

# SYNAPSE

THE COLLEGE OF SCIENCE MAGAZINE

Annual Publication 2023-2024



*“The most beautiful experience we can have is the mysterious. It is the fundamental emotion that stands at the cradle of true art and true science.”*

— ALBERT EINSTEIN, “THE WORLD AS I SEE IT”

## Advancing Knowledge, Shaping Communities

*Success Stories From the College of Science*

*By helping students achieve their individual educational goals, the UVU College of Science enhances the physical and financial health of everyone who lives along the Wasatch Front and across the country.*

*Many of our graduates go on to become medical professionals such as doctors and dentists who, over their careers, look after the physical health of thousands of individuals. Other graduates from our college pursue careers as environmental scientists who promote the physical health of entire communities by ensuring access to safe drinking water. Still other graduates promote the financial health of our region by developing energy resources or by serving as leaders in Utah's booming life sciences industry.*

*Any one degree from the College of Science can lead a student to a variety of career options and can help society in a variety of ways. For example, **Karaleen Anderson** used her biology degree to launch a career as a family practice medical doctor, while **Brad Graham** used his biology degree to become a research group leader at bioMerieux, where he helps to develop new medical diagnostic tests. **Joseph Phillips'** degree in geology led to a career developing traditional energy resources at an oil company, while **Brett Huffaker** combined his geology degree with a law degree to become a legal counsel for a renewable energy company.*

*Our students' personal growth, and their roles in promoting the health and wealth of our region, results from their own hard work and from the hard work of our wonderful faculty and staff. Our faculty members provide our students with exceptional learning experiences in the classroom and with remarkable research experiences in the lab and field. Our staff provide students with outstanding resources and guidance. Collectively, our faculty and staff share one professional goal—the success of our students.*

*Please enjoy reading through this document to learn about just a few of the accomplishments of our students, faculty, and staff.*

Sincerely,

Dr. Daniel Horns  
Dean, College of Science



# IGNITING THE SPARK OF SCIENTIFIC PASSION

*Our Dedication to Inspiring and Mentoring Future Scientists*

**AT** the College of Science, our mission is to build the scientific economy and promote scientific literacy in the Wasatch Front region and beyond. We are committed to empowering the next generation of scientists and providing them with knowledge, skills, and opportunities to succeed in scientific professions or pursue advanced studies. Through our academic degrees, certificates, and courses, we strive to create an innovative atmosphere that fosters personal and professional growth for our students, faculty, staff, and stakeholders.

At the heart of our mission is the development and delivery of high-quality courses and programs that enable students to excel in scientific fields. We believe in the power of engaging and inclusive teaching methodologies that stimulate learning and enhance knowledge retention. Beyond the classroom, we provide various engaged learning opportunities, such as faculty-mentored student research, internships, service learning, and extracurricular field experiences. These experiences complement our teaching efforts and ignite a passion for scientific inquiry and discovery.

Because student success is our primary goal, we encourage our faculty to engage in research activities. We prioritize faculty expertise and continuous growth. We encourage our faculty to engage in research activities to stay at the forefront of their disciplines. Additionally, we provide training in effective teaching methods to

ensure our students receive the best education possible. Effective advising is also a key aspect of our commitment to student success.

Our dedication to the next generation of scientists extends beyond our campus. We actively engage with the K-12 community and the public to promote science and science education. We aim to inspire young minds and cultivate interest in scientific exploration from an early age. By instilling a passion for science in the next generation, we contribute to a brighter and more scientifically literate future.

To ensure the sustainability of our mission, we cultivate understanding and support among our constituents. We establish strong partnerships with corporations, communities, and alumni and actively pursue and fund development initiatives. These resources are essential for us to continue providing exceptional educational experiences, fostering research opportunities, and expanding outreach efforts.

Together, we are shaping a future where scientific discovery and understanding thrive. ■



## Nurturing Student Success

*How the College of Science Leads the Way*

*The College of Science takes great pride in promoting student success. We embrace our mission of providing holistic education and facilitating the attainment of terminal degrees and strive to create an environment where individuals thrive personally and professionally. Guided by our core values of exceptional care, exceptional accountability, and exceptional results, we are committed to supporting student success in diverse scientific disciplines.*

### EXCEPTIONAL

#### CARE

Exceptional care lies at the heart of our mission. We recognize that student success encompasses more than just academic achievements. That's why our faculty and staff go the extra mile to cultivate an inclusive and supportive community where students feel valued, respected, and inspired. Our academic advisors and mentors provide personalized guidance, fostering an environment of growth. We also offer opportunities for students to engage in research, internships, and hands-on experiences. Through exceptional care, we empower students to thrive in their scientific pursuits.

#### ACCOUNTABILITY

Accountability is a cornerstone of our approach to student success. We uphold rigorous academic standards and offer challenging programs that prepare students for the complexities of their scientific fields. Our curriculum emphasizes scientific inquiry, critical thinking, and problem-solving, instilling a sense of responsibility in our students. Our faculty members take pride in delivering high-quality instruction and mentoring, while students are encouraged to take ownership of their learning journeys. We strongly emphasize ethical conduct and foster integrity, equipping students to contribute responsibly and ethically to the scientific community.

#### RESULTS

We are dedicated to delivering exceptional results by producing graduates who are well-prepared to excel. Our comprehensive range of programs, such as biology, chemistry, physics, mathematics, and environmental science, combines rigorous coursework with hands-on experiences, research opportunities, and industry partnerships. Our laboratories, technologies, and collaborations with accomplished faculty ensure students receive top-tier educations. Through experiential learning and practical applications, we equip graduates with skills, knowledge, and critical thinking abilities to succeed in the scientific workforce or pursue advanced studies.

## The College of Science Enhances Advisory Board With Four New Members

Focusing on Industry Collaboration and Student Success

### NEW ADVISORY BOARD MEMBERS

Ruchika Joshi	Manufacturing Engineering Manager, Texas Instruments Lehi Fabrication Facility
Brad Graham	Associate Director, Molecular Biology Research and Development, bioMérieux
Sterling Cornaby	Senior Scientist, Moxtek
Doreen Hamilton	Research Mathematician, National Security Agency



**THE** UVU College of Science proudly welcomes four distinguished professionals to its esteemed advisory board, marking a significant step toward fostering stronger relationships with scientific industries and agencies, and enhancing opportunities for student and stakeholder success. These individuals bring a wealth of experience and expertise to the table, spanning various sectors within the scientific community. Their addition to the advisory board aligns with the College of Science’s commitment to cultivating strong relationships with industry partners to create research opportunities for undergraduates and support the personal and professional development of students, faculty, staff, and other stakeholders.

“The appointment of Ruchika Joshi, Brad Graham, Sterling Cornaby, and Doreen Hamilton to our advisory board signifies a pivotal moment for the College of Science,” said Dr. Daniel Horns, dean of the College of Science at Utah Valley University. “Their service on the board will help the College of Science better serve the employment needs of Utah’s high-tech, life science, and defense and intelligence sectors.”

As members of the advisory board, Joshi, Graham, Cornaby, and Hamilton will collaborate closely with other board members **Stan Lockhart, Kelvyn Cullimore, Tami Goetz, Andy Piercucci, Gregory Prince, Jackie Larson, Eduardo Baca, and Kim Shelley** and the college leadership to identify opportunities for industry engagement, develop research programs that offer hands-on experience for undergraduate students, and provide mentorship and guidance to help individuals reach their full potential.

“We are dedicated to creating an environment where students, faculty, staff, and stakeholders can thrive,” added Horns. “With the support and insight of our advisory board members, we are confident in our ability to foster innovation, promote collaboration, and prepare our students to help build Utah’s scientific economy.” ■

## Guiding Your Path

Meet the Dedicated Advisors of the College of Science



**STARTING** college can be overwhelming, but fear not! The College of Science advising team are your dedicated partners during your time at UVU. We’ll help you choose classes, chart your degree, and guide you through your UVU adventure. Together, we’ll explore your academic pursuits, career goals, and personal aspirations. We’ll be by your side, providing support and resources as you thrive.

Welcome to UVU and the College of Science!

Meet your advisors: Bobby Hughes, Kamee Jordan, Katie Stevens, Mckinzie Greer, Hunter Jaspersen, JoAnna Johnson, Kirsten Paustenbaugh, Shelby Bergeson, Monica Ferreyra, and Melissa Braithwaite.



Advising home page

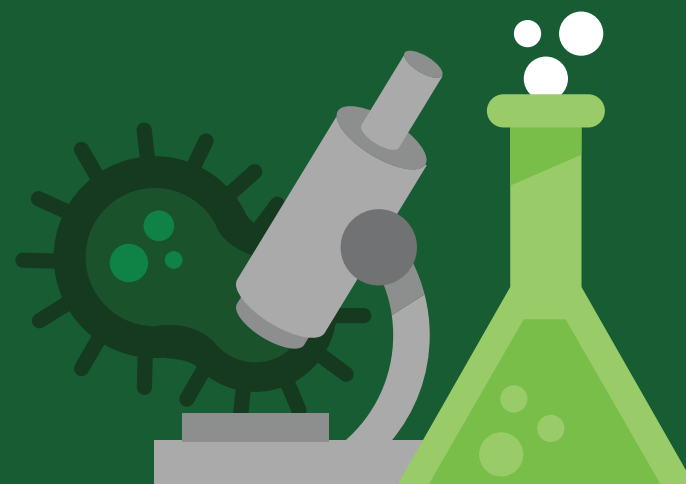
### COLLEGE OF SCIENCE STATISTICS



98% of our graduates rate their experience in the College of Science as excellent or good



45% of College of Science alums are pursuing graduate degrees within a year of graduating (this is the most of any college or school at UVU)



UVU’s College of Science is a hub of scientific excellence, research opportunities, and academic support.

#### Most Common Majors



BIOLOGY



EXERCISE SCIENCE



MATHEMATICS

**400+** students conduct faculty-mentored research in the College of Science each year

There are almost **3,000** students majoring in the sciences taught by **142** full-time faculty and assisted by **42** staff

Source: UVU Business Intelligence and Research Services



## BIOLOGY

### InnovaBio: Research Based Internships

InnovaBio is a biotechnology contract research organization that offers flexible, industry-based research internships for science students. We collaborate with local life science companies on various research and development projects, which our interns execute in teams. These projects are conducted on-site at UVU Biotechnology labs, under the supervision of InnovaBio's scientific staff. Students gain valuable research experience and internship credit, giving them a competitive edge when seeking employment as research associates in biotechnology companies.

### Diversity of Disciplines

The biology department offers a wide range of courses and programs. An A.S. or B.S. degree in biology provides flexibility through elective courses, while seven additional bachelor's degrees specialize in bioinformatics, biology education, biomedical science, biotechnology, botany, microbiology, and zoology. Minors in biology, horticulture, and zoology ensure options for all students.

### Course-Based Undergraduate Research Experiences

The biology department offers 10+ course-based undergraduate research experiences (CUREs), integrating hands-on research within courses. These experiences apply theoretical concepts to real-world problems, fostering scientific understanding, critical thinking, and problem-solving skills. CUREs cover disciplines like botany, microbiology, and genetics, inspiring future scientists and facilitating growth.

### Conference Participation

Scientific conferences significantly contribute to students' academic and professional growth, providing opportunities to share research, network with professionals, and access cutting-edge discoveries. Each year, UVU biology students participate in and present their research at regional, national and international conferences. As an example, this year 10 students attended the international entomology conference, some teaching bioinformatics to graduate students. Also, 10 students participated in the Annual Biomedical Research Conference

for Minoritized Scientists (ABRCMS) conference, advancing research and professional development.



## CHEMISTRY

### Introducing the Chemistry Department

UVU's Department of Chemistry is a dynamic hub of scientific inquiry. The department is led by dedicated faculty and offers comprehensive programs to nurture the next generation of chemists. It provides a stimulating environment for students to explore the wonders of chemistry and build strong career foundations.

### Academic Programs and Opportunities

The department offers a Bachelor of Science degree in chemistry with a rigorous curriculum covering organic, inorganic, physical, and analytical chemistry. Undergraduates can also participate in research alongside faculty members, gaining valuable hands-on experience.

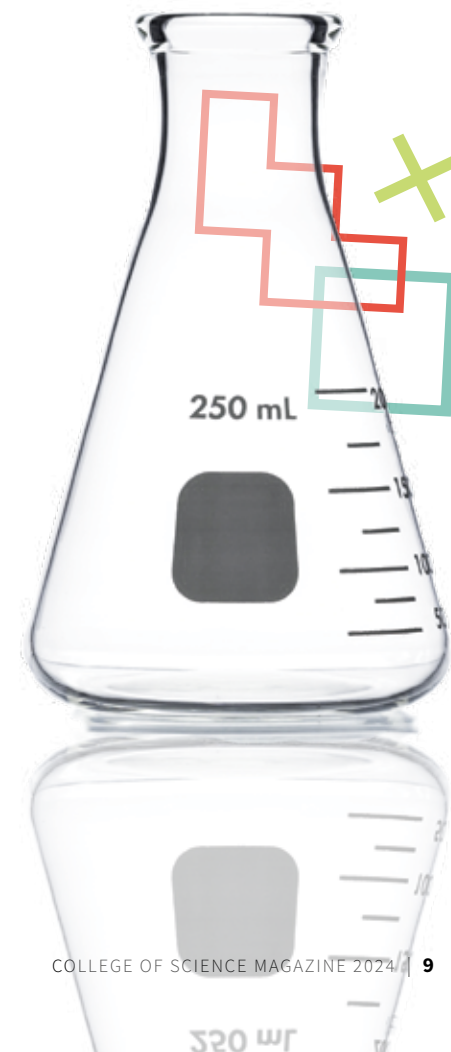
### State-of-the-Art Facilities and Research

Students will find a rich learning environment with state-of-the-art facilities and well-equipped laboratories. From advanced instrumentation for spectroscopy and analysis to computational chemistry resources, students have access to tools that foster

exploration and discovery. Faculty members actively engage in diverse research areas, addressing critical challenges in materials chemistry, biochemistry, environmental chemistry, and drug discovery.

### Community Engagement and Collaboration

The Department of Chemistry values community engagement and collaboration. Through partnerships with industries, government agencies, and research institutions, students and faculty participate in collaborative projects with real-world applications. The department organizes outreach programs, such as science fairs and workshops, to inspire and educate the wider community. These initiatives enhance learning experiences and contribute to scientific advancement in the region.





## EARTH SCIENCE

### Interdisciplinary Nature

The Department of Earth Science offers programs and courses that foster collaboration across scientific disciplines. Students can immerse themselves in curriculum offerings to address pressing environmental issues, climate change, natural resource management, geological hazards, and other challenges. This interdisciplinary focus equips graduates with skill sets applicable in diverse professional settings and future graduate studies.

