MORGRIDGE
INSTITUTE FOR RESEARCH

SPRING 2024

YOU MAKE A DIFFERENCE

INSIDE

A special report for supporters of the Morgridge Institute for Research

BRAD'S UPDATE

FRIENDS AND SUPPORTERS,

As we reflect on our journey of exploration and discovery at the Morgridge Institute, we are deeply grateful for your unwavering support. Your generous contributions and belief in our mission have been the cornerstone of an ecosystem where fearless science doesn't just flourish — it redefines boundaries.

I'm sure you've seen the term "fearless science" in our publications and across our website. But it's far more than a mere slogan. Fearless science is our ethos and a testament to the spirit of innovation you help sustain.

We believe that true scientific breakthroughs emerge from venturing into the unknown. Science doesn't thrive by asking "safe questions." And that's why we support researchers who dare to ask questions that others might shy away from. This bold, intrepid approach is what paves the way for groundbreaking advancements in understanding our world and enhancing human health.

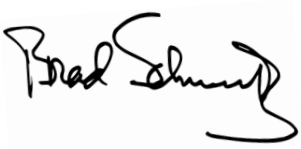
"Fearless science" encapsulates the essence of our culture, our attitude and our commitment to making a difference. Indeed, the Morgridge Institute encourages scientists to stay curious and to push into new frontiers of biology, rather than work around what is known.

Fearless science is what enables our scientists, like the Daniela Drummond-Barbosa Lab, to pursue innovative studies on the intersections of fertility, diet and obesity — explorations that hold the promise of unlocking new insights into complex biological phenomena. You can read more about her lab's work on page 10.

Our scientists need the freedom, flexibility and courage to pursue transformational ideas. From the cutting-edge discoveries detailed on page 2 to the myriad of inquiries unfolding within the walls of our institute, every endeavor is a testament to what fearless science can achieve.

You make discovery and innovation happen. Please accept our heartfelt thanks for your role in this incredible journey. Your support not only propels us forward but also reinforces the foundation upon which our shared aspirations for a healthier, more curious world rest.

Here's to our continued embrace of Fearless Science — with gratitude and anticipation for the wonders yet to come.



Brad Schwartz, M.D.
Chief Executive Officer
Morgridge Institute for Research

P.S. What's on the cover? Meet Peter Ducos, a U.S. Army veteran and graduate student in the Tim Grant Lab. You can read more about Peter's journey from his military career into research on page 6.

YOU'RE MAKING A DIFFERENCE

The Morgridge Institute for Research explores uncharted biomedical research. By asking the boldest questions and following the highest standards of quality research, we will improve human health.

We can't do this important work without YOU. Thank you for supporting fearless scientists and igniting curious minds.

Fearless Science at the Morgridge Institute

Science doesn't thrive by asking "safe" questions. We support researchers who take reasoned risks that may yield greater rewards to human health.

Thanks to your support, the Morgridge Institute helps scientists push into new frontiers of biology, rather than work around the edges of what's already known. For curiosity-driven research to thrive, our scientists must have the freedom, flexibility and courage to pursue transformational ideas.

Curiosity

Science is about what we don't know. Our scientists are driven by a deep curiosity for how the world works.

Freedom

Morgridge researchers have the support and time needed to do the very best possible research — and the freedom to go where the scientific method takes them.

Courage

Pushing into new frontiers means accepting unexpected turns and occasional dead-ends. Morgridge recognizes that embracing risk can yield transformational results.

Flexibility

Morgridge strives to remove barriers so our scientists can work quickly, collaborate freely and pivot into new opportunities when they arise.

THE YEAR IN DISCOVERY

Here's a look back on the research, discoveries, and engagement efforts across Wisconsin communities and beyond.

1

‘Deep proteome project’ provides atlas of human complexity

If DNA is the instruction manual for life, proteins are the frontline workers that translate those instructions into products. The Joshua Coon Lab took a quantum leap forward in 2023 in the ability to sequence proteins en masse — the first step in determining their function.

Coon and Morgridge Postdoctoral Fellow Pavel Sinitcyn created a new process called “deep proteome sequencing” that enables them to identify about 80 percent of all proteins that exist in a mass spectrometry sample — up from the 20 percent found in standard approaches.

