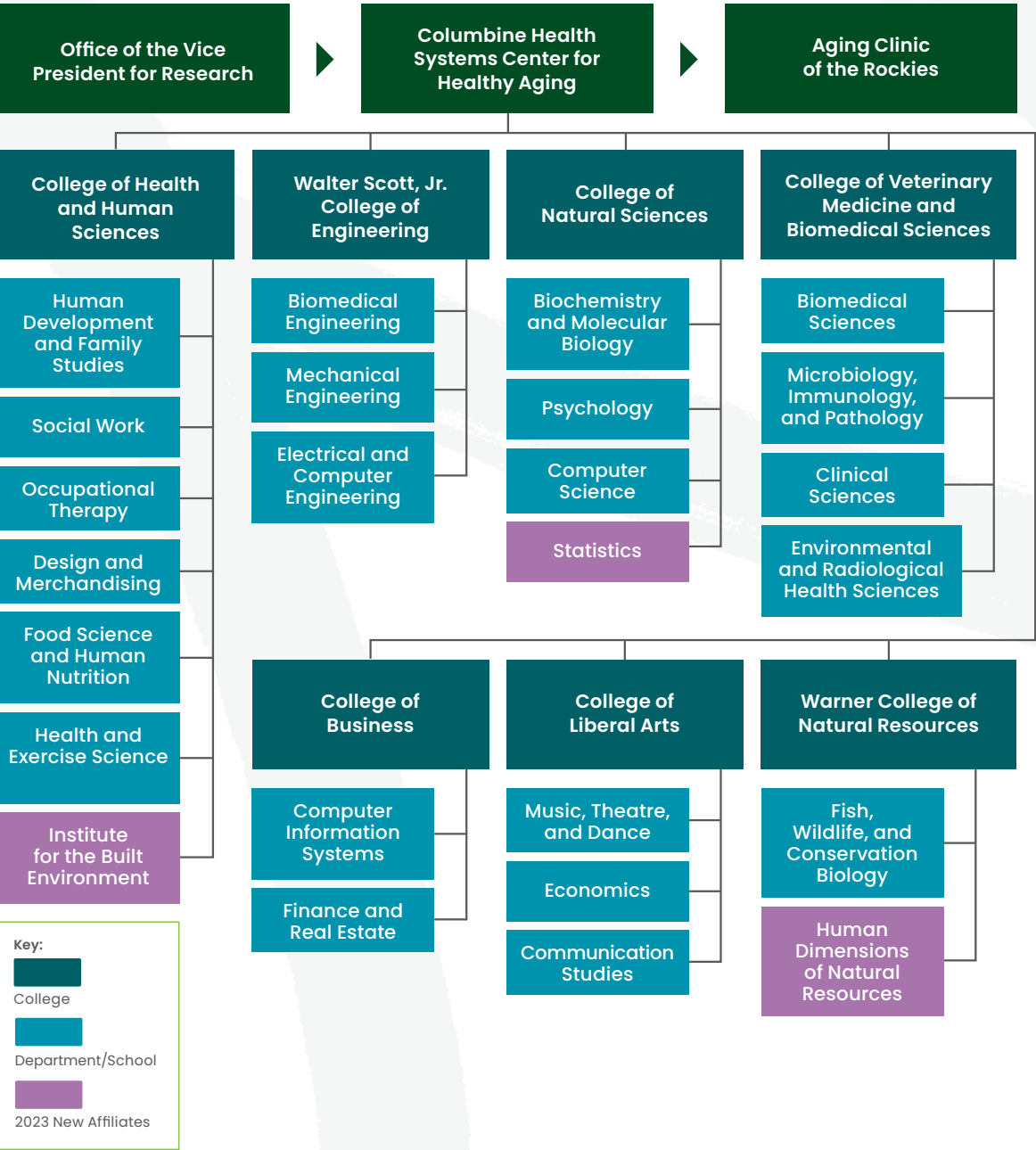
Warm regards,

Heckharts

ABOUT the CENTER

CENTER STRUCTURE

Currently, 83 faculty members across seven colleges and 25 departments are affiliated with the Center.



LEADERSHIP

KARYN HAMILTON, R.D., Ph.D.



Associate Director; Professor, Health and Exercise Science
Karyn L. Hamilton, R.D., Ph.D., is a professor and the director of the Translational Research on Aging and Chronic

Disease laboratory in the Department of Health and Exercise Science at Colorado State University. She also has the privilege of serving as an associate director of the Columbine Health Systems Center for Healthy Aging at CSU. The overall objective of the TRACD laboratory is to understand the role of adaptation to stresses and maintenance of a functional mitochondrial proteome in the context of extending healthspan and maintaining function with aging. To accomplish this objective, she uses models of long life and increased healthspan, including exercise, nutritional, pharmacological, and genetic models. In the TRACD lab, they enjoy using a highly collaborative approach and employ in vitro systems, in vivo animal models, and human participants to help identify mechanisms of healthspan extension and to translate their findings.

DEANA DAVALOS, Ph.D.



Associate Director; Professor, Psychology
Deana Davalos, Ph.D., is a licensed psychologist, director of the Aging Clinic of the Rockies, associate director of the Columbine

Health Systems Center for Healthy Aging, and a professor in the Cognitive Neuroscience program in the Department of Psychology at CSU. She has published on issues surrounding cognitive aging and the neurophysiology of aging and is part of a multidisciplinary research team focused on developing community-based interventions for individuals with dementia-related diseases and their caregivers.

TOM LaROCCA, Ph.D.



Center Faculty Member; Assistant Professor, Health and Exercise Science
Tom LaRocca, Ph.D., is an assistant professor and director of the Healthspan Biology Lab in CSU's

Department of Health and Exercise Science. He is also a faculty member at the Center for Healthy Aging. His laboratory studies the molecular biology and physiology of aging, and he is particularly interested in translational research (using laboratory science to develop practical applications or treatments that can help people). Current projects are focused on finding biology-based ways to increase healthspan, the period of life during which we are healthy and productive. LaRocca is also a former high school chemistry teacher and college instructor, so he enjoys bringing his interests into the classroom.

STAFF

ALI MURPHY



Administrative Assistant
Allison Murphy, or Ali as she likes to be called, is the administrative assistant at the Center for Healthy Aging. She recently moved

to Fort Collins from northern Virginia where she worked for a law firm specializing in special needs trusts, estates, and adult guardianship. Outside of work, she loves hiking, biking, trying her hand at artistic endeavors, cooking, and playing games with friends. Murphy is excited to facilitate faculty in all aspects of Center engagement and to be the friendly face you see at the reception desk when walking into the Center between 8 a.m. and 5 p.m. Please contact Murphy for help with directing clinical trials’ participants, room reservations, website update requests, office needs, mailing, Center AV issues, scheduling, and events planning.

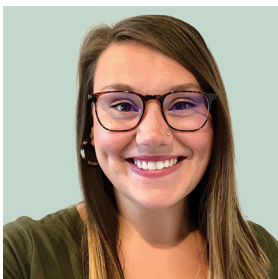
ANNETTE FOSTER, CPA



Operations and Grant Manager
Annette Foster joined the Columbine Health Systems Center for Healthy Aging in late January 2020 as the director of operations and grants

management. She plays a vital role in helping to facilitate grant submissions, post-award support, and overall operations of the Center’s facilities and is providing invaluable leadership and vision during CHA’s growth phase. Foster is a graduate of Colorado State University’s College of Business, a CPA, and a former financial auditor and sole proprietor. Prior to joining the Center for Healthy Aging team, she served as a research project manager for CSU’s Department of Atmospheric Science. She brings her extensive experience from these various roles to contribute to the success of the Center and hopes to gain some valuable tips for her own healthy aging as well.

HANNAH HALUSKER



Communications Lead
As the communications lead, Hannah Halusker develops multimedia communications and plans outreach events to help amplify the research

and programming offered by the Center for Healthy Aging. She comes to the Center from South Carolina, where she received her B.S. in genetics (2017) and M.A. in communication, technology, and society (2020) from Clemson University. At Clemson, Halusker served as a science writer in the College of Science and then as the director for a science and arts festival in nearby Greenville, South Carolina. She is thrilled to bring her passions for science communication and engagement to her role at the Center. When she isn’t working, you can find Halusker reading, doing yoga, or hiking one of the many trails around Northern Colorado.

LAURA THORNES



Assistant Director of Development
Laura Thornes comes to the Center for Healthy Aging as part of the Vice President for Research Advancement team. Her focus is on raising

funds for the Center through philanthropic giving. She is passionate about furthering important research and learning, which benefit individuals and communities and have a global impact. She comes to this role after decades of work in international education and 10 years as CSU’s director of Education Abroad. She received her bachelor’s in secondary education with German and Spanish from the University of Arizona and master’s in educational psychology from Northern Arizona University.

NEW HIRES

NATHAN LARSON – Bioarchivist



Nathan Larson joined the Columbine Health Systems Center for Healthy Aging at the start of Fall 2023 to work as the Center’s bioarchivist after Ashley Snell, our former bioarchivist, left to pursue graduate studies. In this role, Larson manages a large collection of SARS-CoV-2 samples, sorting and organizing them to create a sharable research sample set that can be utilized by the extensive research efforts at CSU. Before this role, Larson obtained his B.S. in biological science from Colorado State University with a concentration in pre-health studies. During undergrad, he worked at CSU’s Veterinary Diagnostic Laboratories as a necropsy hourly, working with

pathologists in their diagnosis and study of diseases. Larson is excited to use the skills he learned from schooling and work to aid him in his bioarchivist duties. Outside of work, Larson enjoys many hobbies including (but certainly not limited to): skiing, hiking, mountain biking, singing, playing clarinet and upright bass, and spending time with his wife and pet cat.