### Faculty Expertise and Research Opportunities

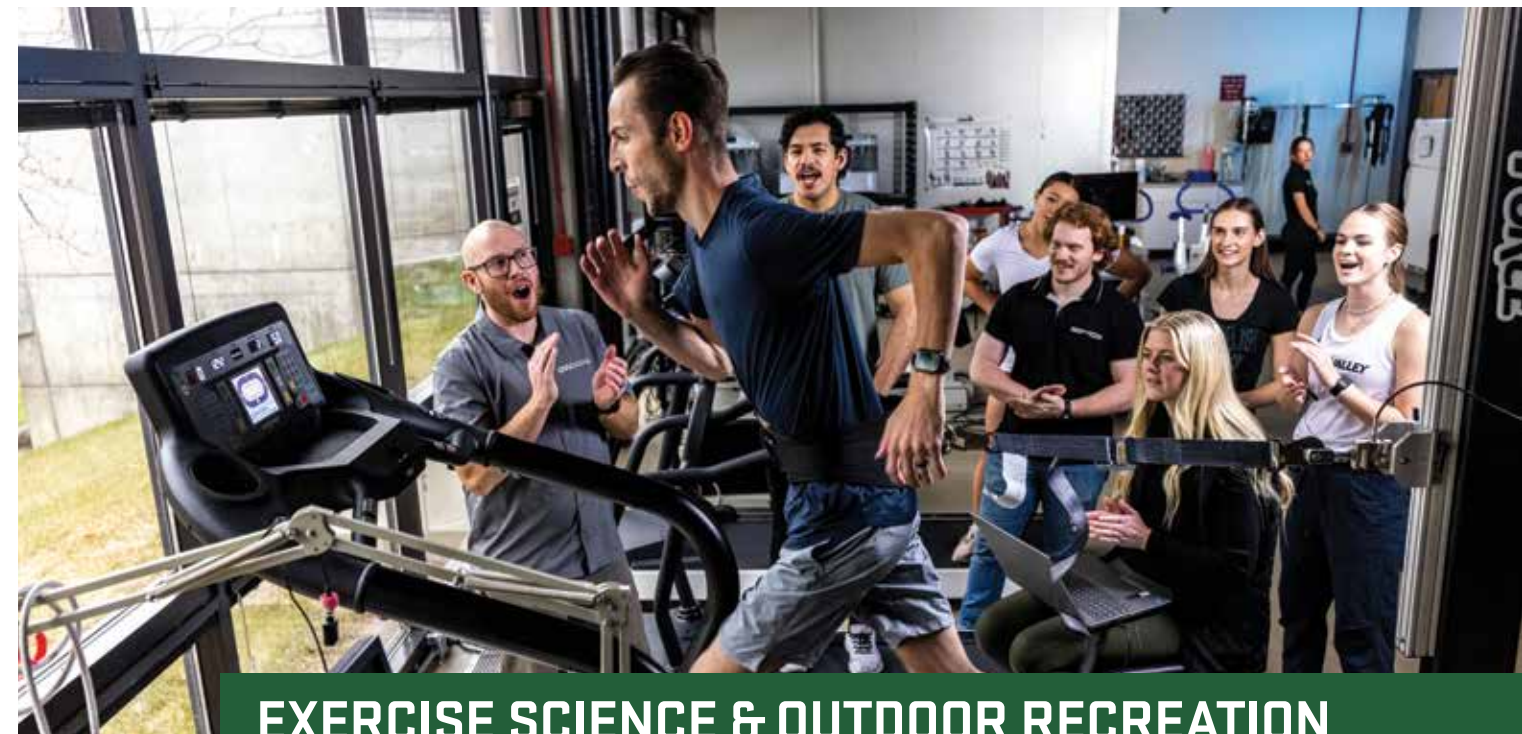
Our diverse faculty possess research backgrounds and expertise in many areas, including geology, hydrology, paleontology, petrology, environmental science and management, climatology, geochemistry, geoscience education, geospatial analysis, and human geography. Students benefit from the wealth of knowledge and mentorship provided by faculty members and have ample opportunities to engage in impactful research projects.

### High-Impact Practices

We strongly emphasize high-impact practices that offer transformative learning experiences, such as science excursion courses to Yellowstone, the Grand Canyon, and Capitol Reef, and study abroad programs in countries like Italy and India. These hands-on experiences expose students to natural environments and allow them to apply their theoretical knowledge in real-world settings, fostering practical skills and enriching their experiences.

### Collaboration With Industry Partners

We maintain strong connections with industry partners, including mining companies, environmental consulting firms, and government agencies. Students gain opportunities to pursue internships, engage in research collaborations, and secure job placements upon graduation. By bridging the gap between academia and real-world applications, these collaborations enhance students' learning outcomes and strengthen their professional networks.



## EXERCISE SCIENCE & OUTDOOR RECREATION

The Department of Exercise Science and Outdoor Recreation is a thriving hub of knowledge and activity, equipping students with the skills and expertise to excel. With a commitment to hands-on learning and a passion for promoting health and wellness, this department offers a diverse range of programs and opportunities for students to explore and engage in their areas of interest.

### Cutting-Edge Programs and Research

At the heart of the department is a collection of cutting-edge programs and research initiatives. Through rigorous coursework and practical experiences, students delve into the intricacies of exercise physiology, biomechanics, sports psychology, outdoor leadership, and more. The curriculum fosters critical thinking, problem-solving, and a deep understanding of the human body's response to physical activity. Under the guidance of experienced faculty, students can conduct groundbreaking research that advances knowledge in the field.

### Experiential Learning and Field Opportunities

The department strongly believes in the value of experiential learning and provides numerous field opportunities to complement classroom education. From outdoor expeditions and leadership training to internships with local sports teams, students gain hands-on experience that prepares them for their careers. These real-world experiences not only solidify classroom knowledge but also foster essential teamwork, communication, and problem-solving skills.

### Career Paths and Alumni Success

Exercise science and outdoor recreation graduates have gone on to become exercise physiologists, personal trainers, outdoor adventure guides, sports coaches, and wellness program directors, among other career paths. The department's strong alumni network provides ongoing support and mentorship to current students,

ensuring a seamless transition from the classroom to the professional world. By offering innovative programs, conducting groundbreaking research, providing experiential learning opportunities, and fostering a strong alumni network, the Department of Exercise Science and Outdoor Recreation inspires and educates the next generation of leaders.





## PHYSICS

### Unveiling the Secrets of the Universe

Physics, the study of the universe from the smallest particles to the vastness of space, is the foundation for all other sciences. In UVU's Department of Physics, this discipline is explored and applied to address pressing technological and environmental challenges. From nanotechnology to medical advancements and astronomical discoveries, the Department of Physics is at the forefront of scientific exploration and innovation.

### Physics and Technology

Under the leadership of physicists Paul Weber and Daniel James, the department collaborates with the College of Engineering and Technology to drive advancements in nanotechnology. Through the UVU nanotechnology program, students gain hands-on experience with equipment such as scanning electron microscopes and 3D laser microscopes. The program's integration of advanced virtual reality training ensures students are well-prepared to operate complex machinery in real-world settings.

### Nanotechnology and Medical Breakthroughs

Beyond technology, the department demonstrates its commitment to improving lives through medical research. Faculty members Vern Hart, Dustin Shipp, Cyill Slezak, Vince Rossi, and York Young lead efforts to enhance medical procedures for cancer detection and treatment. Leveraging laser imaging and infrared spectroscopy, UVU researchers explore ways to identify individual cancer cells, paving the way for more precise and effective medical interventions.

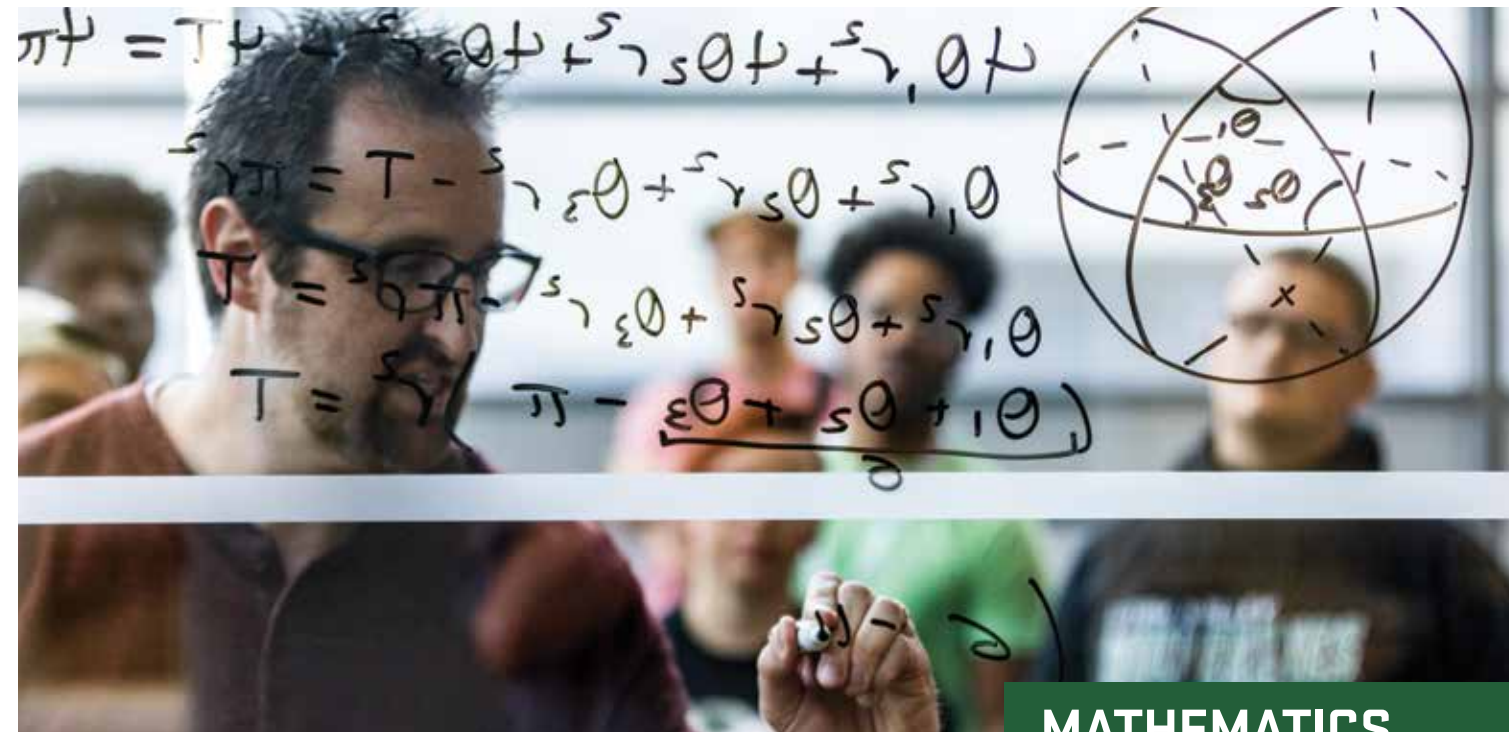
### Exploring the Cosmos With the Department of Physics

The department's engagement with the cosmos is equally remarkable. Joshua Lothringer and the astronomy group contribute to groundbreaking discoveries using space telescopes. Lothringer, as part of an international team, recently employed the new James Webb Space Telescope to detect elements like water and carbon dioxide in

the atmospheres of exoplanets located hundreds of light years away. Physics students actively participate in astronomical research by accessing and analyzing data from the Hubble and James Webb Space Telescopes. Moreover, in collaboration with the city of Eagle Mountain, UVU is constructing a public observatory featuring a 20-inch professional telescope, expanding opportunities for astronomical exploration.

### Honoring Dr. Steven Wasserbaech's Legacy

It is with deep sadness that we remember Dr. Steven Wasserbaech, who passed away in November 2022 after a courageous battle with cancer. Dr. Wasserbaech was an exceptional teacher and will be greatly missed by students, staff, faculty, and alumni. In honor of his enduring legacy, the Department of Physics has established a student research award in his name. His loss leaves a void in the UVU community, but his contributions and memory will continue to inspire future generations of physicists.



## MATHEMATICS

The Department of Mathematics is a vibrant and dynamic academic unit dedicated to fostering a deep understanding and appreciation for the world of numbers, patterns, and logical reasoning. With a team of esteemed faculty members and a wide range of innovative courses, the department strives to empower students with the skills and knowledge to excel in various fields that require mathematical proficiency.

### Academic Excellence and Research Opportunities

The Department of Mathematics prides itself on offering rigorous academic programs that cater to students of all levels and interests. From foundational courses in calculus and algebra to advanced topics like differential equations and mathematical modeling, students explore the vast landscape of mathematical concepts and applications. The department is committed to nurturing a research-oriented environment, providing students with hands-on experiences in research projects, encouraging collaboration, and offering opportunities to present their findings at regional and national conferences.

### Engaging and Supportive Learning Environment

The department recognizes that mathematics can be perceived as a challenging subject for many students, so it places a strong emphasis on creating an engaging and supportive learning environment. The faculty members are dedicated to helping students succeed by offering regular office hours, one-on-one consultations, and mentoring programs. The department also organizes workshops, study groups, and tutoring services to ensure that students receive the necessary support to excel in their mathematical studies.

### Industry Connections and Career Prospects

With its strong connections to industries and the local community, the Department of Mathematics strives to bridge the gap between academia and the real-world application of mathematics. The department collaborates with various organizations to provide internships, cooperative education experiences, and networking opportunities

for students. These connections, combined with the rigorous curricula, equip students with the skills and practical knowledge sought by employers in fields such as finance, data science, computer programming, and more.





## MATHEMATICAL & QUANTITATIVE REASONING

The Department of Mathematical and Quantitative Reasoning is a teaching-focused department. Our diverse group of faculty focuses on excellent teaching, and we emphasize continued growth and professional development of faculty. We research and assess best practices for teaching mathematics to ensure all students have meaningful classroom experiences.

We help our students move beyond our courses so that they can succeed in their academic careers and lives. Based on students' math abilities, we meet students where they are and find a place for them. To help students succeed, we developed co-requisite-style courses that accelerate the completion of quantitative literacy course requirements and provide support outside the classroom.

We work closely with the math lab to ensure tutors are trained and prepared to support students in their classes, and our unique Math Mentor Program directly supports students in the classroom. We also engage with the community through our summer math camp program, which encourages positive attitudes toward math among students in grades 4-7. Research shows that students develop math attitudes during this timeframe, and by positively impacting those attitudes, we hope to help our campers succeed in math through high school and college.

Our peer mentor Math Mentor Program is staffed by students who once struggled with math and/or the transition to the college environment. The math mentors are assigned to specific sections and work closely with faculty to teach students mathematical and

metacognition skills. This program has boosted success rates of students in mentored sections, especially for students of color and women.

The Department of Mathematical and Quantitative Reasoning is an innovative, student-centered program that improves mathematical proficiency and quantitative literacy. We enable students to successfully use mathematics in the pursuit of their educational, professional, civic, and personal goals.



## Igniting Curiosity

### Science Ambassadors

#### The Impact of College of Science Ambassadors

**I**N the vibrant halls of the College of Science, a cadre of exceptional students stand as shining examples of academic prowess and community dedication. These remarkable individuals are known as the Science Ambassadors.

They go above and beyond in their quest to bridge the gap between academia and the wider community. With a spirit of unwavering dedication, they not only excel in their studies but also actively contribute to the enrichment of education through their involvement in outreach events and college tours.

One standout event that showcases their passion for spreading the wonders of science is Science Night at UVU. This flagship event, characterized by its high attendance and enthusiastic participation, owes much of its success to the diligent efforts of these ambassadors. Through captivating demonstrations, engaging presentations, and interactive exhibits, they bring the marvels of science to life, igniting curiosity and inspiring the next generation of scientists and innovators.

The impact of the Science Ambassadors reverberates throughout the organization and the community it serves. Their enthusiasm fosters a culture of inquiry, discovery, and inclusivity. By leading by example, they not only enhance the reputation of the College of Science but also ensure a brighter future for generations to come.

Their dedication and passion remind us of the transformative power of education and the importance of giving back to the community. ■

**“As torchbearers of the College of Science, these ambassadors play a pivotal role in nurturing connections with the community and prospective students.”**



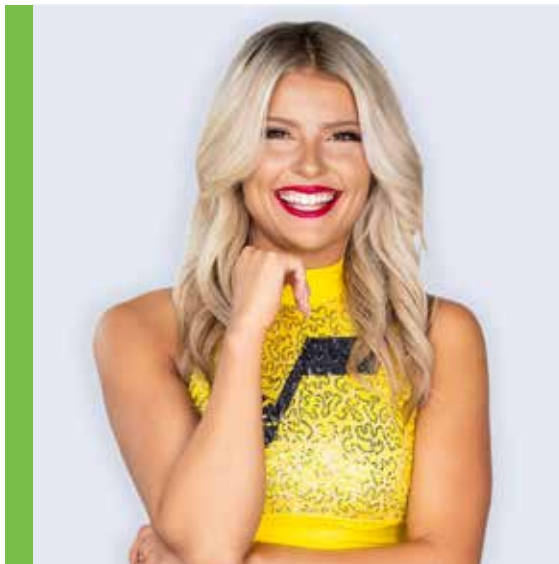


# ALUMNI STORIES

The UVU College of Science takes immense pride in the remarkable achievements of its alumni, whose dedication and perseverance have led to extraordinary successes in their respective fields.

This year's annual report shines a spotlight on three exceptional graduates: Kylie Barney, Michelle Chicas, and Audrey Dayton. Their inspiring journeys, rooted in the education and experiences gained at UVU, reflect the university's commitment to fostering talent and ambition.