“Data generated from this study represent the deepest proteomics map collected to date,” says Coon. “These methods and resources lay the foundation for comprehensive mapping of protein diversity and are expected to catalyze future research efforts.”

JOURNAL: NATURE BIOTECHNOLOGY

2

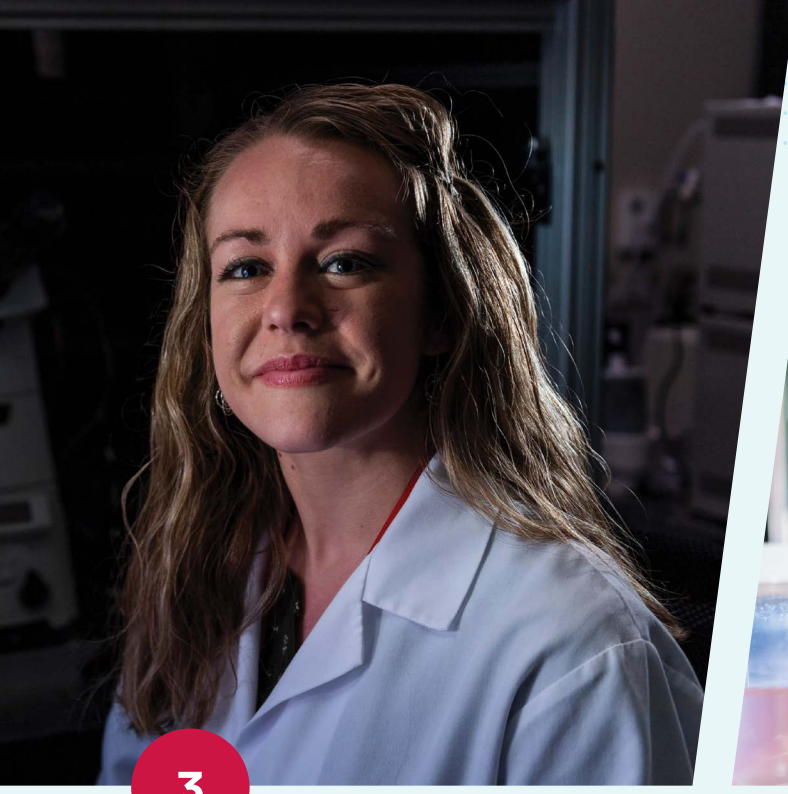
Using cryo-EM to unravel a bacterial ‘high-wire act’

Bacteria have a bumbling, stumbling approach to copying their genome. In almost every case, internal glitches occur that break off the sequence before it’s completed. But they are rescued by a sophisticated process called “replication restart,” which detects the break and quickly dispatches proteins to fix the problem.

Scientists have never been able to catch this activity “in the act,” until cryo-electron microscopy (cryo-EM) paved the way. Morgridge Investigator Tim Grant partnered with UW–Madison biomolecular chemist James Keck to use cryo-EM to reveal a “switch-like mechanism” in bacteria that interacts directly with the broken DNA strands, putting them back on track.

Better understanding this process could have major implications for creating new antibiotics that interfere with replication restart.

JOURNAL: NATURE COMMUNICATIONS



3

Visualizing metabolic activity of tumor and immune cells

A biomedical imaging team at the Morgridge Institute is exploring a new way to monitor metabolic reprogramming in cancer and immune cells — work that may lead to more precise cancer treatments.

Metabolic reprogramming is a key feature of cancer cells, which adapt their metabolism to fuel rapid reproduction in their tumor microenvironment. And as a tumor grows, immune cells can undergo similar changes affecting their ability to combat cancer.

The Melissa Skala Lab created an immunocompetent mouse model to study an important class of immune cells called T-cells. T-cells are essential for recognizing and killing pathogens, including cancer, in our body.

“We now have this red label in all of the T-cells and a subset of other immune cells,” says Alexa Heaton, lead author of the study. “It actually allows us to do a lot of unique tests where we know exactly which cell population we’re looking at.”