NICCOLE NELSON – Center Faculty Member; Assistant Professor, Psychology



Nicole Nelson is an assistant professor in the Department of Psychology at Colorado State University. A lifespan developmental psychologist by training, she aims to identify biological, psychological, and social resources that help individuals thrive through older adulthood. She is particularly interested in the ways in which modifiable, short-term experiences such as stress and emotion regulation relate to longer-term, developmental trajectories of cognitive ability, psychological well-being, and physical functioning. Nelson holds a Ph.D. in research and experimental psychology from the University of Notre Dame. She brings valuable experience as a

former postdoctoral associate in UND’s Adult Development and Aging Lab and is excited to engage in interdisciplinary collaborations and community outreach as a Center faculty member.

STUDENT AMBASSADORS

The Center’s newly developed student ambassador program aims to enhance CHA’s connection to the University and broader Fort Collins community, supporting on-campus partnerships and those with local organizations serving older adults. The program was launched in Summer 2023 with the goal of strengthening CHA’s tie to CSU’s undergraduate student population and the College of Health and Human Sciences’ Gerontology Club.

RACHEL WASHBURN – Major: Health and Exercise Science; Minor: Gerontology



Major: Health and Exercise Science; Minor: Gerontology
Rachel Washburn is president of the CSU Gerontology Club and serves as a student ambassador at the Center for Healthy Aging. In these roles, Washburn coordinates opportunities for students to learn more about aging and working with older adults. She also collaborates with the Fort Collins Senior Center to teach a technology class designed for older adults. Washburn is majoring in health and exercise science with a minor in gerontology. After graduating, she plans to pursue a degree in occupational therapy.

BROOKE ZARECKI – Major: Biomedical Sciences; Minor: Spanish



Major: Biomedical Sciences; Minor: Spanish
Brooke Zarecki is a senior at Colorado State University, majoring in biomedical sciences with a minor in Spanish. Her future goals are to become a physician’s assistant. As a Center for Healthy Aging Student Ambassador, Zarecki works to engage students at CSU with the aging community. With an interest in health care, she is determined to provide resources for older adults and opportunities for her peers. She is also the vice president of the Gerontology Club, where she sets up meetings and volunteer events and identifies opportunities for intergenerational connections between older adults and the CSU community.



COMMUNITY AND CIVIC ENGAGEMENT

Government Relations Faculty Ambassadors Initiative



Nicole Ehrhart; Jennifer Barfield; Chris Funk; Peter Harris; Caroline Havrilla; Kelly Martin; Nathaniel Riggs

CHA Director Nicole Ehrhart was one of seven CSU faculty members involved in the first cohort of the Government Relations Faculty Ambassadors Initiative, a new program by CSU's Office of the Vice President for Research to help faculty influence public policy. The program provides training for faculty members to become expert resources for lawmakers, maximizing the impact of their research while identifying opportunities for new government funding and media relations.

Dr. Ehrhart chose to participate in the ambassadorship after working with state officials on the COVID-19 pandemic response in skilled nursing facilities.

"This experience ignited an interest in optimizing the communication of evolving science-based evidence to guide state and federal policies, programs, and funding geared toward meeting the needs of older adults during times of public health threats," Ehrhart said. "I wish to cultivate strong relationships between faculty thought leaders and government leaders to promote aging research that will inform future policies and position our University community as leaders in advocacy, education, and research to meet the needs of an aging population."

Speaking Engagements

As director, Ehrhart is the Center's key spokesperson, responsible for growing its local, regional, and national presence in healthy aging research, industry, and services. Below is a sampling of speaking opportunities she completed in FY23:

**Comparative Geroscience:
How the Companion Dog
is Moving the Needle in
Longevity Interventions.**

2023 Companion Animal
Nutrition Summit, Lake Geneva,
Switzerland.

**Great Danes and Granddads:
How Man's Best Friend is
Bridging Translational
Aging Research.**

Wake Forest University,
Greensboro, North Carolina.

**How Man's Best Friend is
Advancing Longevity and
Healthy Aging Research.**

Colorado State University's
50 Year Club Luncheon
& Awards, Fort Collins,
Colorado.

EVENTS

Ride to End Alzheimer's

In June 2023, CHA staff attended the Alzheimer's Association of Colorado's Ride to End Alzheimer's race to connect the local community with current CSU research on cognitive aging. Staff met with some of the race's top contributors at the Champions Dinner on June 10, 2023, where Neha Lodha, assistant professor of health and exercise science, participated in an invited Q&A about her Alzheimer's Association-funded study that promotes safe driving behaviors after neurodegenerative conditions.

Tour Tuesdays

CHA hosted more than 30 locals in Summer 2023 as part of Summertime @ CSU's Tour Tuesdays. These attendees learned about CSU's history in aging research and programming and left knowing more about services available to older adults throughout campus.

Faculty Mixers

During FY23, the Center elevated its commitment to faculty engagement through a series of faculty mixers. These gatherings provide CHA's 83 faculty affiliates with opportunities to network and create collaborations in line with CHA's research objectives.

FALL 2022. Professor Jeni Cross from CSU's Institute for Research in the Social Sciences headlined the Fall 2022 mixer, where she discussed the advantages of team science for researchers. Her presentation emphasized how interdisciplinary collaboration can enhance the translation of discoveries into impactful research outcomes.

SPRING 2023. CHA's Hannah Halusker and Gary Polakovic, then-director of research communications, shared tips for faculty to develop concise and accessible elevator pitches about their research and ways to tailor messages based on audience.



Participants at the Ride to End Alzheimer's race, June 2023.



Interested in attending one of the Center's healthy aging events?
Contact Hannah Halusker at hannah.halusker@colostate.edu.

Human-Animal
Translational Science:
A Research Symposium

Oct. 12 | 11 a.m. to 3 p.m.
Translational Medicine Institute
Event Hall

KEYNOTE PRESENTATION
"Wiggly Worms and Furry
Friends: The Search for Healthy
Aging" by Stephanie McGrath and
Julie Moreno

ORAL PRESENTATIONS

POSTER SESSION

Attendees RSVP at col.st/ZmP55 | Abstract submissions at col.st/o0h9N

 ONE HEALTH
INSTITUTE

 CSU

 YEAR OF
HEALTH

 Columbine Health Systems
Center for Healthy Aging
COLORADO STATE UNIVERSITY

Human-Animal Translational Science Research Symposium

On Oct. 12, 2022, the Center for Healthy Aging and One Health Institute co-hosted an interdisciplinary, half-day symposium at the intersection of one health and healthy aging concepts. The event showcased oral and poster presentations from more than 45 undergraduates, graduate students, and postdoctoral researchers at CSU. Translational science, the thematic focus of the event, encompasses research that uses natural animal models to improve both human and animal health and healthy aging trajectories.

Dr. Stephanie McGrath and Assistant Professor Julie Moreno – from the departments of Clinical Sciences and Environmental and Radiological Health Sciences, respectively – delivered the symposium’s keynote lecture titled “Wiggly Worms and Furry Friends: The Search for Healthy Aging.”

The keynote reviewed an ongoing study by McGrath and Moreno that aims to identify biomarkers to predict a dog’s (or human’s) likelihood for developing dementia long before symptoms occur. By studying how animals, such as dogs and cats, age, researchers can gain a better understanding of Alzheimer’s disease and other dementias.



CHA comms lead, Hannah Halusker, records an episode with Assistant Professor Stephen Aichele.

PODCAST CORNER

living healthy longer wrapped up its Season 2 in December 2022 after a short hiatus while the Center focused on other communications projects. Season 3 commenced Jan. 23, 2023, introducing 12 new episodes that showcase the research endeavors of faculty members across CSU and beyond. These episodes delve into critical aging issues, spanning topics such as “Connecting Through Dance,” “Muscle Strength and Alzheimer’s Risk,” and “Racial and Ethnic Health Disparities.”

Listening and streaming

Get ready! Season 4 of *living healthy longer* premiered in March 2024. New episodes are released every other Monday. To stay updated, listeners can subscribe on various podcast platforms including Apple Podcasts, Spotify, or Amazon Music. Learn more about the podcast on SOURCE: col.st/7yk1k.

Podcast Analytics

living
healthy
longer

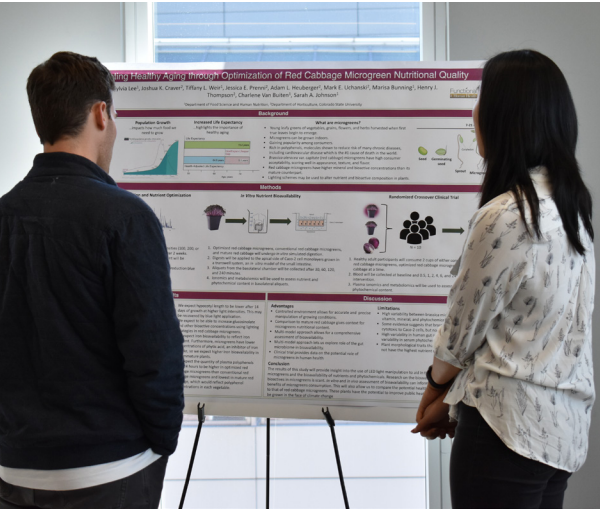
decoding the science
of healthy aging



TOP EPISODES (December 2022 – June 2023)

GUEST	EPISODE TITLE	PUBLISHED DATE	# PLAYS
Nicole Ehrhart and Lise Youngblade	Women Leaders in STEM	12/19/22	151
Sara LoTempio	Your Brain on Nature	1/23/23	151
Josiane Broussard	Everthing About Sleep	2/6/23	148
Ava Segal	Balance Fitness for Longer Healthspan	5/22/23	138
Zhijie Wang	The Aging Heart	2/20/23	130

living healthy longer analytics as of 6/30/23: **TOTAL DOWNLOADS: 7,248** (doubled from prior year)
AVERAGE EPISODE DOWNLOADS: 148 (doubled from prior year)



Photos from the Human-Animal Translational Science Research Symposium.