Barney, a talented Utah Jazz Dancer; Chicas, a Ph.D. candidate at the University of Washington; and Dayton, an education instructor at the Utah Hogle Zoo, exemplify the diverse and impactful paths our alumni pursue. Their stories of commitment, discovery, and education highlight the transformative power of a UVU education, showcasing the ways in which our alumni contribute to their communities and industries. These profiles serve as a testament to the enduring influence of the College of Science, inspiring current and future students to pursue their passions and achieve their dreams.



## From Commitment to Achievement

*"If you make a commitment, honor it. If you make a promise, keep it. If you set a goal, achieve it."*



### Kylie Barney, B.S. Exercise Science

A graduate of the College of Science with a bachelor's degree in exercise science, Barney has always been driven by a commitment to achieve her goals and honor her promises.

From a young age, Barney was captivated by the art of dance. Growing up, she trained rigorously at her local dance studio, honing her skills and developing a deep love for movement.

She furthered her education and dance experience at UVU, where she continued to compete and perform. Her dedication and skill were evident, and she soon found herself coaching drill team. For two years, she poured her heart into coaching, guiding her team to growth both individually and collectively. This period was one of her most cherished accomplishments, as she watched her team flourish under her guidance. Her influence on the dance community grew, but her journey reached a new pinnacle when she became a Utah Jazz dancer.

Making the team was a dream come true for Barney. The moment she found out she had made the team was surreal, filled with excitement and a sense of achievement she would never forget. As a Utah Jazz Dancer, she has created countless memorable moments, but the thrill of making the team remains unmatched.

Throughout her journey, Barney has lived by a powerful mantra: "If you make a commitment, honor it. If you make a promise, keep it. If you set a goal, achieve it." These words have guided her through every challenge and triumph, making her a role model for aspiring dancers and young professionals alike.

Barney's story is not just one of personal success, but also of the impact she has made on others through her coaching, choreography, and performances. Her pride in her academic achievements and her dedication to dance exemplify the spirit of the College of Science alumni, making her a shining example of what it means to follow one's passion and make a difference in the world.

## From Determination to Discovery

*“My journey illustrates that determination and belief in oneself can lead to success, even through setbacks.”*



### Michelle Chicas, B.S. Chemistry

“Science caught my interest at an early age. Throughout my childhood, my dad took me to museums frequently, and once he even bought a microscope from the observatory. We observed anything we could find, and I vividly remember putting one of my mom’s hairs under the lens, being awed by the detail I could see. My observations fueled a deep desire to discover the unseen world. My fascination with medicine began when my dad pretended to have small injuries, and I would grab my toy medical tools to treat him.

In junior high, despite struggling with science and math, I loved doing science projects and worked hard to learn as much as I could. I joined a STEM-focused program and took all the science courses available in high school, including physics and physiology. My dedication led to an internship with a family physician, cementing my decision to pursue medical school. I started college at the University of Utah, majoring in biomedical physics to strengthen my medical school application.

Tragically, during my third year, my dad was diagnosed with terminal cancer, turning my world upside down. I struggled with motivation and decided to drop out to spend time with him. After he passed, I was devastated and took a break from school to focus on my mental health. I attended therapy, moved to Saratoga Springs,

and worked at After Class Tutoring, where I eventually became Director of Education. This period helped me regain my confidence and passion for science.

Feeling ready for a fresh start, I applied to UVU in spring 2020. The supportive environment at UVU allowed me to thrive. I became the department representative for chemistry and engaged in research on microplastics in Utah Lake under Dr. Rocks’ mentorship. My efforts were recognized with the American Chemical Society (ACS) Award for Outstanding Undergraduate Student of Utah. Encouraged by my professors, I shifted my focus from medical school to graduate school, eventually committing to the University of Washington for a Ph.D. in biochemistry, where I hope to research cancer and genetic treatments. My journey illustrates that determination and belief in oneself can lead to success, even through setbacks.”

## From Student to Educator

*“I was never treated any differently for being a woman and for being neurodivergent”*



### Audrey Dayton, B.S. Integrated Science, Biology & Environmental Science

Audrey Dayton’s journey through the College of Science is a testament to resilience, passion, and the power of supportive communities. Intimidated at first, Dayton took time to decide on pursuing a degree in biology. The challenging classes stretched her as a person, but with determination, she found her way. Every morning, she would arrive at school early to spend hours in the library before heading to class. Her dedication was bolstered by the unwavering support of her professors and fellow students, forming study groups that became a cornerstone of her academic success.

Despite facing challenges as a neurodivergent woman, Dayton never felt hindered. Instead, she viewed her accommodations as a source of additional support, enabling her to thrive. “I was never treated any differently for being a woman and for being neurodivergent,” Dayton reflected. This supportive environment was crucial for her, helping her navigate and succeed in her rigorous program. A pivotal moment in Dayton’s undergraduate experience was working in Melissa Cavan’s lab. Engaging deeply with her passion for animals and teaching, Dayton found her calling. One standout experience was a shark dissection at Thanksgiving Point, which helped solidify her career aspirations. “Doing the animal care with the many animals in Melissa’s amazing lab was big for me. It gave me something to put on my resume when applying for jobs after graduation,” she recalled.

Today, Dayton works as an education instructor at the Utah Hogle Zoo, where she seamlessly marries her love for animals with her passion for teaching. Her role is dynamic, changing with the seasons, and includes teaching second graders about Utah’s habitats, conducting presentations, working with volunteers, and participating in giraffe feeds. Dayton finds immense fulfillment in educating the public about wildlife and conservation, particularly through the zoo’s new exhibit, Wild Utah.

“Being able to marry my two loves of animals and teaching is incredibly fulfilling. I love going into classrooms and teaching second graders how they can be champions for wildlife,” she shared.

Dayton’s advice to current science students is to get involved and build relationships. “The times I was happiest were when I had study groups and relationships with my professors. It can be intimidating, but building those relationships really helped me when things got hard,” she advised. She also encouraged students not to be afraid to ask for accommodations if needed, sharing her own experience of overcoming shame to ensure her academic success. Dayton cherishes her time at the College of Science, reflecting on it as a great part of her life and expressing a desire to return one day. Her story is a powerful reminder of the impact of community and perseverance in achieving one’s dreams.

## Connecting Community to Nature

Science Students Create Plant Walk on Utah Shoreline Trail



**I**n a remarkable partnership, Vineyard City and UVU College of Science students have unveiled an educational plant walk along the Utah Shoreline Trail near Sunset Beach Park. This project, involving UVU's botany students, enhances the community's understanding of the local ecosystem while promoting conservation and outdoor learning. The plant walk features permanent signage with common and scientific names and plant families along a 1-mile loop, each sign equipped with QR codes linking to detailed online plant profiles and educational activities.

Anne Robinson, a deaf studies major, emphasized the importance of protecting ecosystems, hoping the public would learn and grow from their efforts. Botany majors Sarah Daley and Abigail Baum expressed their excitement about sparking interest in the natural world and sharing their passion for plants and conservation. Baum noted the lasting impact, saying, "It feels like it's going to be a part of the community and last much longer than this semester."



The project received strong support from Vineyard City. Mayor Julie Fullmer highlighted the benefits of preserving native biota, reducing supplemental watering, preventing nutrient runoff, and promoting pollinator habitats. Council Member Amber Rasmussen explained that enhancing the trail with knowledge about native and invasive species aims to provide a meaningful experience for residents and visitors, reviving the art of plant identification and promoting biodiversity.

The ribbon cutting ceremony on October 10, 2023, marked the official unveiling, attended by Mayor Fullmer, Council Member Rasmussen, Professor Ashley Egan, Baum, and Amanda Diaz from the UVU Excelerate Program. The event celebrated the fruitful collaboration between academia and the community, emphasizing the project's potential to provide educational opportunities for all ages and foster real-world application of knowledge and skills. ■

**This collaboration between UVU and Vineyard City builds personal connections within the community and promotes unity among students and residents. It stands as a testament to the positive long-term effects of partnerships on community and environmental well-being.**



## From Confidence to Skepticism

*The Decline of Trust in Science*

### Trust in Science Declines in America

**TRUST** in science among Americans has significantly dropped. According to the 2022 General Social Survey by the University of Chicago, only 39% of U.S. adults expressed a “great deal of confidence in the scientific community,” a decrease from 48% in 2018 and 2021.

### Why the Decline?

UVU College of Science Dean Danny Horns attributes this decline to confusion between science and government actions. **“In some cases, a person’s skepticism of the science might derive from their skepticism of the possible government response to the science,”** he explained. This confusion is evident in reactions to the COVID-19 vaccine mandate. Those skeptical of government mandates often question the science behind such policies as well.

### Communication Breakdown

Horns emphasized the need for scientists to communicate more effectively. “We need to promote our science more effectively on social media,” he said, stressing the importance of presenting scientific information in plain, understandable language. He believes that scientists must avoid condescending language and instead focus on making their work accessible to everyone.

### The Political Divide

The survey also highlights the growing political divide in terms of trust in science. In 2018, 55% of Democrats and 45% of Republicans had a “great deal of confidence” in science. By 2022, confidence among Republicans dropped to 22%, while it remained relatively stable among Democrats at 53%. Horns said that Republicans’ skepticism toward government often extends to the science behind government policies.

### The Stakes

Horns underscored the critical implications of this trust erosion. “People don’t get into science to get rich,” he noted. “We know science can help society. When people disregard scientific advice, they risk their lives.”

### Finding Reliable Information

For unbiased scientific information, Horns recommends established organizations like the National Institutes of Health and the National Science Foundation, which have long been considered politically neutral. In conclusion, restoring trust in science requires clear, effective communication and a focus on objective, evidence-based conclusions, free from political influence. ■

## From Theory to Action

*Innovations in Environmental Education*



**IN** the ever-evolving realm of natural resource management, grasping ecological theory and its practical applications is essential. This is precisely what students experience in Tara Bishop’s groundbreaking course, ENVT 3770, which introduces ecological theory and logic through a blend of lectures and hands-on projects.

### Course Overview

Bishop’s course stands out for its comprehensive approach to ecological education. The course is an introduction to ecological theory and logic, focusing on material relevant to natural resource management. Lectures are rich with real-world examples that illustrate key ecological concepts and theories, making complex ideas accessible and engaging. Assignments are designed to challenge students to apply ecological theory to practical management situations, such as:

- **Invasive Species Management:** Understanding and mitigating the impact of non-native species.
- **Habitat Management:** Strategies for preserving and restoring natural habitats.
- **Species Conservation:** Developing plans to protect endangered species.
- **Ecological Restoration:** Techniques for restoring ecosystems in forestry, rangelands, and outdoor recreation areas.

The course also provides students with the tools to create detailed conservation and research plans, skills that are highly valued in the industry. This prepares students for careers in various fields of natural resource management, equipping them with the knowledge and experience necessary to address contemporary ecological challenges.

### Real-World Impact: The Orem City Localscapes Project

One of the most exciting aspects of Bishop’s course is the opportunity for students to engage in real-world projects. This semester, the class had the unique privilege of participating in a Localscapes project with Orem City.

Localscapes is a landscaping approach that promotes sustainable, water-efficient landscape design. It incorporates principles that are not only ecologically sound but also visually appealing and functional. The collaboration with Orem City allowed students to apply their theoretical knowledge to a live project, providing invaluable practical experience.

### Project Highlights:

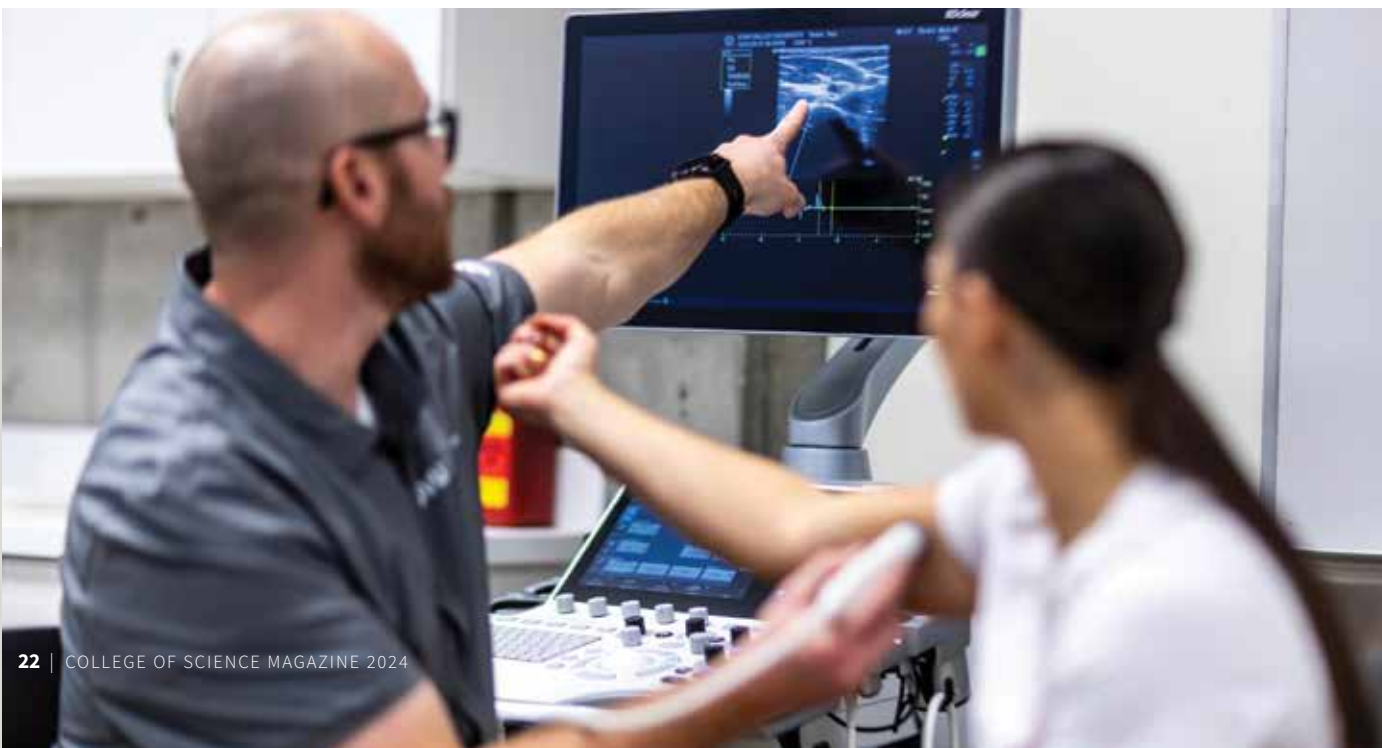
**Site Analysis and Planning:** Students conducted thorough site assessments, analyzing soil health, local plant species, and water availability.

**Design and Implementation:** Using their findings, they designed and implemented a Localscapes plan that balanced aesthetic appeal with ecological sustainability. This included selecting drought-resistant plants, optimizing irrigation systems, and creating habitats for local wildlife.

The project also involved community outreach, educating local residents about the benefits of Localscapes and how they can implement similar practices in their own yards.

### Conclusion

Bishop’s course exemplifies the integration of academic learning with real-world application. By participating in projects like the Orem City Localscapes initiative, students gain practical experience that not only enhances their education but also prepares them to tackle ecological challenges in their future careers. This course is a testament to the importance of combining theoretical knowledge with hands-on practice in the field of natural resource management. ■



## Breaking Barriers

SheTech Sparks STEM Interest Among Utah Girls



**MOST** of Utah's science and tech workforce are men, but SheTech's Explorer Day, run by the Women Tech Council, aims to change that. The event, held at the Mountain America Expo Center in Sandy, was the largest gathering of women in tech in Utah history, according to Governor Spencer Cox. The UVU College of Science was among the most active contributors to the event.

On March 14, Pi Day, 3,000 young women celebrated STEM and explored its possibilities, amidst confetti and glitter. Cydni Tetro, president of Utah's Women Tech Council, emphasized that the event counters stereotypes that women and girls are less capable or interested in STEM.

Salma Al-Shuqairat, an 18-year-old participant, highlighted ongoing barriers women face in STEM, even in tech-friendly Utah. She questioned the governor about state support for women in these fields. Al-Shuqairat, inspired by SheTech, shifted her perspective from doubting her abilities to pursuing her passion in exercise science.