JOURNAL: FRONTIERS OF ONCOLOGY

4

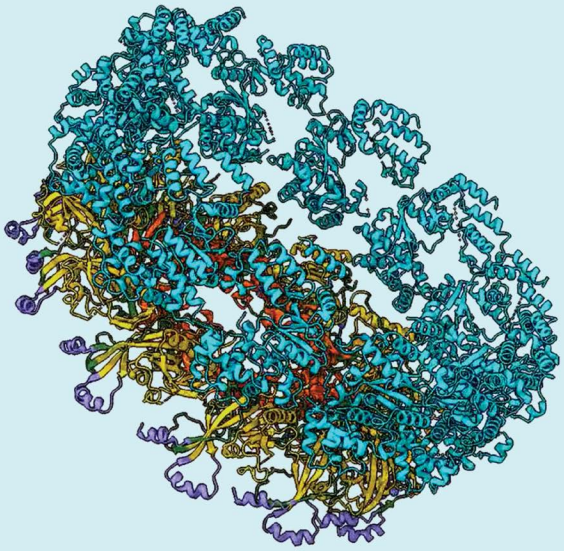
The engineering challenge of preterm birth

Preterm birth remains a stubborn and poorly understood problem, but new imaging techniques developed at Morgridge are helping scientists discover early biomechanical triggers.

Morgridge principal investigator Melissa Skala and assistant scientist Kayvan Samimi lead a multi-year project to image more than 60 fetal membrane samples that have been provided by partner hospitals after births, including Meriter Hospital in Madison and Intermountain Healthcare in Utah.

These membranes normally break during labor, but premature rupture is often one of the key causes of preterm birth. The Morgridge team, for the first time, developed methods to simulate stress points and visualize physical changes in these membranes that might contribute to rupture and be detectable during pregnancy.

JOURNAL: BIOMEDICAL OPTICS EXPRESS



5

The machinery of viral replication revealed

RNA viruses, such as the coronavirus that causes COVID-19, are in a life-and-death race the moment they infect a cell.

These viruses have only minutes to establish their replication machinery inside the host cell before the genetic instructions contained in their vulnerable RNA genomes are compromised. If this early step succeeds, the virus will start cranking out millions of copies of its genome to spread throughout the host.

The machinery involved with this process is being captured in exquisite detail by the Paul Ahlquist Lab, using cryo-EM. In 2023, the team developed striking 3D images of the molecular complex that replicates the viral genome inside the cell. The knowledge may provide new ways to disrupt a dangerous family of viruses.

JOURNAL: PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES (PNAS)

6

Macrophages as a new cancer treatment tool

Macrophages are specialized immune cells that can be adapted for the treatment of certain solid tumors by arming them with chimeric antigen receptors (CARs). Macrophages equipped with CARs can specifically recognize the cancerous cells over the healthy ones, and also eliminate a subset of them in the process.

However, generating macrophages from adult cells is a major challenge, leading Morgridge scientists to explore stem cell engineering for answers. Work led by associate scientist Jue Zhang investigated ways to use CRISPR gene editing methods to insert anti-GD2 CAR into pluripotent stem cells and produce CAR macrophages.

“Macrophages themselves have a limited ability to cure cancer,” says Zhang. “Once you have an anti-GD2 CAR expressed, that macrophage becomes an anti-tumor weapon.”

JOURNAL: STEM CELL REPORTS

Your Impact

We recently launched a new series of web stories that illuminate early-career scientists at the Morgridge Institute. The series, called Rising Sparks, takes you inside the journey of trainees, postdoctoral fellows and emerging scholars.

Rising Sparks invites our community to explore and celebrate the vibrant narratives of scientists who are rising in their careers. The series is a tribute to curiosity, resilience, and the dedicated spirit of Morgridge scientists. Join us on this compelling journey as we amplify the voices of the next generation of outstanding scientists, showcasing why their contributions matter not only to the scientific community but also to the future of knowledge and progress.

Rising Sparks:

MEET PETER DUCOS

MAKING SENSE OF MOLECULAR STRUCTURES AT THE ATOMIC LEVEL

Peter Ducos made a military career of viewing the world from high above the earth, and a research career of examining the tiny particles of life up close.

As a U.S. Army soldier and government contractor instructor pilot of remotely operated aircraft, Ducos sat at a control panel not a lot different from the one he uses to control the technology involved in single-particle cryo-electron microscopy (cryo-EM).

“You have the joystick, and you have to make a map to navigate where you’re going, and then you collect information or data,” he says.