HEALTHY AGING SPEAKER SERIES

In Fall 2022, the Center transformed the monthly Healthy Aging Speaker Series into a semesterly special event. The series now spotlights a different CHA research area each semester, featuring guest lecturers from across the country for an invited lecture, campus tour, and social experience with CSU faculty and students. In its face-to-face format, the goal of the series is to bring renowned aging researchers to CSU, foster collaboration among institutions, and raise the profile of CSU’s own aging research.



AUGUST 2022

Microbiome, Health, and Aging using Nonhuman Primate Models. Kylie Kavanagh, Associate Professor, Pathology and Comparative Medicine, Wake Forest School of Medicine.



DECEMBER 2022

Age-Friendly Health Care: What You Need to Know About Ageism. Kris Geerken, Program Lead, Changing the Narrative, and Occupational Therapist Gilliane Lee.

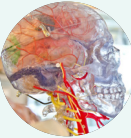


JULY 2023

Social Ties and the Lived Experience: A Daily Assessment. Karen Fingerman, Professor and Research Director, Texas Aging & Longevity Consortium and UT Austin Center on Aging and Population Sciences.

WEBSITE TRAFFIC

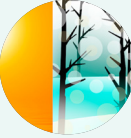
TOP WEBPAGES from July 2022 – June 2023



15,001 VIEWS
How to Rewire Your Brain.



114,828 TOTAL PAGE VIEWS
Nearly doubled from previous year (61,688)
5.6x as many as 2020 (20,189)



22,114 VIEWS
Body Temperature.



16.8% OF VIEWS WITHIN ALL OVPR WEBSITES
Nearly doubled from previous year (9.96%)
~4x as many as 2020 (4.3)

SOCIAL MEDIA @CSUHealthyAging



Facebook – TOP POSTS from July 2022 – June 2023



AUG. 29, 2022
Announcing Christine Fruhauf as the vice chair-elect for the Academy for Gerontology in Higher Education.
MOST REACH: 234



AUG. 19, 2022
Allison Bielak’s review of 10 years on the “use it or lose it” hypothesis.
SECOND-MOST REACH: 189
MOST INTERACTIONS: 8



OCT. 7, 2022
Advertising the Human-Animal Translational Science Symposium
MOST REACH: 625



JUNE 1, 2023
Recruiting for Tour Tuesdays through summertime at CSU.
MOST INTERACTIONS: 29



X – TOP POSTS from July 2022 – June 2023



FEB. 21, 2023
Zhijie Wang’s podcast episode.
IMPRESSIONS: 780
ENGAGEMENTS: 22



JAN. 30, 2023
Sara LoTempio’s podcast episode.
IMPRESSIONS: 418
ENGAGEMENTS: 13



LinkedIn – TOP POSTS from February 2023 – June 2023
The Center started a LinkedIn account in February 2023.



MARCH 13, 2023
Stephen Aichele’s podcast episode.
IMPRESSIONS: 206 **LIKES: 10**



APRIL 14, 2023
Announcing IN-REACH awardees.
IMPRESSIONS: 558 **LIKES: 33**

BLOG

Humans Can't Live Forever

by Grace Weintrob

The first known record of humans on Earth dates to more than 2 million years ago. Through dedicated anthropological research, it is widely accepted that the earliest known record of humans is *Homo habilis*, originating from Africa between 2.4 million to 1.4 million years ago. *Homo habilis* could be our direct ancestors, but more anthropological research is needed to truly pin down humans' prehistoric lineages.

While it is hard to know what life could have possibly been like for these first humans, scientists from multiple disciplines are dedicated to piecing together the past to understand a full history of humankind's origins.



From these humble origins, the population has grown both physically and cognitively. Technology, medicine, and transportation have boomed alongside the development of the human population. With increased innovation and understanding, the health care field has learned more about human health, well-being, and longevity throughout the years, causing human life expectancy to rise from 48 years in 1850 to 72.9 years in 2019. Humans are living longer on average, but that does not necessarily mean that humans can live forever.

Life expectancy vs. lifespan

It would make sense that with medicine and technological advances, illness and disease are treatable, allowing us to live in better health for longer periods of time. But, the lines are not that clear. Life expectancy and lifespan are two different factors of human well-being that measure longevity.

Lifespan refers to the maximum number of years an individual can live, making lifespan unique to everyone. The longest recorded lifespan was Jeanne Calment who lived for 122 years and 5 months, making the maximum possible human lifespan 122 years and 5 months – that is, until someone outlives Calment.

Life expectancy, on the other hand, refers to the average age an individual can expect to live at different stages of life. As humans age, physical and cognitive challenges can emerge, making life expectancy a dynamic measurement that changes based on different experiences and lifestyles of an individual.

This does not mean that 48 years old was considered “old” in say, the 1850s. But 48 was the average age that individuals could expect to live to during that time. It turns out that infant mortality rates sharply drive down the average life expectancy in a population (i.e., the number of child deaths in certain regions is so high that

there are more childhood deaths than adult deaths, lowering life expectancy for that region).

You might think that, since our ability to safely manage childbirth and provide child care has vastly improved since the 19th century, then children would have a greater chance of surviving into adolescence and even older adulthood. While yes, this is true, and yes, it has certainly contributed to an increase in the human lifespan, humans have been living well into their 70s and 80s since ancient times.

For instance, a first-century writer, Pliny, dedicated a chapter of *The Natural History* to individuals who had lived the longest during that time. In the first century, three individuals had already lived to be 100. A third-century B.C. tombstone read, “She was 80 years-old, but able to weave a delicate web with the shrill shuttle.”

Just like today, humans could live to 70, 80, or 90 years old in ancient times, so has anything really changed?

Can humans live forever?

While the population can expect to live longer lives on average, the human lifespan might have a cap.

Scientists believe that the human lifespan could be anywhere from 120-150 years long, but not longer than that, due to accumulating hallmarks of aging and chronic disease.

However, research suggests that expanding healthspan – the period of life that humans are in good health without the burden of disease – could help us live longer on average; though, much of maximizing our time here on Earth depends on the choices we make in our day-to-day lives from a young age.

Our diet, exercise habits, smoking tendencies, mental health, and many more lifestyle factors all play a role in our overall health. By taking care of ourselves and living a healthier lifestyle, we can live healthier for longer, and aging can become a more gracious, gradual process that does not strip us of well-being.

“Lifespan refers to the maximum number of years an individual can live, making lifespan unique to everyone.”



CERTIFICATE PROGRAM

Introducing the Transitions in Aging Community Certificate!

At the start of FY23, CHA launched its inaugural certificate program designed for community members, students, informal care providers of older adults, or anyone who is interested in aging topics. The certificate aims to build shared knowledge of the aging process: myths and misconceptions about aging, experiences of older people and caregivers, and common age-related diseases and conditions. And, it encourages participants to engage in lifestyle practices that support healthy aging. The certificate's modules incorporate a mix of CHA original content (blogs, SOURCE articles, podcasts, webinars, research participation opportunities) and programming from local community partners, such as the Alzheimer's Association of Colorado, Senior Access Points of Larimer County, Fort Collins Senior Center, and more.

The Transitions in Aging Community Certificate marks the initial step in the Center's vision to introduce various educational programs. Ongoing discussions involve the development of additional tracks centered around topics of aging in rural Colorado, interdisciplinary aging studies, and student-to-clinical professional trainings.

The program is customizable for each participant and is offered at little to no cost. Interested participants can enroll via the sign-up form at col.st/pU6mT.



THE GRADUATE STUDENTS OF HEALTHY AGING

The Center has 83 faculty affiliates across 25 departments at CSU, which equates to lots of graduate students who are directly or indirectly associated with the Center. Below is a Q&A with a few of these students.



YUULIN

AN

Ph.D. Student
in Economics

ADVISER:
Ray Miller

What does your research focus on?

My research primarily centers on addressing health disparities and social inequality. I investigate the impact of lifestyle factors, including sleep and spending patterns, on both healthy aging and performance, utilizing machine learning techniques and econometric methods to address policy-related questions within the realm of economics. I hope that empirically addressing these factors could mitigate inequalities related to health and social well-being.

What are your career goals?

Upon completing my Ph.D. in economics, I hope to enter academia, where I aim to teach economics and actively engage in research that focuses on the overall well-being of populations.

How has being affiliated with CSU's Center for Healthy Aging helped your research?

Being affiliated with CSU's Center for Healthy Aging has significantly supported my research, particularly in understanding the dynamics of healthy aging. Through my dissertation adviser's association with the Center, I have gained invaluable resources and guidance, enhancing my ability to examine policy implications within the scope of my research focus. Furthermore, this affiliation is instrumental in augmenting my dissertation as I navigate through the program, ensuring a comprehensive exploration of topics related to aging.



SOPHIE

SEWARD

Ph.D. Candidate in
Human Bioenergetics

ADVISER:
Josiane Broussard

What does your research focus on?

I am a clinical scientist working at the intersection of sleep, circadian rhythms, and cardiometabolic health. My research focuses on understanding cardiometabolic impairments due to changes in sleep and/or circadian timing, as well as developing and testing countermeasures to minimize the impairments associated with sleep and circadian disruption.

What are your career goals?

My career goal is to develop feasible and affordable lifestyle interventions that improve cardiovascular and metabolic health in community members at risk. Additionally, I am committed to contributing to the advancement of women in science. In a field where gender disparities persist, my goal is to work toward breaking down barriers and fostering an inclusive environment in research and the classroom.

How has being affiliated with CSU's Center for Healthy Aging helped your research?

