

# LIFE LINES

WINTER-SPRING 2025



## Improving bone health one step at a time

Photo by Oregon State University

### **Aging is a major factor in falls and fractures and diminished bone health in general.**

When bone mass declines to a certain level, the fragile and common condition is called osteoporosis, which is also known as a “silent disease” because people typically don’t experience obvious symptoms until they suffer a fracture.

Fractures aren’t the only concern when it comes to bone health. Bones also provide mineral storage to support physiological functions and are the site of blood and immune cell production.

These concerns are driving the work of

several Center for Healthy Aging Research faculty members. Their focus on nutrition, exercise, and inflammation is advancing options for helping people improve stability and overall bone health.

### **Nutrition and bone health**

Though our bones may feel like static structures, they are living tissues that change throughout our lives as new bone is created and old bone breaks down.

Bone mass generally peaks around age 30, and then people begin to lose more mass than they gain. Despite this, lifestyle factors such as diet and exercise

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**Oregon State**  
University

## FROM THE DIRECTOR

# Researching aging from an integrated perspective

We are in a time of intensive strategic planning for Oregon State University and the College of Health (where CHAR lives), resulting in the current [University strategic plan](#) and [College of Health strategic plan](#).

I am excited by the role that CHAR can play in the success of these plans. OSU's strategic plan focuses on four defined research areas, including integrated health and biotechnology, reflecting the importance of collaboration across disciplines to achieve health.

As those of us who work in aging research know, it is impossible to understand healthy aging without considering the many levels at and contexts in which people age. As such, CHAR already brings together researchers across colleges and disciplines to consider and investigate healthy aging from an integrated perspective.

A few examples: In the [neurodegeneration journal club](#), faculty and trainees across multiple departments, schools, and colleges discuss articles from our disciplinary and interdisciplinary perspectives. (Our January meeting focused on an investigation into the relationship between different uses of common cardiovascular disease drugs and the risk of dementia.)

Likewise, our last newsletter highlighted CHAR faculty from kinesiology (College of Health) and from biochemistry and biophysics (College of Science) collaborating to understand how a drug taken for diabetes might promote heart and muscle health in aging, as well as CHAR faculty from biochemistry and biophysics (College of Science) and from biomedical sciences (Carlson College of Veterinary Medicine) collaborating to understand how multivitamins might support healthy aging.

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### ***Integrated health is the heart and soul of CHAR.***

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Emphasizing integrative and transdisciplinary research, the College strategic plan includes a focus on conditions and contexts that are important to healthy aging.

As the country has undergone the “epidemiological transition” from deaths mostly due to infectious disease, the number of people living into older age has increased, and medical advances are increasing the number of people in their ‘fourth age’, living with disease and disability.



***Suzanne Segerstrom, Ph.D., MPH***

*Director, Center for Healthy Aging Research; Jo Anne Leonard Petersen Endowed Chair for Gerontology and Family Studies*

CHAR faculty are deeply involved in understanding how social, behavioral, and environmental factors affect the prevention and management of disease and the well-being of people living with disease.

Keeping close to home, I have a research program in amyotrophic lateral sclerosis (ALS; also known as motor neuron disease or Lou Gehrig's disease). As part of that program, my interdisciplinary collaborators and I have examined interactions among quality of life and disease progression in both the person with ALS and their partner.

Other CHAR faculty are involved in research on diseases that disproportionately affect people in older age, including dementia, osteoarthritis, cancer, and cardiovascular disease.

CHAR faculty research also incorporates the roles of culture and place in the care, health, and well-being of older people with (and without) disease.

As the University and College envision their futures, CHAR provides a model for multilevel (bench to bedside, cells to caregivers), multidisciplinary research that addresses important issues in health and well-being for all.

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[healthyaging@oregonstate.edu](mailto:healthyaging@oregonstate.edu)

can help support bone health even as aging increases the breakdown of bone, notes CHAR faculty member and nutrition professor Emily Ho, Ph.D.