In his role as a research assistant, the biophysics doctoral student works in the Grant Lab, which collaborates with researchers across campus trying to answer complex and varied biological questions.

“The most rewarding aspect is when you get the initial view of what this stuff looks like, knowing no one’s ever seen this before,” says Ducos. “The first time you share the results with the people you’re working with, it’s almost like being a sonogram tech saying, ‘Here’s a picture of your baby,’ and you think they’re going to cry.”

Cryo-EM is one of the most promising technologies available to molecular biologists.

The technique requires flash-freezing samples in liquid ethane that fixes proteins in glassy sheets of vitreous ice. From there, they can be examined and imaged using electron microscopes.

This revolutionary technology provides a breathtaking window into structural biology, allowing biological molecules, such as proteins, to be examined in three dimensions through the generation of near-atomic reconstructions.

The models made possible by cryo-EM allow researchers to view the exquisite details of the molecules and gain insight into why functions may occur and the ability to predict interactions based on structure.

“If there’s something interesting going on, it makes it even better,” Ducos says. “It spurs entire sets of questions about what else we can test. What other structures can we look at? We’re not looking at individual molecules. It’s a collection of them and a snapshot in time. Then, we figure out how we get beyond that.”

After a five-year stint in the Army which took Ducos to places like Kosovo and Korea, he spent several years in Iraq as a government contractor. The love of science that he harbored since childhood drew him to earn a bachelor’s degree in biology from the University of Missouri-Kansas City in 2019.

As an undergraduate, he switched majors from engineering to biology.

“When I made that decision, I decided I would make myself a learning aid and have some fun at the same time,” Ducos says. “I programmed a microcontroller for lighting and created a rainforest in a box.”

He obtained tropical plants and poison-dart frogs, bred fruit flies to feed the frogs, and introduced isopods and springtails to act as clean-up crews in his mini-biome.

Ducos became interested in how the frogs’ toxins could have such drastic effects if they entered the bloodstream. Turns out, the toxin stops ion channels from allowing nerve cells to repolarize.

“As I started looking at structures, I thought these ion channels were really cool looking — they were literally the machines I was working within engineering,” he says.

In the Grant Lab, Ducos regularly leans on his military experiences.

“In the military, you learn to deal with all kinds of people working in a mission-oriented way,” says Ducos, who hopes to use his experience and Ph.D. to gain a government or private sector research job.

And whatever became of the poison-dart frogs? They continue to live happily in an expanded tropical environment in Ducos’ home office.

Rising Sparks:

MEET LIZ HAYNES

HAYNES RECEIVES SIMONS FOUNDATION AWARD TO LAUNCH HER CAREER

Liz Haynes, a Morgridge Postdoctoral Fellow, was named a recipient of the prestigious Independence Award from The Simons Foundation in September.

Haynes, who was a first-generation college student, will receive two years of financial support and professional development resources during her fellowship and job search, followed by an additional $600,000 when she secures a tenure-track position.

She is one of three recipients named nationally in the Simons Foundation neuroscience collaboration. This award is designed for early-career scientists in math and basic science, providing a runway to increase the representation of individuals historically underrepresented in the sciences.

Haynes is a cell biologist working with Morgridge Investigator Kevin Eliceiri and UW–Madison Professor Tyler Ulland on the role of microglia, the brain's innate immune cells, in aging and disease.

She uses the zebrafish model, a freshwater fish that shares a striking amount of genetic similarity with humans and has amazing regenerative capacity.

THANK YOU

For helping launch the careers of early-career scientists.

"Understanding how microglia age and deal with neurodegenerative disease in zebrafish might be able to tell us how we can better deal with neurodegeneration," Haynes says.

She hopes to better understand the role of microglia by studying how these cells work in Alzheimer's disease, particularly as the early disease progresses.

Zebrafish, especially the crystal-clear Casper strain, are something of an in vivo imaging darling. The quick-growing animals are optically clear, so scientists can use imaging to inspect the brains for disease. The animal is proving to be an ideal model to better understand Alzheimer's disease, a progressive neurodegenerative disease that impacts more than three million people annually in the United States.

But researching Alzheimer's disease is challenging. It's difficult to understand how neurodegenerative diseases progress because the tissue samples are traditionally collected after death. To overcome this challenge, Haynes worked with the Morgridge Fab Lab to develop a life support chamber for adult zebrafish. This allows Haynes to live-image the brains in anesthetized fish.