My affiliation with CSU's Center for Healthy Aging has significantly enhanced my research impact. Writing for the Center's aging blog enables me to communicate complex findings to a broader audience, making my research accessible to the community. Presenting to community partners, such as UHealth's Aspen Club, further strengthens this connection, providing a direct avenue to engage with community members and discuss the practical implications of my work. These initiatives not only disseminate my research but also foster a meaningful relationship with the community. The connection with the community enables me to bridge the gap between academic research and practical application, fostering a more impactful and relevant contribution to the field of healthy aging.



JAMES

MILLER

Ph.D. Candidate in
Applied Development
Science

ADVISERS:
Gloria Luong and
Stephen Aichele

What does your research focus on?

Broadly, my research examines how people manage and respond to different forms of stress across adulthood. More specifically, I'm interested in understanding if there are specific strategies or approaches that people may apply to stressful situations that lead to more adaptive outcomes. Ultimately, I hope that my research can be used to promote healthy aging and improve the quality of life for older adults as they navigate life's challenges.

What are your career goals?

After completing my Ph.D., I aim to pursue a career that will allow me to leverage my experience and training to serve older adults and the communities they live in through prevention science. Ideally, this work will involve a range of responsibilities spanning program development, implementation, and evaluation. Whatever the job is, I hope that my work can help people live happier and healthier lives.

How has being affiliated with CSU's Center for Healthy Aging helped your research?

Being affiliated with CSU's Center for Healthy Aging has benefited both myself and the larger research team in the HEART Lab by sharing opportunities to participate in our studies with older adults in our community so we can learn from their experiences. Additionally, the CHA has provided a space to share our findings as well as connect and learn from an interdisciplinary group of fellow aging researchers who share similar goals of promoting health and well-being throughout adulthood.





LONGITUDINAL COVID-19 SCREENING STUDY IN SENIOR CARE FACILITIES

The Center's COVID-19 surveillance testing project, funded by a \$20.3 million grant from the state of Colorado, concluded in 2023. The project resulted in a vast longitudinal specimen archive, comprising more than 250,000 nasal swab samples from approximately 8,000 staff and residents in long-term care communities. These samples were collected weekly from March 2020 to May 2022, covering the duration of the historic COVID-19 pandemic, which officially ended in May 2023.

CHA leaders believe that this rare and unique sample set is the largest longitudinal archive of COVID-19 samples, not only in the U.S. but also possibly worldwide.

In FY23, the Center focused on fortifying this valuable asset for global investigators. Efforts included developing infrastructure for remote monitoring and security systems to ensure sample integrity and creating inventory and data management workflows to link each anonymized sample to its metadata. With the expertise of CSU colleagues Associate Professor

Mark Stenglein and Professor Greg Ebel of the Department of Microbiology, Immunology, and Pathology, the viral genomic sequence of all positive samples was obtained.

This crucial resource is now aiding investigators in understanding the spread of COVID-19 in long-term care facilities and in developing strategies to safeguard the safety and well-being of residents and staff in these communities. Well-curated biorepositories, like the one established through this project, play a pivotal role in pandemic readiness and predicting future disease emergence in vulnerable populations, such as those in LTCFs.

The availability of genetic material from COVID-19 and related viruses, along with positive and negative tissue/fluid samples, is essential. Researchers need ready access to these resources to expedite the development of diagnostics, surveillance tools, and therapeutics, ultimately preventing the global spread of diseases.

COLORADO LONGITUDINAL STUDY

The Center continues its role as the first engagement hub for the Colorado Longitudinal Study, a groundbreaking initiative to recruit and track the health trajectories of 1 million Coloradans over a decade. COLS' staff grew in 2023, with Meredith Guerrero succeeding Dr. Phyllis Wise as CEO. Welcoming Valerie Schultz as the community engagement manager, COLS broadened its outreach efforts within the Fort Collins community and expanded its capacity for participant visits by hiring two part-time

clinical research technicians in collaboration with CSU's Human Performance Clinical Research Laboratory. A full-time intern from the Department of Health and Exercise Science joined in January 2024. With the new additions to the COLS team, staff are now able to conduct study visits in Spanish and Arabic.

To join the COLS cohort or explore collaboration opportunities, visit colostudy.org. For inquiries, contact Schultz at vkschultz@colostudy.org or call (970) 305-6358.

CATALYST FOR INNOVATIVE PARTNERSHIP

In FY23, eleven CHA faculty affiliates, along with an outstanding team of trainees and supporting personnel, completed a CIP project funded by CSU's Office of the Vice President for Research. With additional financial support provided by the Center, the team established a translational comparative pipeline to accelerate aging research at CSU. Using this pipeline, they collected data confirming the value of companion dogs for understanding mechanisms of age-related decline – including neurodegeneration – in older humans.

Specific discoveries indicate that extracellular vesicles – particles present in the body's blood, saliva, and other fluids – contain vital information that could serve as markers for cellular aging and potentially play a role in influencing cellular health or diseases during the aging process.

Completion of this multidisciplinary project resulted in the submission of 19 grant proposals to funding agencies including the National Institute on Aging, Webb-Waring Biomedical Research Awards, Colorado Clinical and Translational Sciences Institute, Creutzfeldt-

Jakob Disease Foundation, Colorado's Institute for Cannabis Research, and Mantel Technologies. The project also facilitated the publication of 20 new scientific articles across journals, such as *Frontiers in Veterinary Science*, *Journals of Gerontology Series A*, and *Journal of Physiology*, among others.





HELP US DEVELOP OUR
UNDERSTANDING OF AGING

JOIN *our* RESEARCH REGISTRY

We are seeking to collect names and contact information from individuals of all ages who are interested in participating in research at CSU on healthy aging and age-related conditions. Your contact information will be stored in a secure database and limited to Center for Healthy Aging faculty upon request. You may choose the type of study for which you are interested in being contacted. CSU researchers who are recruiting participants for studies that align with your chosen interests may contact you to gauge your interest and eligibility for a specific research study. Choosing to join the research registry does not obligate you to participate in research or guarantee eligibility.

If you are a researcher with participants who agree to be contacted for future studies or a community member interested in participating in research:

 col.st/p9xxg

 (970) 495-2528

 CHAResearchRegistry@colostate.edu



ADDITIONAL STUDIES SUPPORTED IN 2023

The Center also supports studies conducted by its affiliate faculty members who use Center facilities or the administrative support of Center staff. The following is a partial listing of these studies:

Brain and Lifestyle Mechanisms of Healthy Cognitive Aging

PIs: Aga Burzynska, Department of Human Development and Family Studies, and Michael Thomas, Department of Psychology

At the annual meeting of the International Neuropsychological Society, researchers on this study presented results comparing brain function between adults exposed to pesticides and those unexposed. These results indicate that pesticide-exposed adults show differences in brain activity in multiple critical regions, including parahippocampal and prefrontal cortices. Results also suggest that individuals exposed to pesticides are more likely to report heightened levels of anger and memory-related issues. Leveraging these findings, Burzynska and Thomas began a grant submission to the National Institute on Aging in late Summer 2023.

Evaluating Yoga Intervention- Induced Changes in Performance and Neurophysiology in Adults with Chronic Brain Injury – A Pilot RCT

PIs: Arlene Schmid, Department of Occupational Therapy, and Jaclyn Stephens, Department of Health and Exercise Science

In Fall 2022, researchers secured IRB approval for the study and conducted comprehensive training for all team members, including a part-time postdoctoral fellow who joined in January 2023. The team successfully recruited 12 adults for its inaugural study cohort, which ran from February to April 2023. As FY23 drew to a close, Schmid and Stephens completed data entry and preliminary data analysis tasks and began recruiting and enrolling participants for the study's second cohort.



IN-REACH AWARDEES

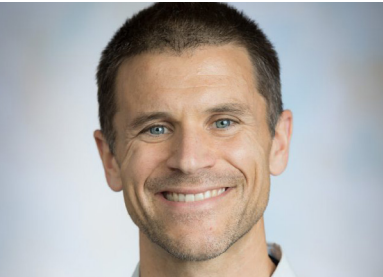
In January 2023, the Center identified four awardees in the INterdisciplinary REsearch into Aging CHallenges pilot grant program, funding a total of \$200,000 for pilot research projects that involve inter/transdisciplinary approaches to societal, behavioral, environmental, and biologic aspects of healthy aging.

The objective of this pilot funding opportunity is to support the creation of new, interdisciplinary research teams and preliminary data that can position CHA’s affiliate faculty and their research teams to be competitive for follow-up funding in novel, transdisciplinary aging research.



STEPHEN AICHELE
Assistant Professor,
Department of Human
Development and Family
Studies

“The influence of air pollution exposure on cognitive decline, cognitive impairment, and dementia risk in middle-aged and older adults.”



TOM LaROCCA
Assistant Professor,
Department of Health
and Exercise Science

“The healthspan van: A mobile research unit for identifying mediators of health and aging across diverse Colorado communities.”



JULIE MORENO
Assistant Professor,
Department of
Environmental and
Radiological Health
Sciences

“Acute peripheral infection and associated greater long-term risk of neurodegenerative pathologies: A pilot study of urinary tract infection in a natural model of age-related neurodegeneration.”



TIANJIAN ZHOU
Assistant Professor,
Department of Statistics

“Creating a pragmatic decision-making tool to guide the delivery of rehabilitation services.”



Can We Treat Cellular Aging Like a Disease for Higher Impact Care?

Opinion piece by Nicole Ehrhart, director of the Columbine Health Systems Center for Healthy Aging.

Expected lifespan for human beings has been extended significantly over the last century, thanks to medical advancements that have resulted in vaccines to prevent common infectious diseases, improved sanitation practices, and better nutrition. However, this longevity revolution comes with a steep price. The exponential rise in rates of Alzheimer’s and cardiovascular diseases, cancer, dementia, and physical frailty across the globe are by-products of a longer lifespan. Humankind simply had to start living long enough to experience them.