Women's participation in Utah's STEM industries was 21% in 2021, up from 16.7% in 2016 but still below the national rate of 27%. Utah also has significant gender wage disparities. Alison Sturgeon, an electrical engineer, and Lindsey Henderson, a state school board specialist, both stressed the importance of visibility and inclusive classrooms for encouraging girls in STEM.

SheTech Explorer Day, featuring booths from 150 companies, demonstrated STEM applications and engaged girls with enthusiastic mentors. Participants like Claire Dean, Ellie Little, Leah Perez, and Kate Topham found the event inspiring and fun. For Manya Nair, SheTech turned a childhood interest in programming into a passion for computer science.

The event's growth suggests a positive shift in girls' perceptions of their capabilities in STEM. As Tetro said, "We want girls to leave saying, 'That was fun.'" ■

## Math Girls Rock!

Inspiring the Next Generation of Female Scientists

### Empowering Female Students in STEM

Math Girls Rock! was started by UVU mathematics professors Violeta Vasilevska and Carolyn Hamilton more than 10 years ago. It is an engaged learning opportunity and outreach program for female university junior high and high school students.

### Hands-On Learning and Mentorship

University students, guided by faculty mentors, create engaging STEM activities for local schools. They also discuss higher education, female role models, and the university experience to encourage more girls to pursue STEM majors.

### Proven Success

Vasilevska and Hamilton's program has been highly successful, even leading to a published paper in PRIMUS about mentoring undergraduates who then guide high school students. This near-peer mentoring approach has shown significant benefits, fostering a supportive and enriching learning environment.

### Building a Supportive Community

The relationships formed through Math Girls Rock! are among its greatest strengths. Vasilevska highlights the joy of seeing students return year after year, witnessing their growth both mathematically and personally.

Math Girls Rock! continues to change perceptions about math and science, proving that with the right support and encouragement, female students can excel in STEM fields. ■

## High Success Rates

UVU Actuarial Program Students Excel on National Exams

**THE** College of Science produces some excellent students, and we are proud to announce the outstanding performance of its students in the nascent actuarial program. Over the past two years, UVU actuarial students have achieved passing rates significantly higher than the national average on two key actuarial exams, signaling a promising future for the program and its graduates.

The two exams in question are Exam P (Probability) and Exam FM (Financial Math). The national average passing rate for Exam P stands at 41%, while UVU actuarial students have demonstrated an exceptional average passing rate of 85.7%. Similarly, for Exam FM, the national average passing rate is 48%, while UVU actuarial students have achieved an impressive average passing rate of 87.5%.

Justin Golding, a senior math student at UVU, attributed this success to the exceptional support from the faculty in the mathematics department. He said that their guidance and advice have been instrumental in helping students excel in their actuarial studies.

Dr. Patrick Ling, who leads the actuarial program at UVU, emphasized the program's implications for the university and students. He believes that the high passing rates on standardized actuarial exams send a strong message to the community, attracting more students to the math and statistics program at UVU.

"The success of UVU's actuarial program reflects the dedication and hard work of our students and faculty. We are proud of the achievements of our students and look forward to further growth and success in the future," said Ling. ■

# SCIENCE DIARIES

A Day in the Life of a Science Student



## PHYSICS

### I'm Brayden Roberts

I chose to study physics because I'm very curious and intrigued about how the world works. My favorite experience at the College of Science was when I was able to attend the American Society conference to present my research with a couple of other students and professors from UK. It's a nationally ranked conference where we discussed astronomy and astrophysics, and it was cool to be in a professional setting.



## BIOLOGY

### I'm Melissa Rangel

I believe I have everything I need to succeed as a student here at UVU because of the faculty members and my mentors. All of them have supported me the whole way. I have six younger siblings, and every time I see them, I tell them about my courses and try to get them involved with the different programs that UVU has, such as Latinos in Action and Summer Bridge, to help them figure out what they want to do. Sometimes they are interested in biology or other fields within STEM, but the most important thing is for them to know that they are smart enough.



## CHEMISTRY

### I'm Ezra Wylie

UVU afforded me several opportunities to research and study physical chemistry, which is what I ultimately want to pursue. It's amazing to work with my professors in a lab space. I didn't understand how valuable that experience was until I got started. They are not only teaching me but also mentoring and befriending me, and it's incredible.

## EXERCISE SCIENCE

### I'm Daniel Odongo

The reason I love exercise science is that it allows me to express myself. I enjoy sports, love going outside, and doing outdoor activities. Exercise science is geared towards that. The research you do, the internships you participate in, and the things you learn help with everything. It's the root of everything. Once you start, you can go into whatever you like. They have athletic training, certifications like CPT, and so many avenues you can pursue.



## CHEMISTRY

### I'm Natasha Munoz

Studying chemistry at UVU is helping me because they are really focused on student success. It helps me prepare for any challenges that come later on. The faculty and staff in the chemistry department are great; they are truly willing to help the students succeed and make sure that we really understand the material. Being a science student at UVU is amazing because there are so many opportunities within the College of Science, all focused on ensuring that the students can succeed.



## EARTH SCIENCE

### I'm Chloe Loveland

I really appreciate the practical application for myself, learning more about the human aspect of the environment with environmental studies. I've been taking more of a sociological approach with it, so learning how humans connect with the environment and how that impacts the environment has really been helping me with my future career goals.



# SCIENCE DIARIES

A Day in the Life of a Science Faculty Member



## EXERCISE SCIENCE

### I'm Kathryn Dispennette and I'm a Exercise Science Educator

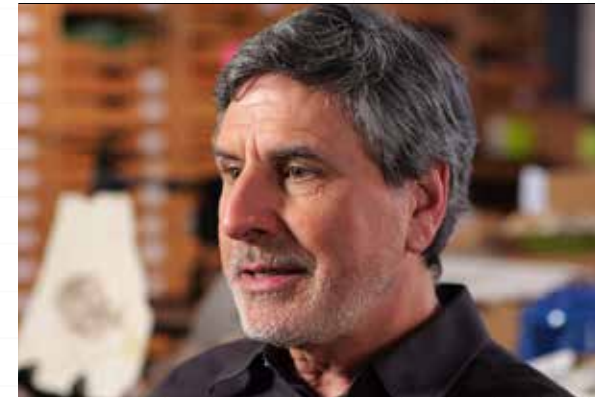
I'm very passionate about what I teach and I think that goes a long way. Seeing someone excited about what they're teaching definitely enhances the motivation to learn if you're able to figure out something you're curious about. So if you're in the sciences, try to find something that piques your interest.



## MATHEMATICS

### I'm John Kidd and I'm a Math Professor

I would advise and suggest to students: one, don't be afraid of math. The math department has the math tutoring lab, where we're able to help students who are struggling. They can go in and there's peers there that have taken these courses, know the professors, know the things that are wanted in each of the classes, and are able to help them.



## EARTH SCIENCE

### I'm Danny Horns and I'm an Earth Scientist

We have 14 full-time faculty members whose expertise spans the fields of our sciences. We have people who specialize in environmental quality, environmental policy, paleontology, rock and mineral formation, earthquakes and other geologic hazards, climate studies, human geography, and physical geography. These faculty members mentor student researchers in all of these areas, and those student researchers present their work at conferences across the United States. Many of the students who graduate from our degree programs go straight into the workforce.

## BOTANY

### I'm Boston Swan and I'm the Greenhouse Manager

The really supportive nature of the College of Science really helps students to succeed. The professors are so proud of their students and they care so much about their students. They just want to support them and make sure that they are going where they want to go and getting those career experiences.



## BIOLOGY

### I'm Lauren Brooks and I'm a Biology Professor

The biggest piece of advice I could give you is to get to know the faculty. We are truly here to support students, and so getting to know us and not being intimidated by your faculty is a really good idea. We're here to help. Come talk to us [and] get to know us.



## PHYSICS

### I'm Maureen Hintz and I'm an Physics Professor

We have students that come from so many different backgrounds, and this is a place where they can find a home, that they can get the support that they need to hopefully eventually be successful. I really pioneered utilizing the planetarium during class because it's this amazing resource. The study of where we are in the universe, where we fit, is something that has always struck humanity. They've always looked up into the heavens and been like "What else is out there?" "Where do we fit in our role in the universe?" And we have strived to answer that question.



# The Volcano That Created a Monster: How Tambora's Eruption Inspired "Frankenstein"

A Recap of the College of Science's Public Lecture Series "The Science Diaries"

## A Year of Unusual Beginnings

In the summer of 1816, Europe experienced unusual weather patterns. It was a year without a summer, with persistent cold and wet conditions that left people longing for the warmth of sunshine. In this same year, Mary Shelley, at the tender age of 18, embarked on a journey that would lead to the creation of one of the most iconic fictional characters in literary history: Frankenstein's monster.

## Tambora: The Volcanic Giant Awakens

The story begins with Tambora, a volcano located on the Indonesian island of Sumbawa. Little did the world know that this seemingly isolated geological event would have far-reaching consequences, even influencing the world of literature. The Tambora eruption of 1815 was one of the most significant volcanic eruptions in recorded history, dwarfing even the more famous Krakatoa eruption of 1883. Before the eruption, Tambora stood at a towering 4,300 meters in height. However, during the cataclysmic event, the volcanic cone lost a staggering 1,400 meters in elevation.

The eruption commenced on April 5, 1815, with rumblings and small explosions, but the most devastating part occurred on April 10. This main paroxysm, a sudden and violent volcanic eruption, turned the sky dark and sent volcanic ash and debris up to 600 kilometers away from the volcano. The eruption spewed a staggering 100 cubic kilometers of magma into the atmosphere, forming pumice islands along the coast of the island of Flores. Tragically, the eruption claimed the lives of 92,000 people, with immediate casualties from pyroclastic flows, a deadly mix of hot gas, ash, and rock. Starvation and disease would later push the death toll even higher, potentially reaching 117,000.

However, the Tambora eruption didn't just bring devastation to the local people; it also left a lasting mark on the world's climate. The eruption produced clouds in the stratosphere which blocked out sunlight, leading to a drop in global temperatures of approximately 3 degrees Celsius (37 degrees Fahrenheit). Europe, in particular, experienced an unforgettable "year without a summer," where snow even fell in July. Crop failures plagued India in the wake of the Tambora eruption's aftermath.

## Shelley, Byron, and the Challenge of a Dark Summer

Now, let's connect these dots to Shelley and her iconic creation, "Frankenstein." Across the world in Europe, Lord Byron, a renowned poet and writer, found himself on the shore of Lake Geneva with a group of fellow writers. Thanks to the perpetual gloom caused by Tambora's eruption, Byron decided to issue a challenge to his fellow wordsmiths: to write a horror story. Among those who accepted this challenge was Shelley.

## The Birth of "Frankenstein"

Shelley's vivid imagination was sparked by the eerie ambiance created by Tambora's effects on the climate. She famously recalled her creative process and the birth of her iconic character, Frankenstein's monster.

## From Darkness to Creativity

After Byron's challenge it took Shelley several days to think of her story about the monster. She clearly would not have produced the story without Byron's challenge, Byron's challenge would not have been made without the gloomy weather, and the gloomy weather would not have occurred without the eruption of Tambora. The peculiar intersection of geological and literary history reminds us that inspiration can emerge from the most unexpected sources. The Tambora eruption, though tragic, indirectly gave rise to one of the most enduring tales of science, ambition, and the human condition. In the end, it's a testament to the power of human creativity, even in the face of nature's most formidable forces.

**"I saw – with shut eyes, but acute mental vision – I saw the pale student of unhallowed arts kneeling beside the thing he had put together. I saw the hideous phantasm of a man stretched out, and then, on the working of some powerful engine, show signs of life and stir with an uneasy, half-vital motion. Frightful must it be, for supremely frightful would be the effect of any human endeavour to mock the stupendous mechanism of the Creator of the world."**

**– Mary Shelley**





## Breaking Boundaries

*Innovations Unveiled at BioUtah's Utah Life Sciences Summit*

**IN** a convergence of intellect and ingenuity, UVU faculty members recently showcased groundbreaking research at the BioUtah annual Utah Life Sciences Summit. From tackling local environmental challenges to revolutionizing disease identification, UVU faculty members left an indelible mark on the scientific landscape.

### Bloom-B-Gone: A Bioengineered Triumph

Dr. Eric Domyan and Dr. Colleen Hough took center stage to unveil the remarkable work of the UVU-iGEM student team. Their brainchild, Bloom-B-Gone, represents a paradigm shift in addressing the scourge of toxic algal blooms plaguing Utah Lake, by using modified algae to treat the wastewater flowing into Utah Lake. This innovative bio-engineered solution not only has the potential to tackle a pressing local issue but also stands as a beacon of global innovation. By harnessing the power of biotechnology, the team has demonstrated the potential for transformative change in environmental conservation efforts.

### Biomedical Optics Research Unveiled Possibilities

Dr. Vert Hart, Dr. Dustin Shipp, and Dr. Vince Rossi illuminated the audience with insights into the cutting-edge biomedical optics research underway at UVU. Blurring the lines between physics and industry, their work holds

profound implications for the future of healthcare. By utilizing visible and near-infrared methods, they are spearheading a revolution in disease identification at the cellular level. Their efforts not only promise to reshape the landscape of medical diagnostics but also offer unparalleled opportunities for undergraduate student involvement in pioneering research.

As the curtain falls on yet another successful summit, the impact of UVU's faculty members reverberates far beyond the confines of the conference hall. Their unwavering dedication to innovation and excellence serve as a testament to the university's commitment to advancing scientific discovery and shaping a brighter future for generations to come. ■



# LIFE SCIENCE IS IN OUR DNA

**8** Offered Life Science B.S. Degrees

- Biology
- Biotechnology
- Biochemistry
- Bioinformatics

- Biomedical Sciences
- Botany
- Microbiology
- Zoology

**1,200+**

students majoring in life science degrees



### AWARD-WINNING RESEARCH

UVU biotechnology students presented their research to reduce Utah Lake's harmful algal blooms at an international genetic competition in Paris, France, and walked away with a silver medal for their progress in solving the problem.

### UNDERGRADUATE RESEARCH

**400+**

students participate in faculty-mentored research projects every year



### BIOHIVE STUDENT CHAPTER

The Biohive Student Chapter at UVU provides opportunities for networking, professional development, and outreach for life science students.



## The Pulse of Progress:

*Utah's Life Sciences Economic Impact*



**\$21.6B** GDP in Utah



**150K+** Direct/Indirect Jobs



**1,600+** Life Science Establishments

## UTAH'S NATIONAL RANKINGS

**#1**

Life Sciences Job Growth (2012-2021)

**#2**

Total Life Sciences Employment Concentration (2.9%)

**#3**

Medical Device Employment Concentration

**#7**

Lab and Research Employment Concentration

Sources: Utah: 2023 Life Sciences Workforce Trends Report, Research Brief: Utah's Life Sciences Workforce and Industry Growth: 2012 to 2021

A Spring Break Adventure

# Exploring the Uncharted Waters of Dolphin Foraging Behavior

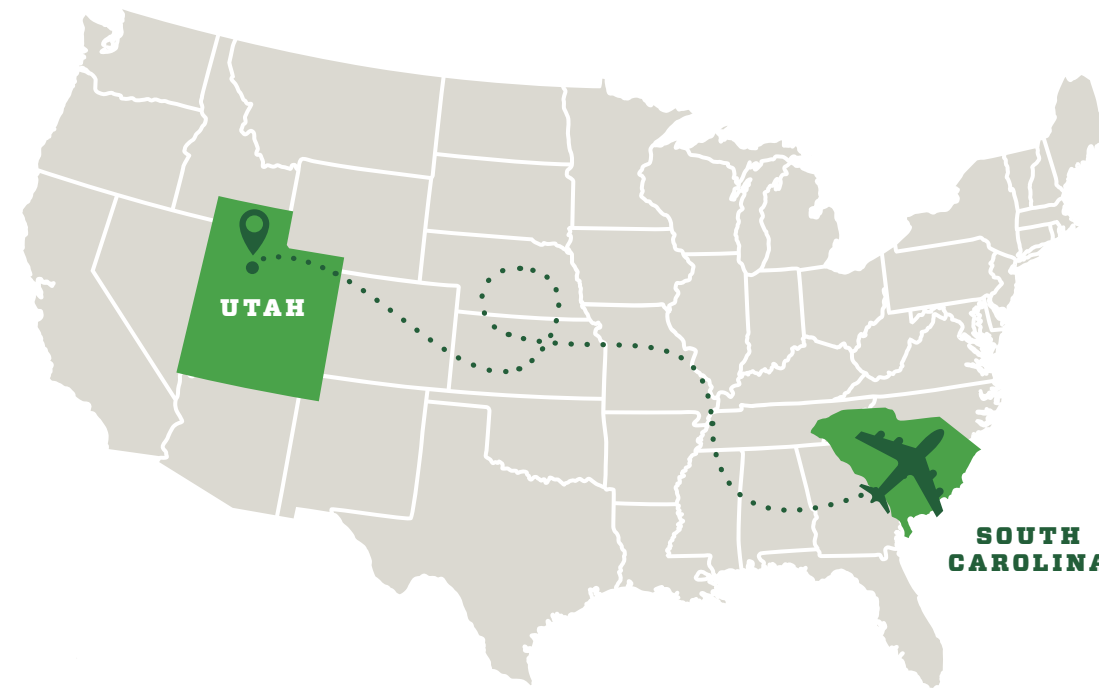
IN the bustling port city of Charleston, South Carolina, a team of researchers from UVU's Department of Biology embarked on an extraordinary journey over spring break. Undergraduate researcher Christina Deaver and biology faculty member Dr. Jessica Cusick embarked on a scientific expedition into the world of wild bottlenose dolphins residing in the Charleston Harbor, in collaboration with Meghan Galipeau, M.S., and Dr. Patricia Fair from the South Carolina Aquarium.