This innovation could open new doors for understanding how microglia contribute to aging and disease. The many changes in an aging brain have not yet been fully characterized, and this is an important step in understanding the cell biology of microglia and aging itself.

Haynes believes her research resonated with the Simons Foundation's mission to advance scientific studies on cognitive aging, autism, and neural dynamics.

"I'm not just building a project necessarily for myself and my own lab," she says. "The kind of work I'm doing will also make the zebrafish a better model for all adult work and for all aging work."

"Morgridge is about people who have their eye on the future, looking for big problems to solve or bringing creative approaches to old problems."

TONY GITTER — JEANNE M. ROWE CHAIR IN VIROLOGY

YOUR IMPACT

Favoring the prepared mind

Flexibility gives the Drummond-Barbosa Lab the power to be curious

Louis Pasteur, a French chemist and microbiologist renowned for his discoveries of microbial fermentation, pasteurization, and the development of vaccines, once said "Chance favors only the prepared mind."

His exceptionally famous quote emphasizes the importance of preparation and readiness in scientific discovery. He believed that unexpected opportunities often arise in science. But those who are well-prepared and have a deep understanding of their field are the most likely to recognize and capitalize on those chances.

It's not an exaggeration to say that Daniela Drummond-Barbosa and her lab are here today at the Morgridge Institute and UW–Madison thanks to this union between serendipity and preparation.

Drummond-Barbosa is a scientist passionate about fundamental research who studies the metabolic and physiological mechanisms that link the behavior of stem cells and their progeny to diet, stress, and other systemic inputs. Her lab uses the powerful genetic model organism, the fruit fly, to understand the genetic drivers of stem cell disorders, obesity, infertility, and a variety of diseases related to metabolism.

Drummond-Barbosa was our top candidate for an investigator in regenerative biology with a demonstrated leadership and expertise in fundamental research, mentoring, and training. Moving quickly, we created a new partnership and collaboration with the Department of Genetics to develop an "out-of-the-box recruitment."

Thanks to the flexibility from private support, we created an opportunity to build stronger connections with UW–Madison and give Drummond-Barbosa the resources, infrastructure, support, and encouragement to continue tackling what she does best: curiosity-driven research that can shape our understanding of human health.

WHAT THE TINY — BUT MIGHTY — FRUIT FLY CAN TELL US

New research unravels the link of warming temperatures and fertility

Ana Caroline Paiva Gandara, an assistant scientist in the Drummond-Barbosa Lab, has built her career on the metaphorical "backbone" of insects.

Most recently, she's turned to *Drosophila melanogaster,* commonly known as the fruit fly — a powerful model organism that has contributed to many fundamental research discoveries.

Her work demonstrates how asking questions about a fundamental process in fruit flies can help illuminate larger ecological trends, an unexpected insight.

"The fact that *Drosophila* research has all these genetic tools, it opens the possibility to think about science more easily," she says. "You can have the craziest idea to explore, and with *Drosophila,* it's not infinite, but it offers a very wide world of options."

In new research published recently in the journal *Scientific Reports,* part of the *Nature* portfolio, Gandara and Drummond-Barbosa describe how chronic exposure to warm temperatures causes infertility in adult male *Drosophila.*

"The idea that temperature affects reproduction is definitely not new, but most studies come from an ecological point of view," says Gandara. "We know that the number of eggs is affected, the hatching rates are affected, but *why*? What is happening inside that is causing this?"

The Drummond-Barbosa group specializes in studying the cell biology of *Drosophila,* but with a focus on oogenesis, the development of reproductive egg cells. Gandara's first publication with the lab explored the effects of temperature within this context, but she saw the opportunity to also look at the effects on spermatogenesis when they observed that males were also becoming sterile at warmer temperatures.

This work continues Gandara's interest in studying thermal stress on insect physiology, particularly reproductive development. With the increasing impacts of climate change on natural ecosystems, the effect on fertility is a potential factor that could contribute to an organism's survival or extinction.