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**“When it comes to bone health, there are definitely things that people can do to slow down bone loss or even, in some cases, gain bone mass as they age,” Ho said.**

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Ho is the director of the Linus Pauling Institute (LPI) and a faculty member in OSU’s College of Health.

To help people make dietary choices that support skeletal functions as they age, the LPI recently published a “Nutrition and Bone Health” resource.

The resource is part of the “Top 10 Micronutrients for Aging Well” project, which is a collaboration between the Institute and OSU Extension Service to provide straightforward nutrition information that helps people become more resilient in many areas of health.

The new bone health flyer highlights micronutrients that have the greatest impact on bone mineral density, as well as 10 foods that are good sources of those micronutrients.

The 10 foods, which include almonds, dried figs, and sardines, are featured because of their relatively high levels of calcium, vitamin D, phosphorus, magnesium, and other nutrients important to bone health.

“Calcium is critical,” Ho noted. “If people aren’t getting enough through food, they can consider taking a daily

multivitamin that helps them get the current recommendation of 1,000 to 1,200 milligrams of calcium.”

### One more reason to exercise

Exercise and especially weight-bearing activities also are essential for bone health. They stimulate bone growth, build density, and improve balance and muscle strength.

Better Bones and Balance, an OSU Extension Service program, is one option people can turn to for these benefits. The community-based program incorporates lower-body resistance training with weighted vests and impact and balance exercises.

Classes are delivered by community-based fitness instructors around Oregon and Washington who are trained and certified through OSU Extension Service and local partners.

CHAR faculty member Kathy Gunter, Ph.D., leads the program. She suggests that people consider proactively taking such classes.

“Most of us are never encouraged to do balance training until those systems that contribute to our ability to balance have already begun to deteriorate,” Gunter said.

The benefits are clear. Better Bones and Balance participants who responded to a recent evaluation of OSU Extension’s physical activity programs reported several health improvements, such as improved balance (69%), fitness (79%), muscle strength (78%), and mental health (65%), as well as fewer or no falls (54%).



**Kathy Gunter, Ph.D., M.Ed.**  
*Professor, College of Health; Program Director, Better Bones and Balance*

In addition to the physical benefits, Gunter highlights the positive social interactions that are part of the class design and can enhance people’s motivation.

“I would argue that the social connections are a key component of the program’s success and positive impact,” she said.

Classes are designed to accommodate a wide range of abilities. For example, because many participants use assistive listening devices, instructors adjust music to lower levels to help people hear instructions.

The program’s website offers several resources, including links to classes in Oregon and Washington. A long-standing class and instructor training provider is Linn-Benton Community College, which was the first community partner to formally adopt the program for the public.

### Unraveling leptin’s impact

CHAR members Russell Turner, Ph.D., and Urszula Iwaniec, Ph.D., are focused on the biological mechanisms that shape the regulation of bone growth and homeostasis.

Based in OSU’s College of Health, much of their research in the Skeletal Biology Laboratory seeks to help prevent or treat metabolic bone disease and bone

## Nutrition & Bone Health Resources

In addition to its new flyer, the LPI offers in-depth information about bone health on its Micronutrient Information Center (MIC) website at [lpi.oregonstate.edu/mic](http://lpi.oregonstate.edu/mic).

The MIC’s bone health resources describe the complex roles that micronutrients play in bone development and strength and in the physiological functions that bones support as reservoirs for calcium and phosphorus. The Institute operates the MIC as part of its mission to promote optimal health through research and outreach about micronutrients and other factors that affect human health.

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cancer. This has included investigating the effects of alcohol on bone, how nutrition affects tumor metastasis, and the cross-talk between bone cells and other cells, such as fat cells.

In 2005, Iwaniec and Turner began collaborating on research into the hormone leptin, which acts on multiple organs, including bone and the immune system.

Known for its role in regulating hunger and controlling energy expenditure, leptin helps maintain a person's body weight.