"Participating in this research was a dream come true for me. I never thought I could do research with dolphins, especially from Utah as a nontraditional undergraduate! This experience opened my eyes to what's possible with a biology degree, and I'm more committed than ever to pushing through any barriers to get that degree and do more work like this," Deaver expressed.

Their mission? To unravel the mysteries behind a fascinating behavior observed among these intelligent marine mammals: shipside feeding. This unique foraging behavior, a form of "barrier feeding," involves dolphins herding fish toward ships and trapping them along the sides of ships, seemingly making the fish easier to catch.

"Bottlenose dolphins are known to develop unique adaptive foraging strategies to fit the specific habitats that they live in, which is likely one of the reasons the bottlenose dolphin is one of the most successful and highly distributed species of dolphin in the world. Charleston Harbor is the 7th busiest port in the U.S. During previous surveys, our colleagues noticed that any time there was a ship docked in port, there were always dolphins near the ships feeding. This 'shipside feeding' is a form of barrier feeding, in this case where dolphins trap the fish against the ship, making it easier to catch. This type of barrier feeding has not been documented anywhere else, only in the Charleston Harbor! Studying this novel shipside feeding behavior is important for identifying how dolphins use these ships to their advantage, how these new behaviors are learned and transmitted throughout the population, and how these dolphins adjust their behavior in our shared environment," explained Cusick.

For five days, the team meticulously documented the dolphins' shipside feeding behavior, aiming to capture it on film and identify the individuals within the population who engage in this behavior. By doing so, they hope to shed light on the mechanics of how dolphins catch fish in this manner and unravel the intricacies of how such behaviors are learned and transmitted within the dolphin population. ■



All research activities were conducted under permit NMFS LOC 22856, ensuring compliance with regulations and ethical standards.

# From Slopes to Science

*Advancing Water Resource Research With Sundance Ski Resort*

**DEDICATED** to environmental research, Dr. Matt Olson, a faculty member in the Department of Earth Science at UVU, leads a team of student researchers in a new collaborative initiative focused on advancing water resource research with Sundance Ski Resort.

With his team of student researchers, Olson is orchestrating a multifaceted research initiative that transcends disciplinary boundaries, spanning snowpack analysis to hydrology studies. Central to this ambitious endeavor is a strategic partnership with Sundance Ski Resort — a symbiotic relationship that promises to deepen our understanding of Utah’s water resources while fostering meaningful connections between academia and industry.



At the core of this collaborative effort between academia and industry is a shared commitment to unraveling and protecting Utah’s limited water resources. Leveraging the unique resources of the Sundance Ski Resort and expertise offered by Olson, his team is conducting research and field expeditions to collect vital data crucial for deciphering the dynamics of snowpack accumulation and melt. By establishing a robust sampling protocol within the pristine surroundings of Sundance, the research not only benefits from access to diverse ecological settings but also fosters a mutually beneficial relationship between the College of Science and the local community.

Collaborating closely with Sundance Ski Resort and the University of Utah, the project investigates the impact of various factors, including dust and black carbon deposition on snow, which can affect the hydrological dynamics of the watershed. The dust on snow (and black carbon) research component is building on existing research and ongoing collaboration with the University of Utah. Through meticulous analysis and experimentation, Olson’s team seeks to unravel the underlying drivers of snowmelt acceleration, offering critical insights for water resource management and climate resilience.

The partnership with Sundance Ski Resort is key in providing easily accessible, untouched study plots in different alpine settings that offer invaluable experiential learning opportunities for UVU science students. The opportunity for student to engage in fieldwork alongside industry professionals and seasoned scientists provides students firsthand experience in applied research, honing their skills and broadening their perspectives in watershed science and environmental stewardship. Additionally, this collaboration helps Sundance fulfill its mission to conserve and preserve (<https://www.sundanceresort.com/conserve/>).

As the research progresses, the collaborative efforts between the UVU College of Science and Sundance Ski Resort yield promising results that will transcend our academic community. Through publications, presentations, and outreach initiatives, the findings will be disseminated to stakeholders, informing evidence-based decision-making and fostering a culture of environmental awareness and sustainability. ■

**In the UVU College of Science, the partnership with Sundance Ski Resort exemplifies a commitment to forging meaningful collaborations that advance scientific knowledge and address real-world challenges. By bridging academia and industry, the research not only propels the frontiers of watershed science but also cultivates a shared vision of environmental stewardship and community engagement.**

# The Insects of Capitol Reef: A Field Guide

A Decade-Long Project by the UVU Biology Department



**THE** UVU College of Science — more specifically, Dr. T. Heath Ogden and some of his exceptional students — are proud to announce the completion of a decade-long project: “The Insects of Capitol Reef: A Field Guide.” The book is a culmination of multiple grants, collection trips, curation, databasing, and years of preparing photos and illustrations. The project was made possible through the generosity of funding and grants, primarily the efforts of the undergraduate students who carried out the research while in UVU’s Ogden Lab.

The book, authored by Jeremy B. Jensen, Kelsey Stone, Rebecca E. Jensen, and Dr. T. Heath Ogden, is not viewed as an exhaustive or comprehensive presentation of all species in the park. However, it is a valuable resource for anyone interested in the insects of Capitol Reef National Park. The park’s unique landscape is home to species of insects that can be found nowhere else in the world.

“Insects play an important role in the ecology of Capitol Reef National Park,” said Ogden, assistant professor and Department

of Biology chair. “This project would not have been possible without our fantastic science students. They have taken advantage of the unique hands-on learning experience within UVU and the College of Science and have been able to take part in the multiple research projects associated with the writing of this field guide.”

UVU students Jeremy Jensen and Kelsey Stone brought all of the previous work to complete the project. Earlier versions of the book were sent out for peer review, and the final version is now available for purchase.

“The Insects of Capitol Reef: A Field Guide” is a testament to the dedication and hard work of UVU’s Department of Biology and its students. It is a valuable resource for anyone interested in the insects of Capitol Reef National Park and illustrates the importance of hands-on learning experiences in higher education.

The book is available for purchase at the UVU Campus Store and online retailers. ■



# Lessons by the River

Exploring Science in Nature’s Classroom

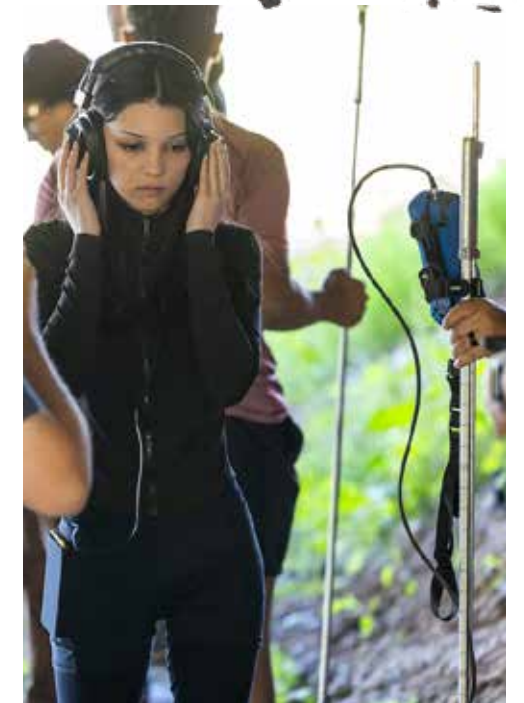
**SUMMER** is synonymous with outdoor adventures, and what better way to embrace the season’s spirit than by taking learning outside the confines of traditional classrooms? At the College of Science, we’re redefining education by immersing ourselves in the natural wonders that surround us.

Picture this: the gentle flow of the Provo River, the sun-kissed banks, and a group of eager students led by the knowledgeable Dr. Daren Nelson. Together, they embark on a journey that transcends textbooks and lectures, delving into the depths of water levels and environmental science in a truly unforgettable way.

Our water level class isn’t just about equations and theories; it’s also about understanding the intricate balance of ecosystems firsthand. From conducting experiments to observing wildlife habitats, every moment spent by the riverside adds layers of insight and appreciation for our planet’s delicate balance.

With each ripple in the water and every rustle of leaves, students are not just learning — they’re experiencing. They’re forging connections with nature that will stay with them long after the summer fades into memory.

So this summer, why confine yourself to four walls when the great outdoors beckons? Join us in embracing the beauty of experiential learning and discover the wonders that await along the banks of the Provo River. ■



# WOLVERINE STORIES



## ROB PATTERSON **CHEMISTRY**

This program is the second time I've been to UVU. I started here in 2001 in computer science, and then I transferred to Arizona State to finish my degree. Then I worked in IT for a long time.

As I aged, I looked around and saw this antisocial behavior around me, and I decided I needed to be doing something better for the world. I felt like education was the rising tide that lifts all boats. If we can have a more educated populace, we can have a better society.

I decided to come back here just because I remember liking Utah. I remember being happy. So I figured, why not? I felt empowered to make this pivot in my career later in life because I planned on it; I saved up for a few years so that I could afford to change my life and go back to pursue something that would hopefully make me happier.

When I moved from Arizona to Utah, I had four sisters in the area. We left Arizona one by one, and every sister who came here ended up liking it and stayed. Now, they have little families here. Utah has become the root of most of my family. So, I moved to Utah and enrolled at UVU.

**"As told by David Nelson, if it's something you're passionate about, go for it. You can do it. If I can do it, you can too."**

**– ROB PATTERSON**

## HAILEY COX **BIOLOGY**

My major is biology. I've always loved science, since I was in middle school, but I didn't really know what to do with it. And I've always known that I wanted to do medicine. Biochemistry aligns really well with medicine.

My seventh-grade science teacher really got me into science. We were learning about cells, and for some reason, it just kind of clicked. We did cells, and we did human anatomy, and I loved those two topics. I did really well in them. I liked memorizing all the bones and the muscles and everything. And I watched all the shows like "Grey's Anatomy," and I only liked the medical parts — I would skip through the drama. I started seeking out TED Talks about cell biology, innovations, surgical tools, and things like that.



## MACY REED **BOTANY & ASTRONOMY**

I grew up in Southern Utah. It's very beautiful there and makes it easy to love the natural world. I knew I wanted to go into science and that I loved being outside. Over time, I realized plants are so cool; I'm alive, they're alive, but we do it so differently. Yet we're experiencing the same thing. The sun rises at the same time for us. We have the same stars overhead, the same temperature of the air around us. But our experiences are so different, and I think that is so interesting. I could just spend the rest of my life learning about plants and never get bored.

## EMILY LIMB **GEOLOGY**

My grandpa was the manager of the Spanish Fork pool. I grew up at the pool and spent a lot of time there. I even started [doing] swim team. About partway through my childhood, I developed some interesting symptoms — sometimes I couldn't quite move, like when you're working out so much that your muscles just tense up and your body just doesn't want to move anymore. It just continually got worse and worse and worse to the point where I couldn't move anymore.

Eventually, one doctor gave me the diagnosis of rheumatic fever, which essentially is saying that I got strep as a child, and it was never caught. When I was told that at a young age, I thought the doctor was telling me I was going to die. I was so scared, and I just wanted to cry. I was trying to stay brave, but my only emotion was to cry.



## The Science of Excellence

Science Students Honored as Goldwater Scholars

**TWO** of our very own science students have distinguished themselves on a national level this year and have recently illuminated the landscape of academic excellence here at Utah Valley University. Mikaela Cowles and Kyri Forman, both students at UVU, have been bestowed with the prestigious 2024 Goldwater Scholarships for their remarkable achievements in physics and biology, respectively.

The Goldwater Scholarship stands as a beacon of recognition for students who exhibit unparalleled dedication and prowess in STEM research. Out of a competitive pool of 1,353 nominees, only five students from the state of Utah were recognized as Goldwater Scholars, with Cowles and Forman leading the charge with their outstanding contributions.

For Cowles, a journey into the depths of astrophysics has fueled her passion for understanding the cosmos. As a physics major, her research ventures have taken her far beyond the confines of textbooks, propelling her into the realm of astronomical exploration. Utilizing cutting-edge technologies like the James Webb Space Telescope, Cowles has embarked on a quest to measure distances to galaxies, shedding light on the mysteries of the universe. Her presence at national conferences, including the esteemed American Astronomical Society Conference, underscores her impact in the field and marks her as a rising star in the world of astrophysics.

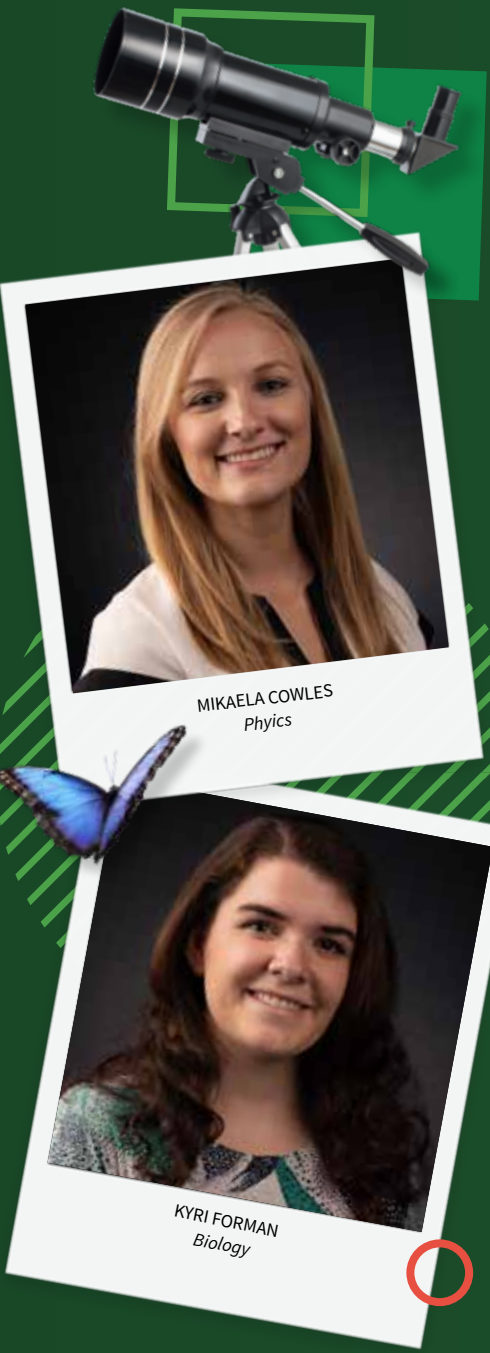
Meanwhile, Forman's fascination with the intricate world of butterflies has led her down a path of scientific inquiry and discovery. As a biology major at UVU, Forman has delved deep into the realms of entomology, particularly focusing on the proteins and proteomics of a rare white morph monarch butterfly. Beyond the laboratory, Forman's commitment to butterfly

research extends to the heart of conservation efforts, where she actively contributes to initiatives aimed at preserving local butterfly populations. Her accolades, including a first-place win for undergraduate poster presentations at the Entomological Society of America meeting, attest to her dedication and impact in the field.