"We don't need super high temperatures to affect an imbalance in the ecosystem that could cause extinction. The flies don't need to die, they just need to be sterile," Gandara says. "We have all this research on extreme, lethal temperatures, but if the discussion is in the context of climate change, then more studies on chronic exposure to suboptimal temperatures are necessary."

Gandara and Drummond-Barbosa concluded from this study that there are two factors that contribute to infertility in *Drosophila* when exposed to warm, suboptimal temperatures: males develop less sperm and the sperm are of poor quality.

Gandara's curiosity and pursuit of big scientific questions goes back to when she was around 13 years old, and her science teacher brought a microscope to class. She remembers being amazed at the tiny living organisms swimming around and declared, "I want to study this!"

That moment inspired her passion for mentoring students throughout her career, and she hopes to move on in the next few years and develop her own lab as a principal investigator.

"I'm in a phase in my career where I'm transitioning," she laughs when asked about finding the balance between working on experiments herself and working with training students. "I do like being in the lab, especially if it means going to the microscope. It's still the best!"

Outreach

Donors like you are changing lives. Your commitment to science education, engagement and outreach continues to make a profound impact for children and families.

Community engagement at the Morgridge Institute is linked with our mission to spark scientific curiosity and to serve society in partnership with UW–Madison.

For us, "community" includes students, teachers, researchers, and the general public. Our work isn't limited to a laboratory. The bridge between the institute and the community is a two-way street — we are more than a physical building that invites the public in.

The Community Engagement team:

- builds programs that inspire the next generation of fearless scientists,
- supports educators working to enrich their STEM classrooms, and
- provides professional training to prepare early-career researchers.

Our programs are designed with diversity, equity, and inclusion in mind. Nearly 1 in 4 workers in the United States are employed in STEM occupations. But women, along with Latinx, Black, and Indigenous people remain underrepresented in STEM occupations relative to these groups' proportion of the U.S. population.

We strive to ensure our programs are accessible to members of these underrepresented minorities, to students who are first-in-family to college, and to students from rural communities. Our efforts are bolstered by the many Morgridge scientists and researchers who dedicate their time, talent and enthusiasm to inspiring the next generation.

That's because science belongs to all of us. And your support makes this possible. Thank you for helping create a world where science enriches and transforms lives.

Wes Marner
Engagement, Education and Equity Director

THANK YOU

For sparking curiosity, inspiring minds and creating lasting connections.

Meet the team

Val Blair

SENIOR COMMUNITY
ENGAGEMENT COORDINATOR

I have always been curious about the world around me, and growing up on a farm gave me many opportunities to explore the natural world and be curious. I love working at Morgridge in the field of informal science education because I get to keep learning about the research that happens here, and I have the opportunity to serve our community by helping young people see themselves as scientists.

Jerrod Buckner

COMMUNITY
ENGAGEMENT COORDINATOR

I represent the students who might feel less intelligent and are underperforming in school. As that young adult growing up, I am proud to be part of Morgridge Engagement team that offers programs that show these students they belong and can succeed. We strive to empower those students who lack that confidence or don't have the connection to STEM.

Dan Murphy

COMMUNITY ENGAGEMENT
AND LAB MANAGER

My perspective and passion in science education has shaped my identity and helps me create brave spaces where people can explore their world through STEM and feel empowered to participate in science. Welcoming people to explore together and have fun helps build a lifelong relationship with discovery and community, and I'm honored to be a part of that journey.

Felipe Gomez

ASSISTANT COMMUNITY
ENGAGEMENT COORDINATOR

Growing up, community educational programs were my cornerstone, offering a nurturing environment that fueled my curiosity and love for learning. Now, working within these very communities, I am dedicated to paying it forward by offering STEM programs that empower youth to build their own academic identities, fostering a new generation of enthusiastic and confident learners in science, technology, engineering, arts and mathematics.

EXPLORING SCIENCE STATEWIDE

2023 Wisconsin Science Festival

Curiosity was unleashed during the 13th annual Wisconsin Science Festival held Oct. 16-22, 2023 across the state. Designated Wisconsin Science Week by Gov. Tony Evers, the week is the signature time for communities to celebrate science — and get curious.

Children of all ages, families, and friends participated in 569 events across 51 Wisconsin counties. They held fascinating scientific projects in their hands, spun them around in bottles, saw them through virtual reality, and much more.