This phenomenon refers to a foundational concept in aging studies: that while lifespan has increased, healthspan – or the number of years we spend living without the burden of chronic disease – has not kept pace. We’re living longer, but not necessarily living healthier for longer.

Definitions of aging

From a physiological perspective, aging is the highest risk factor for diseases that are on the rise globally. Put simply, changes in our cells and tissues occur with the passage of time. We call this aging. Older bodies are made up of older cells that are less and less able to repair from the wear and tear of everyday function or damage. Subsequently, when enough unrepaired cells accumulate within an organ or body system, the system fails to work properly. We recognize this dysfunction as a disease.

Modern medicine does what it can to detect and treat diseases of aging, one at a time, as they occur. This involves reacting to the onset of disease, rather than preventing it. Addressing individual diseases in this manner has led to incremental success in the treatment of certain

cancers, dementia, and cardiovascular diseases, but the underlying biologic processes of aging continue to march on in the background, undeterred from these treatments. In other words, knock one aging disease down and another manifests shortly after. The longer we live, the shorter the timeline between the occurrence of such diseases.

Geroscience

This observation leads to some important questions. If aging is the common thread linking all chronic diseases of older age, could we think of cellular aging itself as a “disease” and therefore “treat” the condition of aging? If so, could we reverse or slow the accumulation of unrepaired damage within our cells, and thereby halt the decline in function that ultimately leads to disease?

These questions have led to the formation of geroscience as an interdisciplinary field of study that seeks to translate knowledge gained from aging research to prevent, minimize or reverse detrimental age-related changes and functional decline in older individuals.

Until very recently, too little was known about how the cellular aging process happens to address these questions. However, in the last two decades, aging research has led to a deep understanding of the fundamental processes that drive cellular aging and how those changes ultimately lead to disease. As a result, it is now possible to significantly slow the rate of aging in other species, resulting in significant lifespan and healthspan improvements.

The impact of this scientific progress is mind-boggling. Rather than treating one disease at a time as it occurs, we could potentially slow down the process of aging and lower the risk of all fatal and disabling diseases of aging at once.

The dawn of age-modifying therapeutics that extend human health into old age is on the horizon. However, the road map to bringing such treatments to humans is exceedingly challenging.

Obstacles to advancement

Chief among these challenges is that the Food and Drug Administration does not recognize aging as a treatable condition. The FDA approval pathway only considers the effect of a new therapeutic on specific individual diseases. There is no current pathway for approval of therapeutics that target aging itself, even though such interventions are possible. Scientists and policymakers are now encouraging the FDA to reconsider its definition of aging and develop pathways to allow for age-reversing medications to be tested and approved for humans.

However, even if such regulatory reform takes place, there is a second major challenge. Any clinical trial testing for improved healthspan in humans will take multiple decades to complete. The expense associated with such a lengthy trial is enormous, and the return on investment would not be realized for a long time, thus disincentivizing investment by both big pharma companies and federal funding sources.

Thus, the direction forward must also include a way to study aging on an accelerated timeline, which brings us to the topic of model organisms in research. Laboratory mice – the most common species involved in testing the safety and effectiveness of a drug prior to human clinical testing – are astoundingly poor models of human aging. They live in highly controlled environments, eat identical diets, and are genetic twins of one another. This is a far cry from humans, who are genetically diverse and have a myriad of social, economic, environmental and lifestyle behaviors that influence their health outcomes. Consequently, a mouse-to-man approach for new drugs has historically been unsuccessful.

Primates, our closest genetic relatives, are an alternative model in which to study age reversal drugs, but primates

also have long lives, and when in a laboratory environment, they are not subject to the same variations in environment, exposures and habits as human populations.

However, there is another promising approach: a species that lives among us, shares our environments, lifestyle habits and social

structures. They develop the same diseases of aging as humans, are genetically diverse and have access to well-established health care systems and interventions, yet they age much more rapidly than humans.

Enter the companion dog.

Man’s best friend

Pet dogs have co-evolved with humans and represent a unique animal population that could be a powerful bridge to accelerating the development and approval of age reversal drugs in humans. There are millions of companion dogs in the United States, and the quality

of veterinary care has paralleled human medical care, such that there is a large population of dogs living to old age and developing diseases of aging naturally, just as humans do.

The development of well-designed clinical trials to show healthspan extension in family dogs would need to include all the ethical and safety considerations of human clinical trials. Studies such as these are conducted while the pet continues to live out their daily life in their home with their family – while the medical team conducting the trial carefully ensures that their health and well-being are maintained. Pet owners can choose if they wish to voluntarily enroll their companion dogs in a study and participate in citizen science, collaborating with trained researchers to share observations, thereby co-creating and contributing to scientific outcomes.

Engaging companion dogs in healthspan clinical trials provides a chance to enhance their well-being and lifespan, not only for their benefit, but also as a more accurate predictor of the effectiveness of healthspan-extending drugs in human populations. Given the identical nature of most age-related diseases between dogs and humans, and the shorter canine lifespan, the overall effect would be the acceleration of meaningful healthspan extension therapies for humans that our best friends get to benefit from too. In my role as director of CSU’s Center for Healthy Aging, this is exactly what we’re doing.

The Center unites and facilitates interdisciplinary research teams across CSU’s colleges and programs to address the grand challenge of global aging. While our work spans many disciplines from the behavioral sciences to engineering, my personal passion and focus is to find ways to bridge the gap between discovery in geroscience and meaningful healthspan interventions that will impact how we, and the creatures we share our world with, can live our best lives.



Photo credit John Cline

DECODING BRAIN WAVES:

Exploring Anxiety and Memory Using EEGs

by Rachel Washburn

“Understanding the relationship between anxiety and error-related negativity can aid clinicians in using EEG as a diagnostic tool for mental health issues.”

Chronic anxiety disorders are proven to have a negative effect on physical and cognitive health.

In children and adolescents, symptoms of anxiety and depression have been rising since the 2010s and nearly doubled worldwide under the constraints of the pandemic. Outcomes for older adults are similar, with a 2023 report finding that 14% of older adults have a mental health disorder, notably anxiety and depression, marking concern on a global scale.

Despite the growing prevalence of these conditions, there is limited research on the impact of the occasional anxious thought – state anxiety – on physical health. At a time when chronic anxiety is affecting people of all ages, more research is needed to gauge how the brain responds to anxious behaviors.



Neuroscientists such as Sara LoTempio, Ph.D., from the Department of Human Dimensions of Natural Resources, are studying how the brain works when a person feels anxious by using electroencephalography. Recent research is aiming to better understand the meaning of the electrical brain waveforms recorded by EEGs.

Error-related negativity waves

A 2023 study conducted by LoTempio and her colleagues, published in the journal *Psychophysiology*, explores how error-related negativity waves can be interpreted.

“We can actually track the exact millisecond when a person makes a mistake. We can see in their brain activity this big negative deflection in the waveform, called the error-related negativity,” said LoTempio, describing how ERNs appear on an EEG.

LoTemplo's study also aims to address compensatory error-processing theory, which currently suggests the cognitive load of worry produces a larger negative deflection. The theory explains that enhanced ERN is due to the brain's extra effort to complete a memory task while managing anxiety at the same time.

"Theory suggests that when you're worried about something, those thoughts are literally running through your mind, right? And so, when you are playing those thoughts on a loop, it's taking up a certain amount of bandwidth in your brain," LoTemplo said.

To analyze the implications of ERN waves, participants in LoTemplo's study completed a set of working memory tasks while wearing an EEG head cap. Working memory refers to our ability and capacity to hold and manipulate recently learned information in mind. To modify working memory, participants were asked to remember a series of letters varying in length. When participants had more letters to remember, the demand of their working memory was higher.

Before each test, half of the participants were prompted to think about something that was worrying them, while the other half were told to think about something that was positive. Then, midway through testing, researchers asked the participants to switch the object of their thought: those who were worrying were asked to think about something that was positive, and those who were in a state of joy were asked to think of something worrying.

Findings

As suggested by compensatory error-processing theory, LoTemplo expected to see the largest negative deflection ERN wave when participants were in an anxious state while recalling a longer series of letters. However, the study revealed there was a nonsignificant difference between the ERN waves regardless of whether the participants were feeling worried or joy, or

whether they were processing the low- or high-demand working memory task, i.e., recalling shorter or longer patterns of letters. The findings were corroborated in a 2022 study by Kai Harper and colleagues from the University of Hamburg, Germany.

"The study found two things. It doesn't seem like ERN is measuring just general working memory load. It also doesn't seem like state anxiety influences ERN amplitude at all either," LoTemplo said. "Instead, we think this may mean that day-to-day variations in ERN amplitude are more closely linked to how much attention you are actually paying to the task, rather than the emotion you're feeling while carrying out the task."

In the experiment, LoTemplo did find a decrease in ERN when some participants were

processing the high working memory task. LoTemplo reasons this may indicate they were paying less attention to a flanker task, which was intended to measure participants' baseline reaction times regardless of mood.

These findings highlight a specific component of state anxiety and working memory research. By investigating the meaning of ERN waves, LoTemplo's findings contribute to EEG interpretation validity – just one tool of many in cognitive aging research.

Further understanding the relationship between anxiety and ERN can aid clinicians in potentially using EEG as a diagnostic tool for mental health issues. This study suggests that merely feeling anxious cannot change ERN amplitude – instead, only individuals with trait-level (chronic) anxiety display enlarged ERN amplitudes.

Future research

As LoTemplo continues her work with EEGs, she is interested in studying the impacts of nature on anxiety and working memory, particularly how spending time in nature could slow cognitive decline in older adults and boost mood and attention span. She is the director of the Restoring Attention and Affect in Nature Lab at Colorado State University.