The recognition of Cowles and Forman as Goldwater Scholars not only celebrates their individual achievements but also highlights UVU's steadfast commitment to fostering excellence in STEM education. Through a supportive environment that encourages hands-on research and mentorship, UVU empowers students to push the boundaries of knowledge and innovation.

College of Science Dean Daniel Horns lauds Cowles and Forman for their exceptional accomplishments, emphasizing the pivotal role of faculty mentors in shaping the next generation of scientific leaders. Indeed, the Goldwater Scholarship program serves as a testament to the importance of investing in the bright minds that will drive forward the fields of mathematics, computer science, the sciences, medicine, and engineering.

As the College of Science celebrates the success of Cowles and Forman, it also looks ahead to a future illuminated by the brilliance of its students. With their unwavering dedication and insatiable thirst for discovery, Cowles and Forman stand as shining examples of the potential that lies within each student, waiting to be unlocked through the power of education and opportunity. ■



## Celebrating Exceptional Achievement

This year's recipients of the Student Excellence Awards

This year's College of Science Student Excellence Awards were a momentous occasion, shining a spotlight on the remarkable achievements and contributions of 17 outstanding COS students. These recipients have embodied dedication, passion, and scholarly excellence within their respective fields, setting a standard for academic and personal growth. Their commitment to intellectual curiosity and the pursuit of knowledge has left an indelible mark on the college and inspired fellow students and faculty members.

Each award recipient exemplifies the fundamental values of scholarship, innovation, and leadership. Through pursuits of academic

excellence, groundbreaking research endeavors, and engagement in extracurricular activities, these individuals have excelled in their studies and contributed to the advancement of scientific knowledge.

Whether unraveling the mysteries of the cosmos or devising solutions to global challenges, these students have meaningfully impacted the College of Science and will undoubtedly do the same in their careers and respective fields. Their passion, perseverance, and commitment to excellence make them trailblazers and role models, igniting a sense of scientific discovery and innovation that extends far beyond college boundaries.





## National Science Foundation Grant to Fund Open Access Education Research in Utah

*Changing the Landscape of Higher Education*

**THE** National Science Foundation (NSF) has granted \$387,295 to a group of researchers at universities in the Utah System of Higher Education (USHE) to create open access responsible and ethical conduct of research and mentoring trainings across academic institutions.

The project is titled “Scaling Open Access Responsible and Ethical Conduct of Research and Mentoring Trainings Across Academic Institutions” and will run from 2023 to 2026. One of the researchers in this inter-institutional effort is Dr. Weihong Wang, associate professor and chair of the Department of Earth Science at UVU.

The ultimate objective of the research is to provide support for increasing the involvement of underprivileged and underrepresented students in STEM research, helping them persist through graduation and forging pathways to future graduate study opportunities.

“We know from experience that our first-generation students, especially those from underrepresented populations, will benefit greatly if they enter the workforce with a STEM degree to boost our state’s economy,” said Wang. “This project carries significant potential not only for UVU but also the entire academic community, as it directly addresses the critical need to engage both faculty members and students in the responsible and ethical conduct of research and research mentoring.”

Open access refers to teaching, learning, and research materials that are available for free online for anyone to use. The project aims to foster collaboration among USHE institutions and promote resource sharing, thereby reshaping the landscape of open access research education and mentoring materials. ■



DR. WEIHONG WANG  
Associate Professor of Earth Science

## Exploring the Origins of Flight

*A Journey in Entomology*

**AVERY** Larsen, a budding researcher from our college, recently made waves at the Entomological Society of North America Pacific Branch meeting held in the serene landscapes of Kona, Hawaii. Their presentation, representing the pioneering work of the Ogden Lab, delved into a fascinating aspect of evolutionary biology: the origins of flight on Earth.

In their captivating presentation, Larsen shared insights into a groundbreaking project focused on unraveling the mysteries surrounding the evolution of flight. Mayflies, often regarded as some of Earth’s earliest aviators, took center stage in this quest for understanding. What makes mayflies particularly intriguing is their unique life cycle, which includes a winged stage unrelated to reproduction.

The Ogden Lab’s research revolves around asexually reproducing mayfly species, particularly *Centroptilum triangulifer*. Through meticulous experimentation and analysis, Larsen and their team aim to shed light on the evolutionary pathways that led to the development of flight in these ancient insects.

Larsen’s presentation stood out not only for its academic rigor but also for its innovative approach. By examining the gene expression patterns of mayflies at various life stages, the research team seeks to uncover crucial insights into the genetic underpinnings of wing development. This approach promises to provide valuable clues about the evolutionary connections between mayfly wings and their ancestral gill structures.

Larsen’s outstanding performance at the conference, where they secured the third position among undergraduate presenters, underscores the significance of their research endeavors. It highlights not only their academic prowess but also their dedication to pushing the boundaries of scientific knowledge.

As Larsen continues to spearhead this groundbreaking research, their work serves as a beacon of inspiration for aspiring scientists within our college and beyond. It exemplifies the spirit of exploration and discovery that defines our academic community, reaffirming our commitment to unraveling the mysteries of the natural world.

The College of Science takes pride in nurturing budding talents like Larsen, whose passion for entomology and dedication to scientific inquiry promise to shape the future of our field. As they continue their journey of exploration, we eagerly anticipate the groundbreaking discoveries that lie ahead.

“Avery was an awesome student. She was curious and enthusiastic about all the projects she worked on. She was an S-STEM scholar and will be completing a paid summer research experience at the U of U cancer institute.” said UVU Professor Heath Ogden. ■





## Preserving Nature's Legacy

*The Herbarium's Role in Botanical Conservation and Education*

**THE** College of Science has a hidden gem — a sanctuary where the rich tapestry of our region's plant life is meticulously preserved and studied. This haven of botanical treasures is none other than the UVU Herbarium, a testament to the institution's commitment to botanical conservation, education, and scientific exploration.

But what exactly is an herbarium? It's more than just a repository of dried plant specimens — it's a living archive that captures the essence of our natural world. Each pressed plant specimen serves as a time capsule, preserving crucial information about its habitat, morphology, and ecological interactions. These botanical vouchers are invaluable resources for researchers, educators, and conservationists alike, offering insights into the intricate web of life that sustains our planet.

Established in 1987 under the guidance of Dr. Jim Harris, the UVU Herbarium has flourished into a sanctuary for over 18,000 specimens. These curated collections represent a diverse array of plant species found across Utah and North America, providing a rich tapestry of biodiversity for students and scholars to explore.

One of the herbarium's primary objectives is to collect and conserve new material while adhering to the highest standards of specimen integrity. Through museum-quality curation techniques and

rigorous documentation, Herbarium Director Erin Riggs ensures that each specimen retains its scientific value and authenticity for generations to come. Moreover, the herbarium's collections serve as invaluable resources for molecular taxonomic studies, phylogenetic research, and ecological investigations, contributing to our understanding of plant evolution and adaptation in a rapidly changing world.

Beyond its role as a repository of botanical specimens, the UVU Herbarium serves as a dynamic educational resource for students from many disciplines. From biology to environmental science, undergraduates can engage in hands-on research and experiential learning, deepening their understanding of plant biology and ecosystem dynamics.

The UVU Herbarium is a testament to the enduring beauty and resilience of our natural world. Through the unwavering dedication of its curator and the collaborative efforts of its researchers, the herbarium continues to inspire future generations to explore, conserve, and celebrate the wonders of nature. ■



## Exploring Marine Biology

*A Field Trip to the Oregon Institute for Marine Biology*

**THE** Biology 3850 courses taught by UVU Associate Professor Paul Dunn introduce students to the study of marine life and provide science students with the opportunity to visit the Oregon Institute for Marine Biology (OIMB) in Charleston, Oregon.

Over three days, participants engaged in a series of activities designed to familiarize them with various marine habitats and organisms. From tide pooling expeditions at Sunset Bay State Park to clam digging in the Charleston marina, students encountered a diverse array of marine life forms, gaining insights into their behaviors and adaptations.

The itinerary also included tours of OIMB labs, where ongoing research projects provided a glimpse into the forefront of marine science. Interactions with graduate students offered valuable perspectives on pursuing careers in the field.

A highlight of the trip was the boat tour, where students collected samples and participated in research activities under the guidance of experienced professionals. Visits to the Charleston Marine Life Center further enriched the experience, allowing students to observe and feed marine species up close.

Throughout the excursion, students were immersed in the natural beauty of Oregon's coastal landscapes, hiking through forests, and exploring diverse ecosystems. Dunn's expertise in marine ecology provided valuable insights, enhancing the educational experience.

In summary, the Biology 3850 field trips at OIMB provided students with a practical understanding of marine biology, complementing classroom learning with hands-on experiences in the field. As they return to their studies, participants carry with them a deeper appreciation for the complexities of marine life and the diverse career opportunities available in the field. ■





# DANIEL J. FAIRBANKS

*Science Professor Shares His Exhibit Featuring Prestigious Art, Science, and History*

Daniel J. Fairbanks, a UVU biology professor and university research officer, has published many research pieces on genetics. However, none of the publications answer the question of how his genetics have impacted his ability to create fine art. The Springville Museum of Art currently features The Fairbanks Family: An American Art Dynasty, celebrating the family's contributions to art in Utah, the country, and the world.

"This exhibit profiles five generations of the Fairbanks family, with works by 22 artists," Fairbanks said. "The first artist in the family was John B. Fairbanks, my great grandfather, who has the distinction of being the first native-born artist in Utah, who studied Barbizon and impressionist landscape painting in France in the 1890s, and who was one of several Paris-trained American artists who established American impressionism."

The title "An American Art Dynasty" is appropriate. Hundreds of monuments, murals, and museum pieces by Fairbanks artists are on permanent exhibit in almost every state in the United States, Canada, Europe, Latin America, and Japan.

Visitors will also see how Fairbanks artists have contributed to the development of American Impressionism through plein-air painting and monumental historical works commemorating Abraham Lincoln, George Washington, suffragist leader Esther Morris, geneticist Gregor Mendel, the Pony Express, the tragedy of Winter Quarters, Salt Lake City's Eagle Gate monument, artistic human anatomy, and the intersection of sculpture and medical science.

Speaking of the intersection between science and art, Fairbanks explains that he is not the first in his family of artists to combine the two.

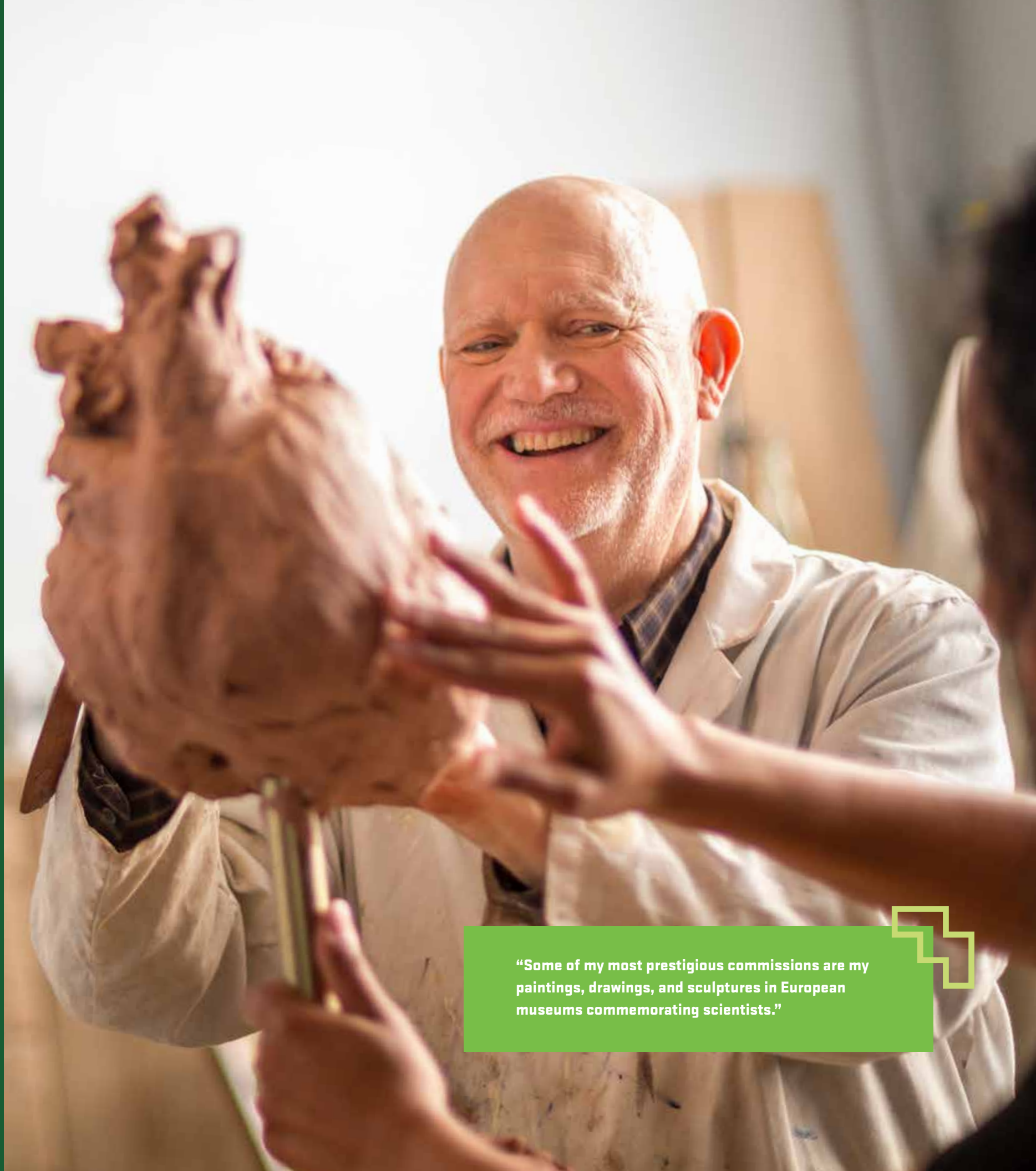
"I was fortunate to be very close to three Fairbanks artists/scientists from childhood through adulthood: my father, Justin; my grandfather Avard; and my uncle Jonathan," Fairbanks said. "I worked in their studios, receiving instruction in sculpture and painting, and I accompanied my grandfather for three summers in Italy, where I studied marble carving with Italian sculptors. My grandfather was a credentialed scientist with a Ph.D. in human anatomy, and we often discussed science in the studio. From the time I was a child, I loved science and nature and spent many hours drawing animals and plants that I observed."

As an undergraduate student, Fairbanks faced a dilemma. Should he major in science or art?

"At the time, art programs at universities were heavily focused on abstraction, whereas realism and impressionism were my family's tradition," he said. "After meeting with an art professor who arrogantly belittled my family's artistic heritage, and at the encouragement of my parents and grandparents, I chose science. I have never regretted that decision."

When asked what piece of his art he is most proud of, he echoes the sentiment of his grandfather, who said, "My works of art are like my children; I love them all the same."

"I am proud of my bronze monuments, portraits in sculpture, painting, and drawing that I made to honor outstanding individuals, family members, and loved ones, landscape paintings and drawings, and book illustrations," Fairbanks said. "Each piece has its unique story, and I cherish the memories of making every one of them." ■



**"Some of my most prestigious commissions are my paintings, drawings, and sculptures in European museums commemorating scientists."**



## SCIENCE NIGHT

# UNLOCKING THE WONDERS OF SCIENCE

**THE** College of Science recently opened its doors to a vibrant community eager to embark on a journey of exploration and wonder at its first-ever Science Night. With an impressive turnout of over 300 attendees, the event promised an exclusive peek behind the scenes of the College of Science, offering a kaleidoscope of engaging experiences tailored to ignite curiosity and fuel passion for the sciences.



From the moment attendees stepped into the venue, they were greeted with an atmosphere buzzing with excitement and anticipation. The Chemistry Magic Show, a dazzling display of colorful reactions and captivating demonstrations, set the stage for an evening filled with enchantment and discovery. From flames dancing in intricate patterns to mysterious transformations unfolding before their eyes, guests were transported into a realm where science truly felt like magic.