They initially focused on leptin as an important factor in bone metabolism, working in a feedback loop between fat stores and the brain to signal when there is enough energy for optimal functioning.

Then, in 2011, they began investigating a potential dark side of leptin action on bone – that leptin, at high levels, could contribute to inflammation-driven bone loss.

### Inflammation and bone health

Working as the principal investigator for this research, Iwaniec has received over \$3 million in funding from the National Institute of Arthritis and Musculoskeletal and Skin Diseases since 2011.

In addition to Turner, Iwaniec also works closely with OSU researchers Carmen Wong and Adam Branscum to study leptin.

The molecular mechanisms for leptin's negative effects are poorly defined, Iwaniec said. Around 2011, it was



**Urszula Iwaniec, Ph.D.**  
Professor, College of Health

generally believed that leptin's negative effects on bone were mediated through the central nervous system.

Since then, Iwaniec and Turner have provided evidence that the negative effects are mediated through a different mechanism: the immune system.

The team's current work focuses on the role of immune cells in leptin's skeletal actions.

***The research hypothesizes that leptin signaling is necessary for normal bone growth, maturation, and turnover, but in the presence of chronic inflammation, leptin acting on immune cells promotes net bone loss.***

"It may be possible to target those immune cell-specific pathways while preserving the important beneficial effects of leptin on appetite, immune function, and bone metabolism," Iwaniec said.

Iwaniec and Turner are currently testing their hypotheses in male and female mice.

Iwaniec said the research could provide new insights for the development of interventions to interrupt leptin-mediated inflammatory cascades without compromising leptin's beneficial skeletal actions.

Chronic inflammation is seen in many conditions, such as asthma, arthritis, and estrogen deficiency, and is associated with bone loss. It increases bone turnover and is a strong risk factor for pathological bone loss.

Bone degradation and loss can also happen with inflammatory conditions associated with wear particles from joint replacements, leading to joint replacement failure.

Iwaniec notes that these inflammatory conditions and consequences are more likely to occur as people age.

"In spite of these associations, the potential role of leptin in mediating bone loss associated with inflammation has received little attention," Iwaniec said. "We are seeking to fill this gap in knowledge."

### Research & Resources

**Top 10 Micronutrients for Aging Well:** [ipi.pub/Top10Project](http://ipi.pub/Top10Project)

**Better Bones and Balance**  
[extension.oregonstate.edu/bbb](http://extension.oregonstate.edu/bbb)

**Skeletal Biology Laboratory**  
[health.oregonstate.edu/research/skeletal-biology](http://health.oregonstate.edu/research/skeletal-biology)

Visit  
[osugero.org](http://osugero.org)  
to learn more  
and register.

### OSU Gerontology Conference is set for April 17

"Innovations in Aging" is the theme for the 48<sup>th</sup> Annual OSU Gerontology Conference.

Presentations will address many age-related issues, such as social isolation, compassion fatigue, cognitive decline and disorders, and aging into poverty.

The conference runs from 8 a.m. to 4 p.m. on Thursday, April 17 at the Alumni

Center in Corvallis.

Anyone is welcome to register to attend, and continuing education certificates are available.

The conference is a collaborative effort by OSU's College of Health, Extension Family and Community Health Program, Center for Healthy Aging Research, and Center for Health Innovation.

# Q&A with program graduate Madi Nichols

**We spoke with graduate student Madi Nichols about her experience as a 2022 LIFE Scholar and her recent work. She is currently working in Dr. Kelly Chandler's lab, and her research focuses on how adults in mid-life and beyond understand, process, and regulate their emotions in different interpersonal contexts.**

## What drew you to doing your graduate work at OSU?

I grew up in Rock Hill, South Carolina. Moving across the country to come to OSU for my graduate work was a big decision, and Oregon is unsurprisingly very different from South Carolina.

One of my mentors at the time introduced me to some OSU Human Development and Family Sciences students and faculty at a conference in 2019, when I was beginning the graduate school application process. These students were so supportive and willing to answer my questions honestly that I thought it indicated a positive program culture of which I wanted to be a part.