"We are interested in whether nature can reduce stress and affect physiological measures of stress recovery," LoTemplo said. "So, we can give people cognitive tests and see how spending time in nature can affect their performance, as opposed to just sitting in a lab."



A person is seen from behind, riding a road bike on a paved path that curves through a field of tall grass. The sun is low on the horizon, creating a warm, golden glow and long shadows. The sky is a clear, pale blue with a few wispy clouds. The overall mood is peaceful and active.

EXERCISE and AGING:

How Physical Activity Can Increase Healthspan

By Brooke Zarecki

“ We want to help people live healthy longer, preventing or compressing the number of years or months or weeks that they spend feeling the effects of age-related chronic conditions.”
– Karyn Hamilton

Advances in medicine and improvements in how humans live have increased human life expectancy across the world.

However, this increase in lifespan does not coincide with an increase in healthspan, which is the number of years someone is free from age-related diseases. Consequently, while individuals are living longer lives, more are developing age-related chronic diseases, such as cardiovascular disease, dementia, and diabetes.

Researchers continue to explore approaches to mitigate the changes known to contribute to cellular aging as a way to simultaneously decrease the burden of age-related chronic diseases and promote healthy aging. Evidence suggests that exercise is a compelling way to decrease the effects of cellular aging.

From her decades-long career as a professor of health and exercise science, Karyn Hamilton has seen firsthand the value of exercise in prolonging healthspan.

“Cell dysfunction and organismal decline with advancing age is not inevitable; we can do things about it. And it’s never too early to start thinking about healthy aging,” she said.

Most recently, Hamilton helped organize a special issue for *The Journal of Physiology* on how exercise at any age can lead to multisystemic benefits that counteract drivers of aging. The review, authored with University of Glasgow, Scotland, Professor Colin Selman,

summarized original research that was led by various aging-focused authors, exploring health and cellular homeostasis with an emphasis on how exercise can extend healthspan.

Exercise maintains neural communication

One advantage of exercise outlined in the review relates to its impact on the neuroimmune system. As individuals age, the brain undergoes changes that can affect cognitive and immune function. An aging immune system can prompt increased susceptibility to infections and disease, and it can eventually lead to the immune system attacking itself.

In a 2022 study included in Hamilton’s special issue, researchers from the Trinity College Dublin, Ireland, found that endurance exercise can enhance neuroimmune communication and increase cell resilience. Specifically, endurance running impacts the glial cells, which support neuronal function and participate in immune response. As a result of endurance exercise, processes involving brain and immune cells can be carried out more smoothly.

Staying active keeps the heart healthy

Regular exercise has also been shown to maintain cardiovascular health. Hamilton outlined another study by researchers from the University of Copenhagen, Denmark, finding that, for women, exercise can lead to activation of important hormone receptors that are key in regulating physiological processes.

However, during menopause, sex hormone levels decrease, and the risk of developing vascular disease increases significantly. High-intensity exercise, such as running or cycling, was found to compensate for the loss of estrogen. The authors advise that initiating exercise around the time of menopause, rather than later, may be more effective at preserving cardiovascular health in older age. However, exercise at any age still provides many benefits.

Exercise has endocrine and metabolic benefits

In a separate 2023 study featured in the special issue, researchers from the University of Otago, New Zealand, focused on the benefits that



physical activity has on the body’s hormone system. They found that exercise increases a protein known as brain-derived neurotrophic factor, which helps to maintain brain metabolic function, learning, and memory.

Both light and intense exercise, specifically cycling, showed an increase in BDNF. The authors conclude that periodic intense exercise is an avenue to boost BDNF production and potentially slow age-related cognitive decline.

In summary

Although there is always more research to be done regarding factors that influence aging, the research highlighted in this special issue of *The Journal of Physiology* demonstrates that there are a plethora of benefits that come with exercise to reduce the risk of developing age-related chronic diseases.

It is important to note that participation in physical activity can vary across different demographics and abilities, and there is not a “one-size-fits-all” approach when it comes to the benefits of exercise. But all signs suggest that physical activity is more helpful than harmful in reversing cellular drivers of aging.

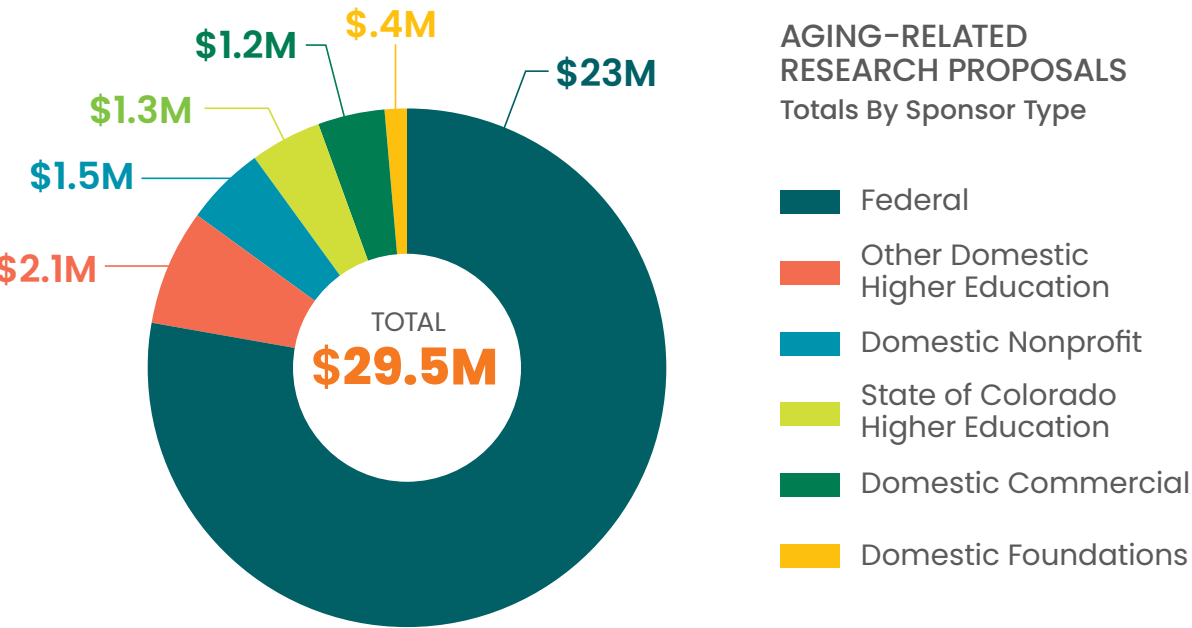
For Hamilton, focusing on health-promoting behaviors, including engaging in physical activity, earlier in life is key.

“We know that at the cellular level, people begin to experience age-related changes in their mid-30s to mid-40s, but they may not feel the effects until much later,” Hamilton explained. “Ultimately, we want to help people live healthy longer, preventing or compressing the number of years or months or weeks that they spend feeling the effects of age-related chronic conditions.”

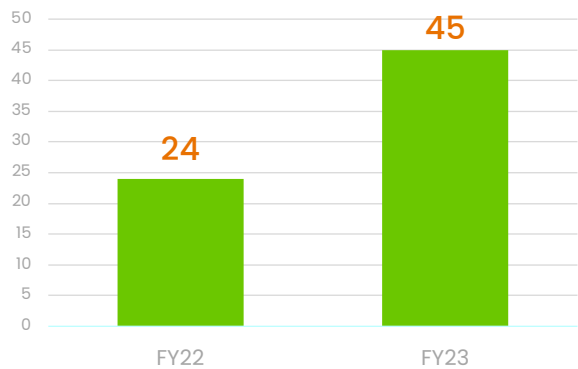


FINANCIAL Report

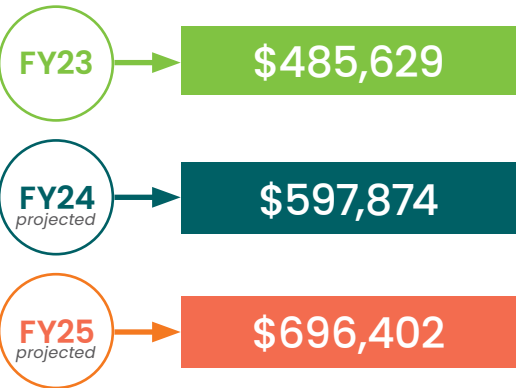
FY23 SUMMARY OF PROPOSED AND AWARDED FUNDING FOR AGING-RELATED RESEARCH



AGING-RELATED RESEARCH PROPOSALS: TOTAL # SUBMITTED



TOTAL OPERATING EXPENSES



EXTERNAL FUNDING

Aging research at CSU spans seven colleges and 25 departments and is funded by federal grants, industry partnerships, and philanthropic foundations.