For those with their heads in the stars, the Planetarium Shows provided a breathtaking journey through the cosmos. Guided by expert astronomers, attendees embarked on a virtual odyssey across galaxies, witnessing the beauty and majesty of the universe unfold before them. From the twinkle of distant stars to the dance of planets in orbit, each presentation left participants in awe of the boundless wonders of space.

Venturing into the Greenhouse and Herbarium, attendees found themselves immersed in a lush oasis of botanical marvels. Amidst a sea of verdant foliage, they discovered the rich diversity of plant life and learned about the vital role these organisms play in sustaining our planet's



ecosystems. Through interactive activities and guided tours, they gained a newfound appreciation for the beauty and complexity of the natural world.

Animal enthusiasts found their paradise in the Zoology Lab tours, where they encountered an array of captivating creatures up close. From exotic insects to furry mammals, each encounter offered a glimpse into the fascinating world of animal behavior and adaptation. Guided by knowledgeable experts, guests gained insights into the delicate balance of life on Earth and the importance of conservation efforts to protect our planet's biodiversity.

Amidst the flurry of activities, undergraduate research posters provided a window into the innovative research projects shaping the future of science. From groundbreaking discoveries to pioneering solutions, guests were inspired by the passion and ingenuity of the next generation of scientists and researchers.

For those with a passion for human performance and athletics, the Human Performance Lab tours offered a glimpse into the science behind athletic excellence. Participants delved into the physiology

and biomechanics of human movement, gaining insights into the factors that drive peak performance and resilience.

And for a touch of recreation, the golf simulator and swing evaluation provided a playful respite, inviting guests to fine-tune their golfing skills in a virtual setting. With expert guidance and state-of-the-art technology, participants honed their swings and embraced the joy of mastering a new skill.

As the night drew to a close, attendees departed with hearts and minds alight with newfound wonder and inspiration. UUVU's Science Night succeeded in fostering a spirit of exploration and discovery, igniting passions and forging connections that would resonate far beyond the event's confines. With plans to make it an annual tradition, Science Night stands as a beacon of scientific curiosity and innovation, promising to inspire generations to come to unlock the mysteries of the universe and embrace the limitless possibilities of the world around them. ■



## Science Students Triumph in Bench to Bedside Innovation Challenge

*Wolverines Win Best in Science Against 32 Other Teams*

**STUDENTS** from the College of Science recently showcased their brilliance at the Bench to Bedside competition, held at the Utah State Capitol building. Despite fierce competition from 32 other teams, the UVU contingent secured the coveted Best in Science title along with a \$5,000 award.

At the heart of Bench to Bedside is a mission to foster healthcare innovation. UVU's science students embraced this challenge with gusto, pouring their energy into developing a groundbreaking medical device. Their meticulous research and dedication resulted in a comprehensive package, including a compelling marketing plan, an engaging pitch video, and thorough market research.

This victory not only highlights the technical prowess of our science students but also their ability to translate scientific knowledge into practical solutions. Their success serves as a beacon of inspiration, demonstrating the transformative impact of student-led research on the future of healthcare.

UVU's triumph at Bench to Bedside reaffirms the university's commitment to nurturing a culture of innovation and excellence. These students are shining examples of the university's dedication to empowering aspiring scientists and visionaries to make a meaningful difference in the world. ■



## Utah STEM Fest

*Inspiring the Next Generation of Scientists and Engineers*

**THE** Utah STEM Fest has provided an exciting and interactive environment for students from fourth to tenth grade to engage with various aspects of science, technology, engineering, and math. Hosted by the Utah STEM Action Center, the event aims to ignite children's passion for STEM fields, which are critical to many career paths.

One of the highlights of this year's event was the exhibit by the UVU Department of Earth Science. Matt Olson, a representative of the department, manned a booth featuring an impressive array of rocks, minerals, and fossils. Olson observed that children are naturally drawn to these tactile exhibits, often spending considerable time feeling the textures and making observations. "I think that cultivating that curiosity will continue to keep people interested in caring about the earth," Olson commented, emphasizing the importance of nurturing a lifelong interest in earth sciences.

The eighth annual Utah STEM Fest featured more than 60 exhibitors from various STEM-related companies and organizations. Participants included notable names such as NASA and Meta, as well as local entities like Dominion Energy and Utah Valley University's Earth Science program. These exhibitors provided hands-on activities that allowed students to directly interact with STEM applications in real life.

Students had the opportunity to explore a diverse range of exhibits, including handling a moon rock, operating underwater robots, examining tarantulas, and even visiting an army mobile command center. These experiences were designed not only to educate but also to inspire and show the fun and practical sides of STEM fields.

Tami Goetz, director at the Utah STEM Action Center, highlighted the importance of maintaining and fostering the natural curiosity of children. "Kids are born curious, they are naturally curious. And it's really important to help those kids understand that life is a journey of learning and exploration and seeing problems and solving problems," she said. Goetz also noted that the interactive nature of the exhibits is crucial for demonstrating how STEM knowledge is applied in the real world, saying, "STEM is about playing, it's about having fun — building and breaking and fixing."

With hundreds of schools participating, the Utah STEM Fest has once again succeeded in its mission to spark interest and enthusiasm in the next generation of scientists, engineers, and innovators. Through events like these, students gain valuable hands-on experience and a deeper appreciation for the wonders of STEM. ■

## Associate Professor Sally Rocks Receives Prestigious ACS Award

*Honored for Exemplary Best Practices, Mentorship, and Encouragement in Chemistry Education*

**CONGRATULATIONS** to Dr. Sally Rocks, associate professor of inorganic chemistry in the College of Science, on receiving the American Chemical Society (ACS) 2023 Utah Award: Outstanding Educator.

“I am delighted that Dr. Sally Rocks has been honored as the 2023 Outstanding Undergraduate Educator by the Utah Chapter of the American Chemical Society,” said College of Science Dean Daniel Horns. “The ACS is one of the largest and most respected scientific organizations in the world, and its membership includes people working in both academia and industry.”

Before coming to UVU, Rocks worked at one of the premier chemical analytical companies in the United States.

“She brings the deep applied skills she developed at that job, plus a passion for student success, to UVU,” Horns said. “This award recognizes the fact that Dr. Rocks’ outstanding teaching helps students learn and that her enthusiasm for chemistry motivates students to persist through graduation and become part of Utah’s growing scientific workforce.”

The award criteria include effective, inspiring, and exciting use of pedagogical best practices. Recipients must also be mentors who encourage students and colleagues to pursue careers in chemistry, foster a sense of belonging, seek diversity, and recruit minority and underrepresented groups. Requirements include providing extra support for students outside the classroom and leadership within their department, college, or scientific organizations. Recipients are also required to contribute to the public’s understanding of chemistry with effective communication and volunteerism and expand engagement in science and chemistry.

The Utah award is a state-wide award given on behalf of the ACS, and the award committee is composed of officers from two Utah-based sections of the ACS.

“I feel honored to be recognized for my work at UVU,” Rocks said. “I am thankful to my colleagues for their support in the nomination process and my fellow Utah chemists for recognizing me. It was very exciting to learn I was to receive this award, and I thoroughly enjoyed celebrating with chemists from around the state at the awards banquet.” ■



## Dreams Realized

*Scholarships Propel Science Student Toward Medical Career*

**SIX** years ago, Oriana Freeman made the decision to leave her home country of Venezuela. Freeman was in her final year of medical school when the political, economic, and social crises in her home country became too much to handle.

“Telling my family about my decision to leave was the most difficult thing I have ever done, but they all supported me,” Freeman said. “I remember the day I left, January 20, 2017. My mom gave me her last \$10, and that was all I had in addition to a bag full of dreams — the American Dream.”

A year and a half after Freeman arrived in the United States, she married her husband, Ryan. Together, they now have a young daughter.

“After we got married, I applied to UVU to complete my degree and continue pursuing my goal of becoming a doctor,” she said. “UVU is a place where diversity is their flag, and I feel accepted for who I am — an immigrant working hard to make her dream come true against all odds.”

Freeman hasn’t given up her goal of becoming a doctor, despite the challenges and obstacles that she faces every day. “Pursuing a degree in medicine is a long and challenging journey that requires a significant amount of time, dedication, and financial resources,” Freeman remarked. “My husband works day and night to provide for our family and support me while I’m in school.”

With the financial costs of going to school and starting a family, receiving a scholarship was essential in helping Freeman focus on her studies.



*Oriana Freeman  
College of Science*

“This scholarship has helped me tremendously by providing me with the financial support I need to continue my degree,” Freeman said. “It has helped to relieve the financial burden of tuition, textbooks, and other expenses, which has allowed me to focus more on my studies and my daughter. This scholarship has also provided me with a sense of validation and encouragement that my hard work and dedication are recognized and appreciated.”

At the 2023 UVU Scholarship Luncheon, Freeman shared her inspiring story with UVU donors and thanked them for their support.

“Your generosity and support are instrumental in helping students like me pursue their dreams and achieve their goals,” she said. “This scholarship has made a significant impact on my life, and I will forever be grateful for the opportunities it has provided me. Thank you from the bottom of my heart.” ■



*Eliza Ballantyne  
Valedictorian  
College of Science*

## Thriving in Science

*The Importance of People: Advice From Our Valedictorian*

**“IF I** could share one piece of advice with other students, it would be to prioritize people. Sometimes we focus so intently on passing exams and GPAs and checking all the other “good student” boxes that we forget that science isn’t done in a vacuum. We do better — in labs, classes, life, whatever - when we work together. We need each other. We need people who will let us bounce ideas off them, mentors who will work with our crazy ideas (or vice versa), and chances to practice communicating scientific ideas. We need people who encourage us, and we need chances to root for others.

So, get involved in research, find (or make!) study groups, and look for opportunities to teach what you are learning. In other words, find a way to connect with people who get excited about the same stuff you do. The most valuable part of my time at UVU has been the people who believed in me before I believed in myself. Finding those people or becoming that sort of person is well worth the effort.” ■

## Mentorship and Excellence

*Success at Geological Society of America Conference*

**DR. MIKE STEARNS**, assistant Professor in the Department of Earth Science, along with his student, Emmaline Saunders, and Dr. Eddy Cadet's student, Mason Gordon, showcased their dedication to academic excellence and the spirit of scientific inquiry at the GSA conference.

### Dr. Mike Stearns and His Inspiring Mentoring Journey

Stearns played a significant role in mentoring students for the GSA conference, providing an opportunity for them to present their research. His partnership and mentorship with Saunders began during her time as a student in his Earth materials class in the fall of 2022. He shared, "I am always looking for motivated students, and she approached me about research opportunities." Stearns emphasized the importance of helping students set ambitious goals, such as presenting at internationally recognized meetings.

He outlined his approach to student support, highlighting the balance between guiding and allowing students to take ownership of their work. Weekly meetings and open communication were key to success. Traveling to the conference together allowed for valuable discussions about expectations and experiences. Stearns' dedication to his students was evident, as he was close by during Saunders' presentation, providing support when needed. The results spoke for themselves, with potential graduate school offers coming her way.

In discussing the qualities vital for student success, Stearns emphasized curiosity, tenacity, and an open mind. He stressed the importance of creating a nurturing space where students can feel intellectually vulnerable. Tailoring research projects to align with students' interests and goals was a crucial element of his approach. Furthermore, he recognized the effort and progress, even in the face of imperfect outcomes, and he never failed to share his enthusiasm for the scientific process with his students.



EMMALINE SAUNDERS  
Earth Science Major



DR. MIKE STEARN  
Professor of Earth Science

**Emmaline's advice to fellow students looking to get involved in research is simple but powerful: "Just do it! It's such a rewarding experience. Just talk to a professor who is doing research that you're interested in, and they'll probably be more than happy to help you get involved."**

### A Student's Perspective

Saunders offered her insights into her experience at the GSA conference. Initially overwhelmed by the size and scope of the event, Saunders soon found her footing and made valuable connections. She described the preparation as somewhat stressful, given that it was her first conference and poster presentation. However, she expressed her gratitude to Stearns, who went above and beyond to ensure she was well-prepared.

For Saunders, the GSA conference was a unique opportunity to network with geologists from around the nation, particularly as an undergraduate student. She engaged with graduate students, potential advisors, and learned about cutting-edge research in her field.

The most memorable moment for Saunders was meeting a fellow student in a similar position — a junior undergraduate interested in pursuing graduate studies. This connection emphasized the value of attending conferences like GSA.

The success of Stearns, Saunders, and Gordon at the GSA conference exemplifies our commitment to fostering academic excellence and research opportunities for our students. We applaud their dedication, resilience, and the positive impact they have on our academic community. ■

## Empowering the Next Generation

*The Impact of Undergraduate Research in Entomology*

**AT** the Annual Entomological Society of America meeting in National Harbor, Maryland, one of our very own students presented research titled "The Impact of Undergraduate Research in Entomology on Academia and on the Community." This event provided a platform for budding scientists to shine. Among them was Remington Motte, a standout undergraduate invited to share his insights in a 15-minute talk — a rare honor in a sea of 3,500+ registered scientists.

Motte's presentation wasn't just commendable; it was exceptional. Colleagues marveled at his research prowess and his ability to articulate complex ideas with confidence and clarity. But his success wasn't just about a polished performance on stage; it was also about the journey that led him there.

For Motte, preparation went beyond crafting a stellar presentation. He meticulously curated his online presence, coding his own website to showcase his achievements. He seized the opportunity to network, reaching out to potential graduate school mentors and making connections with peers from other institutions. His proactive approach epitomized the essence of undergraduate research driven, passionate, and committed.

The significance of events like the Annual Entomological Society meeting extends far beyond academic presentations. They serve as incubators for growth, shaping students' scientific identities and fostering invaluable networking opportunities. Amidst the symposiums and workshops, students find mentors, forge friendships, and glimpse into the future of their careers.

Motte's journey mirrors the broader mission of educators like his mentor at UVU, Dr. Carl Hjelman, who tirelessly advocates for

undergraduate involvement in scientific discourse. These mentors recognize the transformative power of research experiences, instilling confidence and nurturing a passion for discovery.

But the journey didn't end at the Annual Entomological Society. It extends to platforms like the International Plant and Animal Genome meeting, where educators like Motte's mentor take center stage. In workshops like "Arthropod Genomics and Genome Engineering," they showcase the culmination of years of dedication and expertise.

For Hjelman, these conferences are not just an opportunity to present research; it's also a chance to pay it forward. Having benefited from supportive mentors in his own undergraduate years, he is committed to empowering the next generation of scientists. Through mentorship and hands-on experience, they pave the way for students to navigate the complex landscape of scientific inquiry.

Events like the Annual Entomological Society meeting and the International Plant and Animal Genome meeting are more than just gatherings of academics. They are catalysts for change, fostering collaboration, sparking innovation, and nurturing the scientific leaders of tomorrow.

As Motte reflects on his journey — from eager undergraduate to confident presenter — he embodies the spirit of curiosity and determination that drives scientific progress. And behind every success story lies a mentor, guiding, inspiring, and shaping the future of science, one student at a time. ■



## Frontiers of Discovery

*UVU's Paradigm-Shifting Research on Wallace's Line*

**I**n the realm of scientific inquiry, there exists a profound truth: the best education often comes through direct experience. At UVU, this philosophy is embodied in the Microbiome Boot Camp, an innovative program designed to immerse bioinformatics students in real-world research challenges. Led by Dr. Geoffrey Zahn, the bootcamp offers a platform for students to apply their skills while unraveling the complexities of microbial ecosystems.

In the spring of 2023, students embarked on a collaborative project with Dr. Benjamin Wainwright and his team from the National University of Singapore. Their mission? To investigate the enigmatic Wallace's Line — a boundary separating distinct faunal realms across the Indonesian archipelago. Animal populations on one side of the line have a distinct affinity to Asia, while animal species on the other side have an Australian affinity. While this geographical feature has long captivated scientists, its influence on microbial communities remained largely unexplored.

Armed with metagenomic sequencing techniques, UVU students ventured into uncharted territory, analyzing samples of *Syringodium isoetifolium* — a seagrass endemic to the region. Their goal: to discern whether microbial populations exhibit patterns mirroring the biogeographic divisions observed in animal populations.

