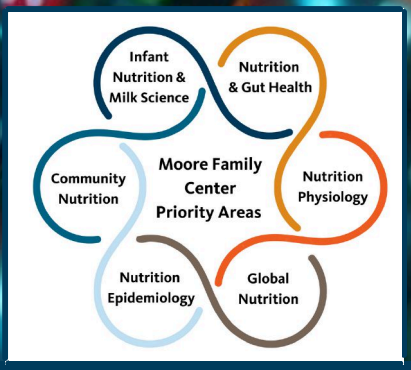
COLLEGE OF HEALTH SUMMER 2025

MOORE FAMILY CENTER

FOR WHOLE GRAIN FOODS, NUTRITION AND PREVENTIVE HEALTH

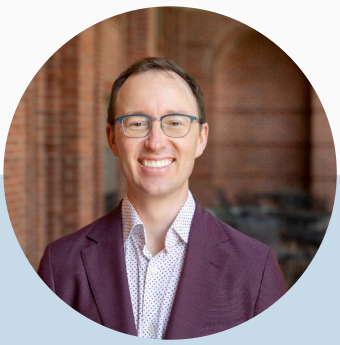
NEWSLETTER

Creating a healthier future for all people through the power of nutrition.



Welcome to our summer newsletter where we explore the intersection of nutrition and gut health. With interest in gut health beginning centuries ago, a surge in research has occurred in the past few decades—and for good reason: the gut plays the critical role of breaking down and absorbing the nutrients our bodies get from food. The gut also hosts an incredibly dense and diverse ecosystem of bacteria known as the microbiome. Our gut's unique microbiome provides us with crucial health benefits, especially in concert with quality nutrition.

Thank you for taking some time to check in with the Moore Family Center—please enjoy these articles about the work of our outstanding students and faculty affiliates in the fascinating research area of nutrition and gut health!



David Dallas
Endowed Director, Moore Family Center
Associate Professor, Nutrition

This issue's focus area: nutrition and gut health

Oregon State University

Meet the Simulator of the Human Intestinal Microbial Ecosystem (SHIME)

"The SHIME" is a phrase we hear often here at the Moore Family Center and the Dallas Lab, and with good reason: the Simulator of the Human Intestinal Microbial Ecosystem (SHIME) is a remarkable piece of equipment. It gives scientists the ability to study human digestion in the lab, outside of an actual human.

So how does this science fiction-sounding machine work? Envision a series of glass containers connected to each other with numerous pumps and tubing (see a photo of the SHIME, below right). The containers represent different sections of the digestive tract. When you "feed" something to the SHIME, the contents are pumped to different containers that represent different sections of the digestive system. For example, there is a container that mimics the unique environment of the stomach, the small intestine, and the large intestine. Like a human's gut, the SHIME's "large intestine" containers are where the gut microbiome, with loads of beneficial bacteria, is most active.

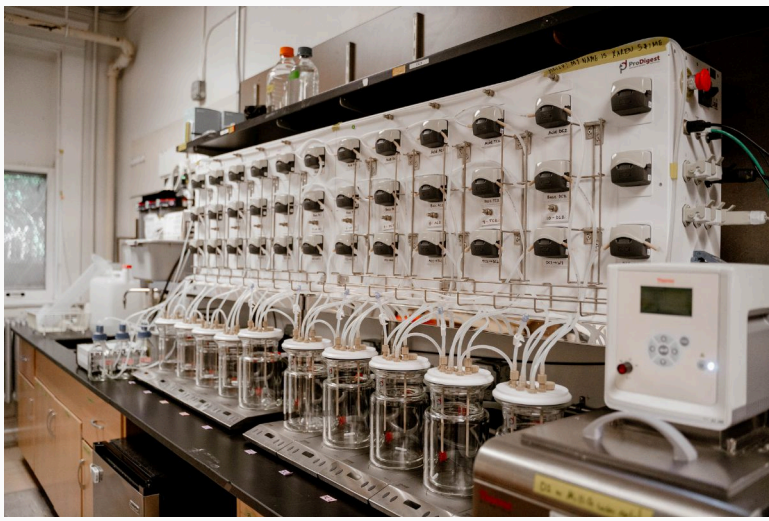
With special care, such as keeping containers oxygen-free, and adding correct enzymes, scientists can grow and maintain a gut microbiome within the SHIME that is equivalent to our own.

HOT TOPIC: Meet the SHIME

Researchers can use the SHIME to study different foods and explore how they break down, release nutrients, and affect the gut microbiome.

Presently, researchers in the Dallas lab are using the SHIME to discover differences in milk digestion between preterm infants and infants born at term.