Each year, the Wisconsin Science Festival highlights a specific aspect of the world around us. In celebration of the many milestone anniversaries happening in Wisconsin, the 2023 festival focused on time and its undeniable influence on science, art, and technology.

Seventy-four Wisconsin libraries were among the dozens of event sites across the state. For the third year in a row, select library locations distributed more than 2,000 “Science in a Bag” STEM Kits, which are free for local families to take home. Inside the kits are three to four hands-on science and art activities that connect to research conducted throughout Wisconsin.

A member of the Prairie du Chien Memorial Library said, “We had so many people check in to get a science bag! It was wonderful being able to share this amazing program with people.”

Thanks to support from the Melita Grunow Fund, we were proud to welcome nearly 1,000 K-12 graders to the Discovery Expo. This daylong event welcomed students and teachers from 26 schools and programs to explore the UW-Madison campus and experience research and discovery. More than 230 STEM professionals volunteered during the Expo including naturalists, brain scientists, physicists, and more!

“Every single presenter was kind, interactive, and had a strong sense of knowledge around their topic,” said one teacher from Kegonsa Elementary School. “They were great with our kids!”

Thank you for inspiring, engaging and enriching the lives of the next generation of global citizens.

At-a-glance:
The Wisconsin Science Festival

51 COUNTIES ACROSS WISCONSIN

"The materials provided by the Wisconsin Science Festival were a great way to promote STEM in our rural library. The Science in a Bag kits were met with enthusiasm, as was the scavenger hunt!"

— Hortonville Public Library

Milestones
MADE POSSIBLE BY YOU

As we look back on the last year of groundbreaking research and scientific discovery, we pause to express our deepest gratitude for your unwavering support. It is through your generous contributions that we can realize our mission of advancing human health and igniting curious minds.

Your financial investment has paved the way for countless milestones and transformative stories, each a testament to the profound impact of your philanthropy. Allow us to share with you a glimpse into the remarkable achievements made possible by your invaluable support.

THANK YOU

For helping improve human health.

Gitter receives Jeanne M. Rowe Chair in Virology

In fall 2023, Morgridge Investigator Tony Gitter was named the inaugural Jeanne M. Rowe Chair in Virology. The chair honors Jeanne Rowe, who, along with her late husband John Rowe, has been deeply involved in the Morgridge Institute and UW–Madison.

The Rowes have been longtime supporters of fundamental research and, in particular, of how early-stage research can improve human health. That support culminated in the creation in 2018 of the John W. and Jeanne M. Rowe Center for Research in Virology, where Gitter is an investigator.

“My husband, John, and I wanted to do our part in helping the best and brightest investigators such as Tony do what they do best: impacting humanity in such a huge way,” Jeanne Rowe says.

BioImaging North America takes wing

If there is one constant in biology, it's the need for precise, robust imaging. A program housed at Morgridge hopes to elevate the entire field of biomedical imaging by helping scientists learn from one another and explore new technologies.

BioImaging North America (BINA), led by investigator Kevin Eliceiri, received a new multi-year commitment in 2023 from the Chan Zuckerberg Initiative (CZI) to continue building scientific bridges across the continent.

With the core CZI support, BINA has now grown to more than 1,200 members from across the globe, including 200 core imaging facilities in the U.S., Mexico and Canada. In both 2022 and 2023, more than 700 new members joined the organization.

"We're trying to set up an organization that has all the elements we would want to build strong, lasting, interactive communities," says Eliceiri.

SeLight: Morgridge's newest spinoff gaining momentum

A technology generated from the Melissa Skala Lab is showing promise in improving the efficacy of immune cell and stem cell therapies, both exciting new frontiers in cancer therapy and regenerative medicine.

SeLight LLC, a company run by Morgridge assistant scientist Amani Gillette, could revolutionize cell manufacturing by allowing researchers and clinicians to screen cell health and fitness before manufacturing. SeLight has been in development since 2018, when it won a Wisconsin Alumni Research Foundation Innovation Award.

SeLight technology is built off of the bread and butter of the Skala Lab: label-free imaging of cell metabolism. It works by measuring the inherent fluorescence of metabolic signals within cells to give a readout related to the health of those cells — in a way that doesn't require specialized training from experts. The goal is an affordable, customizable system that can plug right into clinical settings.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