## What inspired you to focus on the midlife and older age range in your research?

As Dr. Chandler always says, "Research is me-search." I've always been curious about what comes next, and my OSU course on adult development and aging really solidified my interest in midlife and older adulthood. I found research on age stereotypes and discrimination to be fascinating.

Of course, it also helped that I have an amazing grandmother who exemplifies the positive aspects of aging – and resilience, in particular – and always inspires me to do better.

## How did you become interested in emotion regulation?

My interest in emotion regulation stems from an interest in self-reflection and self-improvement, as well as a desire to help others improve their lives and emotional well-being through changing their behaviors.

These two interests have really allowed me to focus on a question that is constantly on my mind: How do we change our behaviors now to make our lives better in the future?

## What did you enjoy most about being a LIFE Scholar?

I really enjoyed the LIFE Scholar meetings where we got together to share updates about our projects. A common thread I saw across all our projects was the desire to improve lives for older adults and optimize the aging process.

It's always helpful to get feedback from people within different academic disciplines, and their questions helped me improve my ability to communicate about my research. My experience also helped solidify my interest in conducting



*Nichols is a Ph.D. student in the Human Development and Family Sciences program. She is currently working on her dissertation, and her co-advisors are Kelly Chandler, Ph.D. and John Geldhof, Ph.D.*

research – it's exciting to collect data, and working with real people with primary data after working with secondary data for a while renewed my energy and passion for research.

## What do you enjoy doing outside of your studies?

Knitting and baking have been a big part of my life outside of graduate school! It's always nice to be able to pick up a project while I'm waiting for analyses to run, and I also love baking pretzels when I have time.

Other than that, I really enjoy exploring some of the state parks near me in Salem. I often go to Spring Valley State Park to walk trails along the Willamette or to Willamette Mission State Park to explore the different educational trails and watch people play disc golf!

## Emotion regulation in midlife

Nichols has found that adults in midlife are a particularly interesting focus for studying how context influences emotion regulation because they are often regularly challenged by demands from both work and family.

Her research in this area began when she was a LIFE Scholar, working with mentor Kelly Chandler, Ph.D., to develop The CIDER Study (Contextual Influences on Daily Emotion Regulation).

The study draws on a process model of emotion regulation proposed by Stanford University researcher James J. Gross in 1998. The model identifies five emotion regulation strategies that people often use to respond to emotionally significant situations, such as whether a situation is engaged with and other choices or reactions that can develop as situations unfold.

Visit [health.oregonstate.edu/research/flow](https://health.oregonstate.edu/research/flow) for more information on the CIDER Study and Chandler's Family, Work & Well-Being Lab.

# Awardees complete deep dive into aging research



Back row, left to right: Alysia Vrailas-Mortimer (mentor), Suzanne Segerstrom (CHAR Director), Claudia Maier (mentor), and Emily Ho (former CHAR Co-director). Front: students Dhilan Thanik, Hailey Harris, Phoebe Lee, and Prongbaramee Colling.

**The LIFE Scholars Program provides stipends to support students as they work with faculty mentors during the summer to expand their skills in healthy aging research. Below, the 2024 awardees reflect on their experience.**

## HAILEY HARRIS

Senior working towards an Honors B.S. in Psychology | Mentor: Alysia Vrailas-Mortimer

### What was your LIFE Scholar research about?

My research explored the effects of Empagliflozin (EMPA), a Type 2 diabetes and cardiovascular disease drug, and its impact on lifespan and healthspan in the model organism *Drosophila melanogaster*.

I tested various concentrations of EMPA on fruit flies using lifespan assays, which track fly lifespan, and DAM assays, which measure general locomotive function. This research investigated whether EMPA has an influence on aging processes, specifically through its potential involvement with a gene called p38 MAPK (p38Kb), which regulates the oxidative stress response and aging.