In summary, the SHIME opens up the "black box" of digestion, empowering researchers to study how foods behave after we eat them, a promising approach for increasing gut health through better nutrition.



The Simulator of the Human Intestinal Microbial Ecosystem (SHIME) allows researchers to better understand human digestion and gut health in the Dallas Lab.

Research Update

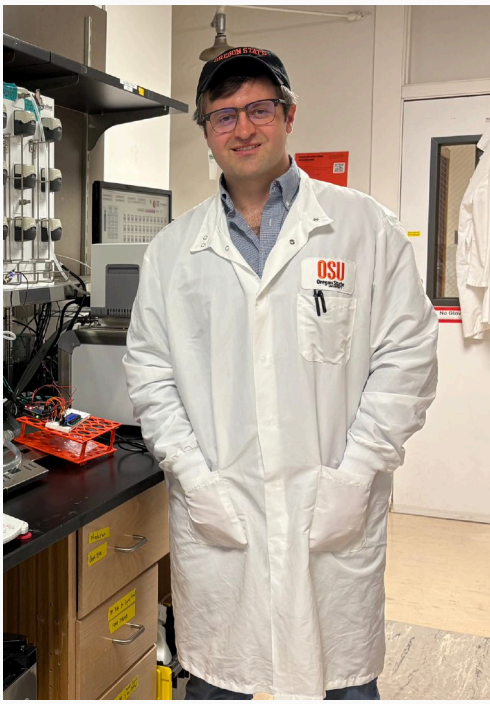
Dr. Clay Swackhamer uses the SHIME to study probiotics, prebiotic fibers and the gut microbiome

The gut microbiome is complex and personalized, but scientists are starting to understand the characteristics of a healthy microbiome, and how a thriving microbiome leads to overall well-being. The question many people are asking is “how do I keep my microbiome healthy?” Fiber is the fuel for the health-promoting microbes in the gut, yet only 1 in 20 Americans eats the recommended amount of fiber.

To Dr. Clay Swackhamer, the question of how dietary fibers promote or inhibit specific types of gut bacteria involves a mixture of chemistry, biology, ecology, and engineering. As a USDA-NIFA postdoctoral fellow at Purdue, Clay studied corn bran fibers and their effects on the gut microbiome. Out of that research he developed modified fibers that increased the relative abundance of certain healthy gut microbes like Bifidobacterium and Roseburia, while maintaining high levels of butyrate, an anti-inflammatory nutrient produced by gut microbes.

As part of the Moore Family Center and Dallas Laboratory, Clay is working on a device called the SHIME (Simulator of the Human Intestinal Microbial Ecosystem), along with PhD student Jillien Zukaitis, to accurately simulate the digestion of milk in the infant gut. This work could help researchers better understand the effect of milk processing or fortification on the release of bioactive components of milk (like peptides) to improve nutrition for this special population.

Currently, Clay and Jillien are focused on simulating the stomach and small intestinal phases of infant digestion using SHIME—stay tuned for updates on this project!



Dr. Clay Swackhamer, research associate with a joint appointment in the Moore Family Center, Dallas Lab, and the Food, Science and Technology Department at OSU.

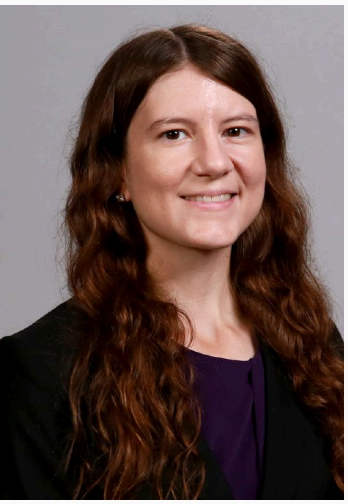
Learn more...

- Read Clay’s article about prebiotic soluble fiber.
- Read Clay’s article about solid food digestion.

Research Update

MFC faculty affiliate investigates the gut-brain axis, whole grains, and how these connections influence human health

We wish to welcome Dr. Anna Hayes, an affiliate faculty member of the Moore Family Center and newly appointed assistant professor in the Department of Food Science and Technology at Oregon State University (OSU). Dr. Hayes recently completed an NIH-funded postdoctoral fellowship at the University of Southern California, where she researched what has been called the "gut-brain axis," a set of elusive connections that link the foods we eat to the brain.



Dr. Anna Hayes, newly appointed assistant professor in the department of Food Science and Technology at OSU and Moore Family Center faculty affiliate.