\$882,000 1/31/19 TO 1/30/26	Telomeres and the One Year Mission Project (PI, Susan M. Bailey) NASA-National Aeronautics and Space Administration
\$403,440 9/30/21 TO 5/31/23	New Approach to Studying White Matter Aging: Symmetric Multimodal Fusion of MRI Techniques Targeting Different Biophysical Properties of White Matter (PI, Agnieszka Z. Burzynska) HHS-NIH-National Institutes of Health
\$330,203 10/31/20 TO 10/30/24	Evaluation of the Effect of Intra-Articular Injection of a Proprietary Extracellular Matrix for Osteoarthritis-Associated Pain in Dogs (PI, Felix M. Duerr) PetVivo Holdings Inc.
\$276,412 1/31/22 TO 1/30/24	Evaluation of Two Joint Supplementation Formulas for the Treatment of Naturally Occurring Canine Osteoarthritis (PI, Felix M. Duerr) Zoetis
\$269,213 7/1/22 TO 6/30/24	Evaluation of High Energy Focused Shock Wave Therapy for Treatment of Osteoarthritis and Prevention of Contralateral Stifle Injury in Dogs (PI, Felix M. Duerr) Zomedica
\$2,016 4/30/23 TO 4/29/24	Building Community Capacity for Healthy Aging Research and Programming in Northeastern Colorado (PI, Christine A. Fruhauf) University of Colorado at Denver
\$100,944 4/30/19 TO 4/29/24	Antihypertensive and Vascular-Protective Effects of Wild Blueberries in Middle-Aged/Older Men (PI, Sarah A. Johnson) Wild Blueberry Association of North America
\$300,000 1/1/23 TO 12/31/25	Co Activation of Selective Nicotinic Acetylcholine Receptors Improves Hippocampal Inhibitory Activity and Oscillations in Alzheimer's Disease (PI, Seonil Kim) BrightFocus Foundation
\$304,000 8/15/21 TO 6/30/23	Recovery of Synaptic Dysfunction and Memory Loss in Alzheimer's Disease by Selective Co-Activation of Nicotinic Acetylcholine Receptors (PI, Seonil Kim) HHS-NIH-National Institutes of Health
\$757,938 9/14/22 TO 5/30/27	Age-Related Repetitive Element Dysregulation, Neuroinflammation and Alzheimer's Disease (PI, Tom J. LaRocca) HHS-NIH-National Institutes of Health
\$38,744 9/1/22 TO 8/31/24	Role of Age-Associated Epigenetic Repetitive Element Derepression in Alzheimer's Disease (PI, Tom J. LaRocca) HHS-NIH-National Institutes of Health

\$304,000 8/15/21 TO 6/30/23	Role of Age-Dependent Repetitive Element Transcript Dysregulation in Alzheimer's Disease (PI, Tom J. LaRocca) HHS-NIH-National Institutes of Health
\$149,947 8/1/22 TO 7/31/25	Harnessing Behavioral Fluctuations to Predict Driving Deficits in MCI (PI, Neha Lodha) Alzheimer's Association
\$377,541 1/1/21 TO 12/31/25	Investigating Cognitive-Motor Variability to Predict Driving Performance in Stroke Survivors with MCI (PI, Neha Lodha) HHS-NIH-National Institutes of Health
\$188,934 11/15/21 TO 11/14/24	Investigating the Effect of Cannabinoids on Naturally Occurring Canine Cognitive Dysfunction Syndrome as a Surrogate for Alzheimer's Disease (PI, Stephanie McGrath) Panacea Life Sciences
\$271,054 9/1/21 TO 5/31/23	Investigating the Effect of Cannabidiol and Cannabidiol Trazadone Combination Treatment on Naturally Occurring Canine Cognitive Dysfunction Syndrome as a Surrogate for Alzheimer's (PI, Stephanie McGrath) University of Washington
\$172,716 7/15/18 TO 3/31/23	Social Convoy Palliative Care (Convoy-Pal) Mobile Health for Older Adults with Advanced Heart Failure (PI, Jennifer Portz) HHS-NIH-National Institute on Aging
\$13,379 7/1/20 TO 6/30/26	U 19 Dog Aging Project TRIAD (Project 4)- Trial of Rapamycin in Aging Dogs (TRIAD) (PI, Brian A. Scansen) University of Washington
\$100,000 6/1/22 TO 5/31/23	Malleability of Brain Systems that Mediate Wisdom and Reflective Thinking: A Functional Magnetic Resonance Imaging Study (PI, Michael L. Thomas) University of California, San Diego
\$23,144 12/5/22 TO 11/30/27	Understanding Biological and Lifestyle Contributions to Alzheimer's Disease Pathology and Clinical Profiles in Black Women: Defining Prevention Targets in High Risk Groups (PI, Michael L. Thomas) University of California, San Diego
\$15,200 8/1/21 TO 7/31/22	UCSD Successful Aging Evaluation Study (PI, Michael L. Thomas) University of California, San Diego
\$40,000 1/1/23 TO 12/31/23	Nuclear Receptor NR4A2 as a Therapeutic Target for Parkinson's Disease (PI, Ronald B. Tjalkens) Consolidated Anti-Aging Foundation
\$71,580 8/1/20 TO 7/31/22	Efficacy of Cannabidiol in a Rodent Model of Primary Osteoarthritis (PI, Kelly Santangelo) University of Wisconsin
\$1,199,032 8/1/22 TO 7/31/24	Nuclear Receptor NR4A2/Nurr1 as a Therapeutic Target for Neurotoxic Injury in Parkinson's Disease (PI, Ronald B. Tjalkens) DOD-US Department of Defense

\$45,613 2/15/21 TO 1/31/26	Cannabis Use among Older Adults: Potential Risks and Benefits to an Aging Population (PI, Brian L. Tracy) University of Colorado
\$138,214 6/1/21 TO 5/31/23	Kv4 Channels as a Target of Aging and Beta-Amyloid (PI, Susan L. Tsunoda) HHS-NIH-National Institutes of Health
\$165,000 10/1/21 TO 8/31/22	Optimization of a Chemokine Receptor Antagonist Peptide as a Synapse Protecting Treatment for Neurodegeneration in Alzheimer's Disease (PI, James R. Bamburg) Creative Bio-peptides
\$6,980,264	TOTAL



Affiliate FACULTY



Faculty affiliates' research interests fall into one of four categories: comparative aging; cognitive, social, and behavioral aging; age-friendly engineering, design, and rehabilitation; or biology and physiology of aging.

NEW AFFILIATE FACULTY

COLLEGE OF HEALTH AND HUMAN SCIENCES

Josiane Broussard | Health and Exercise Science

The role of sleep and circadian physiology in metabolic homeostasis; Modifying behaviors (sleep, exercise, and eating) to improve health.

Jain Kwon | Design and Merchandising

Neurodesign for physical and virtual environments; Gaze behaviors in wayfinding; Spatial perception and cognition in health care environments; Kinesthetic experience in multisensory settings.

Elicia Ratajczyk | Institute for the Built Environment

Environmental social science; sustainable urban infrastructure; Lifelong Homes Initiative.

Tiffany Weir | Food Science and Human Nutrition

Disruptions to the gut microbiome and the development of age-associated chronic diseases, such as cancer and cardiovascular disease.

COLLEGE OF NATURAL SCIENCES

Hollis Karoly | Psychology

Using behavioral measures, molecular biology methods, and neuroimaging techniques to understand the causes and consequences of substance use behavior, especially alcohol and cannabis use.

Nicole Nelson | Psychology

Link between short-term stress and emotion regulation and long-term cognitive, emotional, and physical development in older adults.

Tianjian Zhou | Statistics

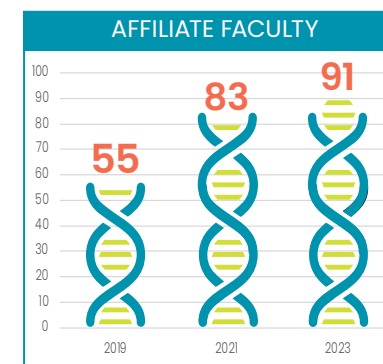
Applied statistics with a focus on clinical trials, cancer genomics, and infectious diseases.

WARNER COLLEGE OF NATURAL RESOURCES

Sara LoTempio | Human Dimensions of Natural Resources

How spending time outside in nature can influence human cognition and health.

Growth of Affiliate Faculty Over Time



Growth in Departments and Colleges Over Time

2019	2021	2023
4 COLLEGES & 16 DEPTS	7 COLLEGES & 22 DEPTS	25 DEPARTMENTS

A key goal of the Center is to bring together faculty working on cutting edge research in topics related to healthy aging. Currently, the Center has more than 85 faculty affiliates across seven colleges and 25 departments.

CHA FACULTY AFFILIATES

COLLEGE OF BUSINESS

Adela Chen | Computer Information Systems

Understanding the use of information communication technologies among individuals, including older adults, with emphasis on the impact of technology use in work and nonwork domains.

Harry Turtle | Finance and Real Estate

Financial decisions of households represented in the Health and Retirement Study and the RAND American Life Panel.

Tianyang Wang | Finance and Real Estate

Household financial planning strategies for managing longevity risk; behavior finance.

WALTER SCOTT, JR. COLLEGE OF ENGINEERING

Tony Maciejewski | Electrical and Computer Engineering

Rehabilitation robotics to aid recovery from injuries; Social robotics for cognitive or emotional support.

Kirk McGilvray | Mechanical Engineering

Deterioration and/or trauma to the skeletal system and soft tissues; development of advanced materials, techniques, and devices to monitor and aid in the treatment of these conditions.

Stu Tobet | School of Biomedical Engineering

Structures in the brain that control neuroendocrine functions; Microbiome and aging.

Zhijie Wang | Mechanical Engineering

Cardiovascular biomechanics at different scales (single segment of artery to whole organs, including the heart and lungs).

Jianguo Zhao | Mechanical Engineering

Design and control of robotics devices.

COLLEGE OF HEALTH AND HUMAN SCIENCES

Stephen Aichele | Human Development and Family Studies

Cognitive epidemiology; Advanced longitudinal modeling and machine learning approaches to risk analysis (for cognitive decline, depression, mortality) in middle-aged and older adults; Cognitive testing for early diagnosis.

Chris Bell | Health and Exercise Science

Diabetes; control of blood glucose in aging.

Allison Bielak | Human Development and Family Studies

Normal and pathological cognitive changes in adulthood; influence of lifestyle factors on cognitive aging; intraindividual variability in cognitive speed and how it relates to cognitive ability, health, and possible dementia prediction.

Barry Braun | Health and Exercise Science

Effects of physical activity and pharmacology on prevention and management of Type 2 diabetes.

Allyson Brothers | Human Development and Family Studies

Promotion of healthy aging throughout the lifespan; attitudes toward aging and awareness of age-related change; the influence of attitudes toward aging on health, well-being, and health behaviors; rural aging experiences.