### How could this research impact people's lives?

This research could offer insights into EMPA's influence on aging, potentially leading to new treatments for improving lifespan and healthspan in humans. By studying these effects in fruit flies, we can uncover key mechanisms that may apply to humans as well. Better understanding these mechanisms

can help develop treatments that promote healthier aging while preserving physical functionality.

### What did you enjoy about the experience?

What I enjoyed most was the opportunity to lead an independent project as an undergraduate. I gained valuable insights into genetics and biochemistry research methods, while also appreciating how this work contributes to healthy aging processes.

It was rewarding to see how my research could eventually help develop treatments that could improve both lifespan and quality of life for people as they age.

## DHILAN THANIK

Junior studying Biohealth Sciences | Mentor: Alysia Vrailas-Mortimer

### What was your LIFE Scholar research about?

My research focused on using the model system *Drosophila melanogaster* to investigate how p38 MAPK (p38Kb), a stress gene, is regulated in response to aging

Aging is a complex process that is characterized by a slow decline in cellular functions and is associated with an increase in oxidative stress. This can result in the accumulation of damaged DNA, proteins, and other cellular structures.

p38kb regulates aging and lifespan by mediating oxidative stress and activating transcription factors to increase the expression of antioxidant genes. It also regulates the body's ability to maintain regulation and normal function of various proteins within cells.

### How could this research impact people's lives?

By understanding protein homeostasis and how transcriptional regulation can impact aging, we can develop strategies that promote healthy aging and potentially identify targets for therapeutic interventions to enhance and prolong lifespan, as well as mitigate age-related diseases such as Parkinson's and Alzheimer's.

### What did you enjoy about the experience?

My favorite part of being a student scientist last summer was being able to dissect flies under a compound microscope to practice my fine motor skills. Also, my grandfather passed away due to complications with Parkinson's disease, so being able to research aging and how it ties into neurodegenerative diseases brings me joy knowing that it could impact many people in the future.

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## PHOEBE LEE

*Junior working towards a degree in Chemistry | Mentor: Claudia Maier*

### What was your LIFE Scholar research about?

My research with Dr. Maier was in collaboration with Dr. Kathy Magnusson's lab. I observed mitochondrial, dendritic, and RNA alterations in young 5xFAD mouse brains as Alzheimer's disease (AD) develops.

Using matrix-assisted laser desorption/ionization-mass spectrometry imaging (MALDI-MSI), I further explored these differences through their spatially resolved protein and lipid profiles.

Proteins and lipids that were uniquely altered in the young 5xFAD mouse model were identified and their biological pathways were analyzed.

### How could this research impact people's lives?

Although the 5xFAD mouse model is a common model for AD, most AD research studies older mice when AD pathology is extensively developed.

By focusing on AD alterations in young 5xFAD mice, the discovery of significant discriminatory proteins or lipids can become useful biomarkers for pre-symptomatic AD diagnosis and targeted drug development.

Furthermore, analyzing associated protein and lipid pathways is critical to shedding light on AD pathogenesis.

**Claudia Maier, Ph.D.,**  
(Department of Chemistry) and **Alysia Vrailas-Mortimer, Ph.D.,**  
(Department of Biochemistry and Biophysics) mentored students in the 2024 LIFE Scholars Program.



### What did you enjoy about the experience?

My favorite part of my research was data analysis. The imaging data and colors were truly beautiful.

## PRONGBARAMEE COLLING

*Junior studying Biochemistry and Molecular Biology with an option in Advanced Molecular Biology | Mentor: Claudia Maier*

### What was your LIFE Scholar research about?

My research focused on how the amyloid beta peptide changes the protein profiles of neuron-like cells, intending to determine which cellular pathways are affected.

I also wanted to know the potential of Centella extracts to reverse the damage caused by the peptide, since the plant has a long history of use in traditional medicine and is packed with antioxidants.

By studying these interactions, I hope to add to the body of knowledge about how natural compounds can help mitigate the cellular damage linked to Alzheimer's disease.