It is known that the gut and brain are linked through nerves (like the vagus nerve), but the microbiome also influences the signals sent back and forth between the brain and the gut. The carbohydrates that we eat have a lot of influence on the gut, with the digestion of carbs affecting blood sugar, feelings of hunger and fullness, and the undigested parts of carbs (dietary fibers) shaping the gut microbiome.

These links are crucial to gut health and human health in general, and each connection is a fascinating puzzle for Dr. Hayes, who combines the perspective of carbohydrate chemistry gained through a PhD at Purdue University, with the point of view of behavioral neuroscience, equipping her with a toolbox to figure out how foods we eat affect the gut and brain.

Some of Dr. Hayes's previous studies investigated the ancient grain pearl millet and its influence on digestion and control of food intake. She has looked at how certain carbohydrates can combine with proteins and other food components during heat treatment, resulting in changes in the gut microbiome, health of the gut wall, and cognition. Now at OSU, Dr. Hayes' work includes investigating how foods affect the gut and brain, health implications of ancient grains and whole-grain foods, and how spent grain can be incorporated into healthy foods for the future.

Clockwise, from upper right: quinoa, millet, farro, and buckwheat. Dr. Hayes' lab investigates grains like these and other whole grain foods in relation to human health.

Student Stories

Gerber Foundation research grant awarded to Md Atikur Rahman

Congratulations to Md Atikur Rahman, a PhD student in the Dallas Lab, for earning a Gerber Foundation research grant! Read this interview with Atik to learn more about this opportunity and his plans for future research.

Q: What project are you working on for your Gerber Foundation research grant?

A: I am studying how digestion of donor human milk in preterm infants may release infection preventive molecules called antimicrobial peptides. These peptides could help protect preterm infants by fighting off harmful bacteria in their gut. My research will identify and test these peptides to see if they could be added to infant formula or milk fortifiers to strengthen babies' immune systems.

Q: Why is this work important?

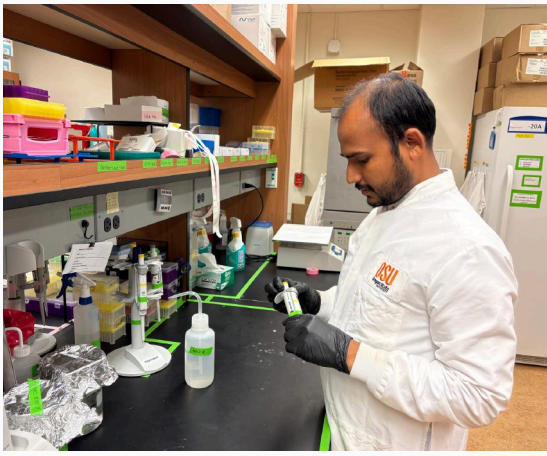
A: Preterm babies are born with underdeveloped immune systems, making them more likely to develop serious illnesses like sepsis and necrotizing enterocolitis, which can be life-threatening. We know that donor milk is better than formula at protecting these babies, but we don't yet fully understand why. If we can pinpoint which specific milk peptides help prevent infections, we could improve infant nutrition by adding these protective components to formula or milk fortifiers—especially for babies who don't have access to donor milk.

Q: What got you interested in this type of work?

A: I've always been fascinated by the power of food to promote health, especially in vulnerable groups like infants. When I realized that milk protein containing encrypted peptides may act like antibiotics, I wanted to dedicate my research to further understanding the antimicrobial role of these encrypted peptides to improve infant health.

Q: What are your career goals after you graduate with your PhD?

A: Once I graduate with my PhD, I hope to keep bridging the gap between science and real-world health solutions. My goal is to work on developing practical nutritional recommendations including improved infant formulas enriched with protective peptides to help babies thrive, especially in areas where donor milk is not available. I would also love to collaborate with both researchers and industry partners to make these discoveries accessible to infants and families around the world.



Atik Rahman, PhD student, earned a Gerber Foundation grant to study the digestion of donor human milk in preterm infants in the Dallas Lab.

Matt Kuchan - Nutrition and Brain Health, Clinical Researcher

Abbott

Matt Kuchan is a discovery scientist at Abbott Laboratories leading research into the impact of nutrition on cognition and memory. We look forward to pairing Matt with a nutrition student for mentorship during the 2025-26 school year!

Nutrition Career Mentorship Program

MFC's first nutrition career Q+A event a success; expansion plans for the 2025/26 academic year

We're grateful to reflect back on a successful pilot nutrition career Q+A event with our first Moore Family Center career mentor and friend, Dr. Matt Kuchan. Matt was greeted with immense curiosity from our attending students, sparking lively conversations about pursuing passion, meaning, and impact both in career and in life.