Anita Bundy | Occupational Therapy

Fitness to drive; everyday time use.

Aga Burzynska | Human Development and Family Studies

Interconnections between brain structure and function, cognitive functioning, and physical health in older age.

Eunhee Choi | Social Work

Aging, health, and policy, particularly for older workers and volunteers; research methodology and program evaluation.

Jen Currin-McCulloch | Social Work

Psychosocial adaptations to serious illness and how people cope at end-of-life; caregiver experiences.

Maria Delgado | Design and Merchandising

Aging in place; housing design.

Manfred Diehl | Human Development and Family Studies

Awareness of age-related change and its role in successful aging; personality development in adulthood and its contribution to successful aging; experience and regulation of emotion in adulthood.

Aaron Eakman | Occupational Therapy

Meaningfulness of everyday activity; behavioral (i.e., non-pharmacological) interventions to promote sleep.

Brett Fling | Health and Exercise Science

Neuromechanics, brain imaging, gait, and balance in multiple sclerosis, Parkinson's, aging.

Christine Fruhauf | Human Development and Family Studies

Grandparent and grandchild relationships; grandparents raising grandchildren; GLBT grandparenting.

Chris Gentile | Food Science and Human Nutrition

Novel treatments to preserve endothelial function in aging.

James Graham | Occupational Therapy

Rehabilitation health services.

Karyn Hamilton | Health and Exercise Science

Integrative, comparative, and translational approaches to increasing human healthspan.

Sarah Johnson | Food Science and Human Nutrition

Functional foods, cardiovascular disease, and postmenopausal women.

Dan Lark | Health and Exercise Science

The contribution of secreted extracellular vesicles (i.e., exosomes) to age-related metabolic disease.

Tom LaRocca | Health and Exercise Science

Biological mechanisms of aging; interventions for increasing healthspan.

Heather Leach | Health and Exercise Science

Physical activity interventions to minimize recurrence and optimize physical health and well-being in cancer survivors.

Neha Lodha | Health and Exercise Science

Neurophysiology and motor skill rehabilitation in stroke and TIA.

Gloria Luong | Human Development and Family Studies

Socioemotional dynamics and emotion regulation across the life span; emotional and physiological stress reactivity and recovery; developmental links between social relationships, emotions, health, and well-being.

Laura Malinin | Design and Merchandising

Age-related cognitive decline and enriched environments.

Arlene Schmid | Occupational Therapy

Complementary and integrative therapies such as yoga for fall prevention in older adults and people with stroke or other neuro conditions; self-management of chronic conditions.

Brian Tracy | Health and Exercise Science

Examining the mechanisms that explain neuromuscular decline with aging and the physical functional consequences of the changes.

COLLEGE OF LIBERAL ARTS

Meara Faw | Communication Studies

Positive communication and intervention strategies for caregivers; community-based experiences to promote healthy aging in people with cognitive impairments and their caregivers.

Ray Miller | Economics

Economics of caregiving, population aging, the inequality of health and economic well-being among older populations; health policy.

Lisa Morgan | Dance

Movement/dance and Parkinson's disease.

Lindsey Wilhelm | Music Therapy

Music therapy for care partners and aging adults with neurologic conditions.

COLLEGE OF NATURAL SCIENCES

Silvia Sara Canetto | Psychology

Cultural scripts of suicide and hastened death; the paradox of U.S. older-adult white men's suicide vulnerability; Stereotypes of gender, sexual orientation, and aging.

Deana Davalos | Psychology

Understanding the development of time-processing abilities over the lifespan, including older adults, with emphasis on processing time accurately.

Ed DeLosh | Psychology

Aging and memory, including effects of physical fitness on age-related declines in memory.

Gwen Fisher | Psychology

Health and well-being among older workers; retirement, work ability, and prolonged working life; work/nonwork interface, including work/nonwork conflict, enhancement, and work/life balance.

Shrideep Pallickara | Computer Science

Cloud computing, distributed systems, content distribution networks, streaming systems.

Matt Rhodes | Psychology

Understanding individual differences in memory, including the impact of healthy aging on memory function.

Eric Ross | Biochemistry and Molecular Biology

Yeast prions as a model for amyloid diseases, including Alzheimer's disease, Parkinson's disease, and transmissible spongiform encephalopathies.

Lubna Tahtamouni | Biochemistry and Molecular Biology

Pathogenesis of cofilin-actin rods in neurodegenerative diseases; Actin dynamics during migration of breast cancer cells.

Michael Thomas | Psychology

Schizophrenia, aging, and dementia; Development of tests to improve the collection and interpretation of cognitive and brain imaging data.

Tingting Yao | Biochemistry and Molecular Biology

Regulatory mechanisms in DNA repair and gene expression; ubiquitin signaling in macroautophagy.

WARNER COLLEGE OF NATURAL RESOURCES**Lise Aubry | Fish, Wildlife and Conservation Biology**

Life history trade-offs and senescence in vertebrates.

COLLEGE OF VETERINARY MEDICINE AND BIOMEDICAL SCIENCES**Susan Bailey | Biomedical Sciences**

Role of chromosomes and telomeres in cancer and other human disease states, tumorigenesis, and aging.

Adam Chicco | Biomedical Sciences

Various aspects of heart health and disease from the molecular to systemic levels and relation to aging.

Felix Duerr | Clinical Sciences

Small-animal musculoskeletal problems, including arthritis, sports injury treatment, and prevention; canine-to-human translational applications.

Gregory Ebel | Microbiology, Immunology, and Pathology

Virus infection; Nursing home surveillance; Arboviruses; Differential pathology/mortality in older adults.

Nicole Ehrhart | Clinical Sciences

Translational aging, limb preservation, tissue engineering, and sarcoma research; bone and muscle regenerative medicine; canine-to-human translational applications.

Laurie Goodrich | Clinical Sciences

Regenerative medicine; Effects of age on various biologic therapies.

Kelly Hall | Clinical Sciences

Naturally occurring trauma in dogs as a model to identify markers of injury; therapeutic interventions to improve outcomes in geriatric trauma patients.

Marcela Henao-Tamayo | Microbiology, Immunology, and Pathology

Immune responses to vaccines and infectious diseases; how these responses vary with age and in relation to degenerative disorders and comorbidities; maternal-fetal immune transfer.

Frederic Hoerndli | Biomedical Sciences

C. elegans genetics and in vivo microscopy to study synaptic aging and neurodegeneration.

Seonil Kim | Biomedical Sciences

Neurobiological mechanisms in aging and Alzheimer's disease.

Thomas Kuhn | Microbiology, Immunology, and Pathology

Cellular and molecular mechanisms underlying the decline of neuronal integrity and connectivity in aging individuals; natural-product drug development.

Candace Mathiason | Microbiology, Immunology, and Pathology

Prion pathobiology, pathogenesis, trafficking, and transmission dynamics with emphasis on blood-borne prions and asymptomatic disease stage.

Stephanie McGrath | Clinical Sciences

Seizure and spinal cord disorders, inflammatory brain diseases; canine-to-human translational applications.

Julie Moreno | Environmental and Radiological Health Sciences

Cellular stress mechanisms in protein misfolding neurodegenerative diseases, and aging.

Katriana Popichak | Microbiology, Immunology, and Pathology

Neurodegenerative disease and neuroimmunology.

David Rojas-Rueda | Environmental and Radiological Health Sciences

Environmental health; climate change; urban and transport planning; epidemiology; public health; community-based participatory research; environmental justice; health equity.

Elizabeth Ryan | Environmental and Radiological Health Sciences

Food access, affordability, and availability; Brain fog, forgetfulness, and cognitive function concerns in long-COVID and cancer patients.

Kelly Santangelo | Microbiology, Immunology, and Pathology

Osteoarthritis, aging, and obesity; translational analyses that combine therapeutic interventions with molecular mechanisms, advanced imaging, and assessments of mobility.

Brian Scansen | Clinical Sciences

Partner site for the Dog Aging Project; cardiovascular health in animals.

Alan Schenkel | Microbiology, Immunology, and Pathology

Pulmonary fibrosis and non-tuberculosis mycobacterial infections.

Michael Tamkun | Biomedical Sciences

Neuronal response to stroke/ischemia; cell biology of traumatic brain injury.

Glenn Telling | Microbiology, Immunology, and Pathology

Mechanisms of prion replication, prion species barriers and strain diversity, and the molecular basis of inherited human prion diseases.

Ron Tjalkens | Environmental and Radiological Health Sciences

Neuroinflammatory mechanisms in neurodegenerative disorders, particularly disorders of the basal ganglia such as manganism and Parkinson's disease.

Susan Tsunoda | Biomedical Sciences

Drosophila genetics to study neurodegenerative disease; aging and Alzheimer's disease.

Jeffrey Wilusz | Microbiology, Immunology, and Pathology

RNA biology; influence of aging on the cell.

Mark Zabel | Microbiology, Immunology, and Pathology

Early lymphoid system distribution of prions and employment of vector systems expressing prion-targeted interfering RNA molecules as therapeutic strategies for prion infections.

Select Faculty PUBLICATIONS

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Biological Agents and the Aging Brain: Glial Inflammation and Neurotoxic Signaling. (2023). Latham, A.S., Moreno, J.A., & Geer, C.E. Frontiers in aging. <https://doi.org/10.3389/fragi.2023.1244149>

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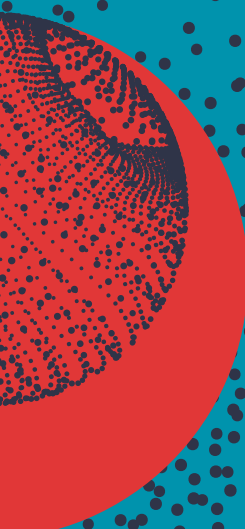
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