### How could this research impact people's lives?

This research may lead to the identification of plant-based treatments that slow down or reverse the damage caused by oxidative stress, which plays a role in the progression of Alzheimer's disease.

In the long term, it could lead to supplements or treatments that improve brain health and support healthy aging.

The insights gained from studying Centella's antioxidative effects may also be applied to furthering our understanding of other diseases caused by oxidative damage to tissues.

### What did you enjoy about the experience?

The summer research experience taught me a lot about the importance of persistence and adaptability as a student scientist. I learned that experiments rarely go as planned and troubleshooting is a huge part of the process.

Instead of getting discouraged when something goes wrong, I take a step back, analyze what went wrong, and adjust my approach.

Patience is key and experiments rarely run perfectly the first time!

## Application period opens for LIFE Scholar program

The Center for Healthy Aging Research (CHAR) is now accepting applications for the 2025 LIFE Scholar summer program.

Through the program, undergraduate students work with faculty mentors on scholarly, creative, or research activities in the interdisciplinary field of aging. Stipends are awarded to support wages and research expenses.

The deadline to apply is 5 p.m. Friday, April 11. To learn more, visit the Student Opportunities page on the CHAR website:

[health.oregonstate.edu/healthy-aging/student-opportunities](https://health.oregonstate.edu/healthy-aging/student-opportunities)

## CHAR RESOURCES & SUPPORT

### Center expands healthy aging resources for the community

Looking for reliable information about health and well-being in older age?

The Center for Healthy Aging Research (CHAR) has expanded its web-based resources for the community. The new webpage is a one-stop shop to learn about information and services for older adults from local, state, and federal sources, as well as nonprofit organizations.

The page features trustworthy sources of information about topics such as Alzheimer's disease and related dementias, bone health, and nutrition, and includes research-based health tips from CHAR members.

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[health.oregonstate.edu/healthy-aging/  
community-resources](http://health.oregonstate.edu/healthy-aging/community-resources)

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Is there a topic related to health and well-being in older age that you are seeking more information about? Email suggestions to [healthyaging@oregonstate.edu](mailto:healthyaging@oregonstate.edu).

### SEEKING NEW RESEARCH PARTICIPANTS

Would you like to help future generations while also learning more about yourself?

We are seeking to expand our registry of possible participants for research studies related to healthy aging.

The Linking Individuals, Families, and Environments (LIFE) Registry is a registry of Oregonians who are age 50 and older who are interested in learning about opportunities to participate in studies conducted by CHAR researchers.

Registry volunteers only agree to be contacted about opportunities. They are never obligated to participate in a study, and their information is never shared beyond the OSU scientists who use the registry for their research studies.

We are interested in participants of any race, ethnicity, religion, physical capability, or social position.

To learn more about the LIFE Registry and to sign up, visit [health.oregonstate.edu/healthy-aging/life-registry](http://health.oregonstate.edu/healthy-aging/life-registry)

## SUPPORT HEALTHY AGING RESEARCH

Understanding the biology, psychology, and environmental influences of aging is critical.

Our researchers are hard at work investigating the causes of diseases and conditions related to aging and finding solutions that will enhance optimal health as we age.

We invite you to join our circle of alumni and friends who are supporting our important research by donating to the Center for Healthy Aging Research.

Gifts of any size are welcome. Whether you choose to give \$25, \$250, or \$25,000, your donation will be used to support faculty and student projects, augment research initiatives, purchase technology to support teaching and outreach, or other uses that you may designate.

For information about donating to the Center for Healthy Aging Research, visit [health.oregonstate.edu/healthy-aging/about/donate](http://health.oregonstate.edu/healthy-aging/about/donate) or contact Jessica at [jessica.merkner@osufoundation.org](mailto:jessica.merkner@osufoundation.org).



Research students analyze their data with Karen Hooker, Ph.D. Hooker is a professor emerita in the College of Health and a former director of CHAR.

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### Center For Healthy Aging Research Newsletter

Editor: Joan Rutkowski

### CENTER FOR HEALTHY AGING RESEARCH

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