Matt's central words of wisdom? Try everything and anything that piques your interest and don't stray away from asking those in charge how they got there. Attendees learned about the qualities Matt considers essential for different paths of the nutrition profession, and how he found his way to the laboratory at Abbott.

We were excited to host students interested in Nutrition – from undergraduates starting to find their way, to graduate students planning for their next big career step.

We look forward to expanding our mentor base into more sectors of the nutrition profession in the near future.

This fall term, the Moore Family Center is partnering with the CATALYST mentorship program to offer the Nutrition Career Mentorship Program as a non-credit course series for the 2025-26 school year. The Nutrition Career Mentorship Program will pair nutrition students with working professionals with an aim to expand our mentee's career horizons ahead of graduation.

Our mentees enrolled in the new course will be guided through leadership and career exploration assignments with their mentors while continuing to build their networks with the very professionals they may work beside in the future.

Are you a nutrition professional looking to give back and lend a guiding hand to the next generation of leaders? Being a mentor is likely much easier than you think.

We are currently recruiting mentors!

To learn more, contact Adam Choate, MFC Outreach Coordinator, at: adam.choate@oregonstate.edu

Welcome Moore Family Center faculty affiliates!

The Moore Family Center extends a warm welcome to the following faculty affiliates in the Nutrition and Gut Health priority area. As a team, we are exploring the intricate connections between foods and digestive health to pioneer preventive health strategies. We are committed to growing our impacts with additional partners!

Faculty Affiliates: Nutrition and Gut Health

Emily Ho, PhD
Distinguished Professor of Nutrition
College of Health
Oregon State University
Endowed Director of the Linus Pauling Institute

- With the MFC: Investigates the interplay among food-based bioactives, the microbiome and cellular mechanisms in the susceptibility and/or progression of chronic diseases.

Myriam Cotten, PhD
Associate Professor
Department of Biochemistry & Biophysics
Oregon State University – Cascades Campus

- With the MFC: employs biophysical, biochemical, and biological methods to study structure-activity relationships and molecular recognition in peptides and proteins.

Maude David, PhD
Associate Professor
Departments of Microbiology
College of Science & College of Agricultural Sciences
Oregon State University

- With the MFC: Analyzes the microbiota-gut-brain axis using new analytical methods and deep learning approaches.

Natalia Shulzhenko, MD, PhD
Associate Professor
Carlson College of Veterinary Medicine
Oregon State University

- With the MFC: Investigates interactions between gut microorganisms and the immune system that drive chronic inflammatory disorders, such as inflammatory bowel disease, type 2 diabetes, and cancer.

Jung Kwon, PhD
Assistant Professor
Food Science & Technology
College of Agricultural Sciences
Oregon State University

- With the MFC: develops useful nutritional and biomedical applications for human health promotion and disease prevention including modulation of gut microbiome.

Learn more...

- Read more about faculty research at MFC

Join our team:

- Contact Dave Dallas, Director, at dave.dallas@oregonstate.edu

A Bright Future - Looking Ahead

Food as Medicine Series

A systematic approach to chronic disease prevention and nutrition science.

Coming 2025-26
Podcast-style educational series with culinary medicine classes!

Addressing the need for increased exposure to nutrition information among allied-health students, the Moore Family Center is developing a new educational seminar series. The Food as Medicine series will explore food systems and innovations advancing our understanding of health. Each seminar will pair with a Culinary Medicine Workshop to teach participants about health promotion and disease prevention, with an additional aim to promote chronic disease prevention.

Episode One: Dairy and Health (coming October 2025!)

Support the Moore Family Center's student mentorship program!

We are fundraising to support the MFC's Student Mentorship Program to bring more career events and 1-on-1 mentors to nutrition students (see p. 7). Join us to help change lives through student success!

To give, contact Candace Russo at:
candace.russo@oregonstate.edu
or visit our Giving page.

Seeking Food-based Sponsors

The Moore Family Center is seeking sponsors and in-kind donations from local food-based organizations for our new Food as Medicine series. Our proposed focus foods include:

- Whole Grains
- Berries
- Cruciferous Vegetables
- Tubers
- Seafood and Protein Foods
- Nuts and Seeds
- Beer, Wine & Hops

For more information, please contact Adam Choate:
adam.choate@oregonstate.edu

Missed the Our Health & Milk episode?
Dr. Dallas and three graduate students answered your questions about milk!

Watch it here: beav.es/mfc-our-health-milk

Interested in receiving future newsletters? Sign up for our listserv here: beav.es/mfc-news

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