What they uncovered was nothing short of remarkable. Through meticulous data analysis and advanced statistical methods, the students revealed a surprising phenomenon: certain bacteria exhibited restricted migration across Wallace's Line. This groundbreaking discovery challenges conventional notions of bacterial dispersal and sheds new light on the intricate relationship between geography and microbial diversity.

The culmination of their efforts was a peer-reviewed publication in "Environmental Microbiome" — a testament to their dedication and expertise. As co-authors, the students not only contributed to the scientific discourse but also gained invaluable insights into the research process, from data collection to publication.

Beyond the academic achievements, the Microbiome Boot Camp exemplifies the transformative power of experiential learning. By engaging in hands-on research and collaboration with an international team, students gained practical skills and global perspectives essential for success in today's interconnected world.

Moreover, their discovery has broader implications for our understanding of microbial ecology and biogeography. By elucidating the influence of geographical barriers on bacterial communities, the

study underscores the complex interplay between geography, evolution, and ecology — a topic of paramount importance in the face of global environmental change.

As pioneers in this field, UVU students have not only expanded our knowledge of microbial ecosystems but have also paved the way for future exploration and discovery. Through their passion, perseverance, and commitment to scientific inquiry, they have demonstrated the limitless potential of the human intellect to unravel the mysteries of the natural world.

In the spirit of exploration and discovery, the Microbiome Boot Camp continues to inspire and empower the next generation of scientists, fostering a culture of curiosity, collaboration, and innovation. As we traverse boundaries — both geographical and intellectual — we embark on a journey of discovery, guided by the belief that understanding the microbial world is key to unlocking the secrets of life itself. ■



## A Hot-Girl Summer

*Navigating Electrolyte Supplementation for Safe and Effective Hydration*

**ELECTROLYTE** supplementation has long been recognized as a crucial strategy for maintaining proper hydration, particularly during strenuous exercise in hot conditions, for individuals prone to salty sweat, and in prolonged endurance events. However, recent developments in the sports nutrition market have introduced supplements with significantly higher sodium content, raising questions about their safety and effectiveness.

Traditionally, sports drinks have contained modest amounts of sodium, typically ranging from 250 to 450 mg per serving. These levels were deemed adequate for replenishing electrolytes lost through sweat during exercise. However, a new wave of "keto" and "low-carbohydrate" supplements boasts sodium contents upward of 840 to 1,000 mg (about the weight of a small paper clip) per serving. While sodium is essential for fluid balance and nerve function, such high doses prompt concerns regarding their impact on core temperature regulation, cardiovascular health, and fluid-electrolyte balance.

In research led by Dr. Melani Kelly, she set out to investigate the effects of these high-dose sodium supplements on exercise performance and safety. What began as an inquiry into optimizing hydration strategies quickly turned into a critical examination of the potential risks associated with sodium overload. During the course of our study, one of the most alarming findings was a hypertensive crisis experienced by a participant, prompting us to reevaluate our protocol and prioritize safety measures.

Our protocol adjustment involved splitting the supplement intake, with half consumed before exercise and the remainder administered

gradually over the first hour of activity. This modification aimed to mitigate the sudden surge in sodium levels and its potential adverse effects on cardiovascular health.

This research holds significant implications, particularly in raising awareness about the potential risks of excessive sodium consumption before exercise. Many individuals may unknowingly put themselves at risk of cardiovascular events due to a lack of understanding of the potential dangers associated with high-dose sodium supplements. By shedding light on these concerns, we hope to empower athletes and fitness enthusiasts to make informed decisions about their hydration strategies.

Central to our investigation are the efforts of dedicated undergraduate researchers. These students have played a pivotal role in every aspect of the study, from data collection to analysis. Their commitment and expertise have elevated this project to a level of scientific rigor typically associated with graduate-level research. Through their contributions, we aim to not only expand our understanding of electrolyte supplementation but also inspire future generations of scientists to pursue meaningful research in sports nutrition and exercise physiology.

Looking ahead, our research will continue to delve into the intricate relationship between sodium supplementation, hydration status, and exercise performance. By refining our dosing recommendations and safety protocols, we aspire to pave the way for safer and more effective strategies for maintaining fluid-electrolyte balance during physical activity.

In conclusion, the quest to optimize hydration strategies in exercise is not merely about performance enhancement; it is about safeguarding the health and well-being of individuals engaged in physical activity. Through collaborative research efforts and a commitment to scientific integrity, we endeavor to unravel the complexities of electrolyte supplementation and chart a course toward safer, more effective hydration practices in the pursuit of fitness and athletic excellence. ■

## Leading by Example

*The Remarkable Story of Kimberlyn Argyle*

**KIMBERLYN ARGYLE** stands as a shining example of the high standards and trailblazing spirit within the UVU College of Science. Her journey from uncertainty to unwavering commitment showcases not only her personal resilience but also her ability to excel in the demanding field of biology and pre-medical studies.

Initially, Argyle's enrollment at UVU was seen as a temporary stop on her academic journey, with plans to transfer elsewhere after her first semester. However, her experience at UVU surpassed all expectations, particularly within the esteemed biology program. The supportive faculty, who demonstrated a genuine investment in her success, inspired Argyle to rethink her plans. Recognizing the opportunity for growth and excellence at UVU, she made the decision to stay and pursue a biology major, setting the stage for her future as a trailblazer in the field.

Argyle's passion for medicine was ignited at a young age, fueled by her experiences helping her father recover from a severe stroke. This early exposure to the complexities of the human body and the transformative power of medical care set her on a path of dedication to the field of medicine.

Throughout her academic journey, Argyle has not only excelled in her studies but has also emerged as a leader and role model within the College of Science. Working closely with mentors such as Dr. Geoffrey Zahn, Dr. Eric Domyan, and Dr. Zoe Thompson, she has embraced every opportunity for growth and development. Her tenure as president of UVU's American Medical Women's Association (AMWA) chapter exemplifies her commitment to fostering a supportive community for aspiring female physicians, further solidifying her status as a trailblazer within the college.

In addition to her academic pursuits, Argyle's service in the Utah Army National Guard has equipped her with invaluable skills such as discipline, time management, and accountability. These qualities, combined with her academic excellence, position her as a trailblazer not only within the College of Science but also within the broader community.

As Argyle prepares to embark on the next phase of her journey, her commitment to excellence and service are sources of inspiration for her peers and future generations of scientists and healthcare professionals. With her blend of academic prowess, compassionate spirit, and trailblazing leadership, Argyle is poised to make a lasting impact in the field of medicine and beyond, leaving an indelible mark on the College of Science and the world at large. ■



**SOLDIER**



**ALUMNA**



**RESEARCHER**

## Bridging the Gap

*Understanding Noise Exposure on the UVU Pedestrian Bridge*

As bustling cities evolve, so do their infrastructures. Pedestrian bridges, like the one linking Utah Valley University to its nearby train station over Interstate-15, serve as vital conduits for safe passage amidst urban chaos. However, amidst the hustle and bustle lies a hidden threat: noise pollution.

In a collaborative effort from Brian Patchett and Bonnie Andersen from the Department of Physics and mechanical engineering Professor Masood Amin, UVU delves into the realm of acoustics to unravel the impact of traffic noise on pedestrians traversing the UVU Pedestrian Bridge. Engineering, Utah Valley University delves into the realm of acoustics to unravel the impact of traffic noise on pedestrians traversing the university's pedestrian bridge. Armed with cutting-edge instrumentation and computational modeling, their research sheds light on a little known but significant concern.

Sound levels, measured using Extech's SL400 noise dosimeter and Larson Davis' 831C sound level meter, unveil a cacophony of noise ranging from 55 to 102 dB. The variability in sound levels, influenced by factors such as time of day and location on the bridge, underscores the complex interplay between urban infrastructure and environmental noise.

But numbers alone don't tell the full story. Enter COMSOL, a modeling platform that simulates the intricate dance between free-way noise and bridge geometry. Through meticulous simulations, the UVU researchers decipher how the bridge's design shapes the



auditory landscape for pedestrians, offering valuable insights into mitigating noise exposure.

The implications are profound. With Occupational Safety and Health Administration (OSHA) guidelines stipulating a 15-minute limit at 100 dB for non-occupational noise exposure, pedestrians lingering on the bridge face potential harm. This research isn't just about data collection — it's about safeguarding the well-being of the community.

Jacob Sampson, a student researcher, recently unveiled the findings at the Acoustical Society of America's 186th national conference in Ottawa, On Canada, on May 16, 2024. His presentation resonated with attendees, sparking conversations and catalyzing further inquiry into urban noise pollution and its ramifications.

As cities continue to grow, the importance of understanding and mitigating noise pollution becomes increasingly urgent. UVU's pioneering research serves as a beacon of hope, guiding urban planners and policymakers toward creating environments that harmonize with the well-being of all who inhabit them.

In the end, it's not just about building bridges—it's about bridging the gap between progress and preservation, ensuring that the symphony of city life remains one of harmony and health. ■



## Dr. Nathan Goldfarb Develops Breakthrough Patents for Tuberculosis Treatment

**DR. NATHAN GOLDFARB**, associate professor of chemistry here in the College of Science, is revolutionizing the battle against Mycobacterium tuberculosis (Mtb) with the announcement of two groundbreaking patents. These patents cover the development of novel drugs designed to combat Mtb, which have the potential to transform the landscape of tuberculosis treatment.

The first patent encompasses two innovative drugs targeting and inhibiting the serine protease, Hip1 (Hydrolase important for pathogenesis). These inhibitors are crafted with a sequence designed to precisely bind to the enzyme target, along with a "warhead" that chemically inactivates the enzyme. This unique approach has demonstrated remarkable success in inhibiting Mtb growth in cell culture experiments. Furthermore, when Mtb is co-treated with these compounds in combination with rifampicin, a front-line FDA-approved antibiotic for tuberculosis treatment, the concentration of rifampicin required to eliminate the bacteria is significantly reduced. This dual-drug strategy not only enhances treatment efficacy but also holds the promise of mitigating antibiotic-related side effects and improving patient compliance, factors that are pivotal in addressing the development of drug-resistant Mtb.

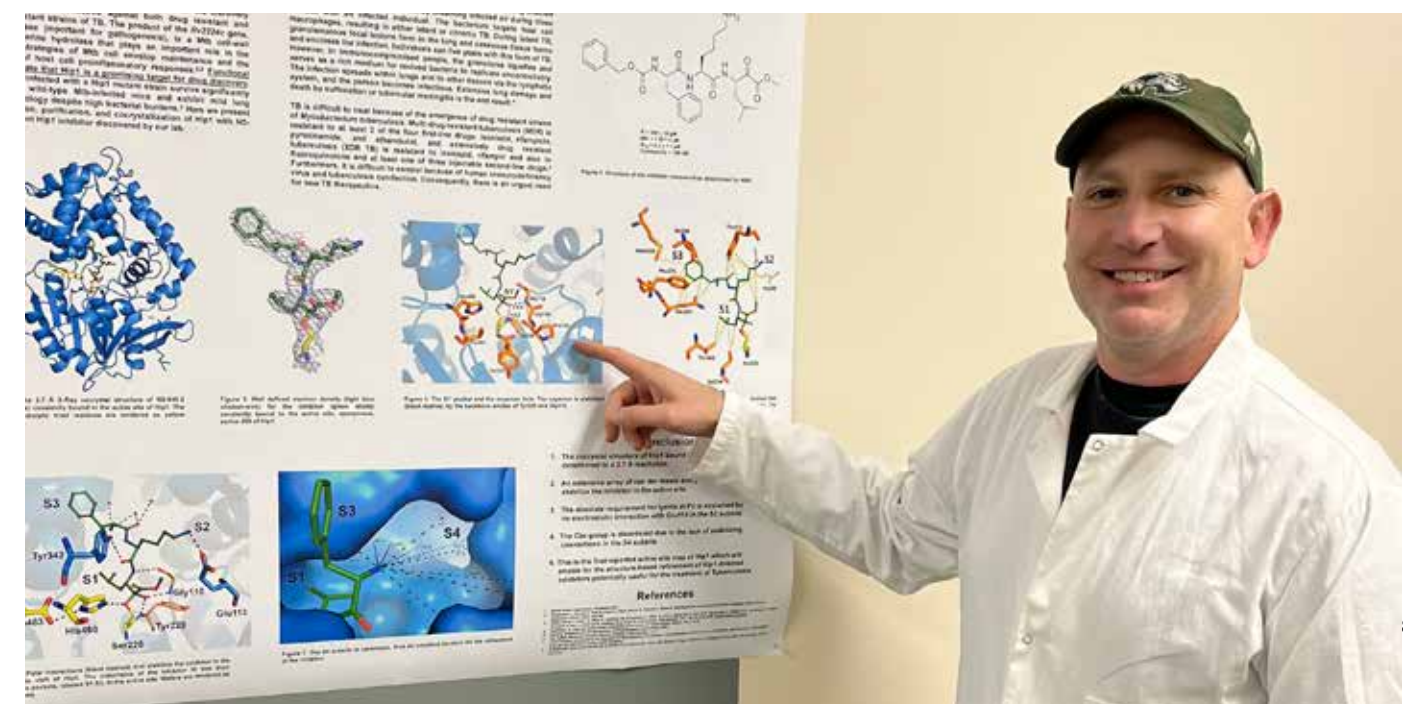
Additionally, these patents include crystal structures of Hip1 bound with Goldfarb's novel inhibitors. These structures provide an invaluable molecular roadmap, essential for the ongoing refinement and optimization of the inhibitors, increasing their potential as game-changing treatments.

What sets these patents apart is the inclusion of a diagnostic assay for Mtb, akin to the simplicity and efficiency of COVID-19 tests. This diagnostic assay is designed to detect Mtb in patient sputum samples, providing a rapid, point-of-care solution that is currently unavailable. Early detection of Mtb is of paramount importance in the global fight against the disease, with one-third of the world's population affected and a staggering annual mortality rate of 1.6 million deaths.

Goldfarb's innovative approach has the potential to significantly impact global healthcare. The combination of advanced drug development and a cutting-edge diagnostic assay represents a multifaceted approach to tackling Mtb, with the potential to revolutionize treatment strategies and change the trajectory of the disease.

"Dr. Goldfarb's patents represent a major leap forward in our efforts to combat tuberculosis," said College of Science Dean Daniel Horns. "The implications of these inventions for global healthcare are immeasurable, as they address a critical need in the battle against one of the world's most devastating diseases."

These patents are a testament to Goldfarb's commitment to advancing science and improving public health. As the world grapples with the challenges posed by Mtb, these patents offer a glimmer of hope and a beacon of progress in our fight against this relentless and deadly adversary. ■





# THE SOUND OF SCIENCE

## PHYSICS MEETS MUSIC

**PROFESSOR** Bonnie Andersen of the Department of Physics has always enjoyed teaching her students in a nontraditional way with her project-Based Learning (PBL) classes. Collaborating with Professor Cheung Chau from the Department of Music, Andersen has created a classroom environment that marries physics and music in a unique educational experience.

Students explored the physics behind four groups of musical instruments: strings, woodwinds, brasses, and percussion. They worked in groups to present these concepts to a public audience in The Noorda Center for the Performing Arts, followed by live performances from UVU musicians. This combination illustrated how vibration, resonance, and sound waves create music, making complex scientific principles accessible and engaging.

The course culminated in a public event attended by over 150 people, showcasing the students' work and the interdisciplinary collaboration. This innovative approach provided students with a dynamic and authentic learning experience, deepening their understanding of both physics and music.

Professor Andersen's class highlights the enriching potential of interdisciplinary education, offering a model for how academic learning can be connected with real-world applications. ■



# HEALING THE BODY AND MIND

## UNVEILING THE POWER OF SOUND THERAPY

**IN** today's fast-paced world, the persistent presence of stress and tension has become a common reality for many individuals. Yet, beyond mere discomfort, chronic stress can pave the way for a host of detrimental health outcomes, from cardiovascular issues to mental health disorders. However, amidst the cacophony of modern life, there exists a profound antidote: meditation.

Research has demonstrated that meditation acts as a powerful tool in mitigating the adverse effects of stress and tension. By eliciting a relaxation response, meditation aids in reducing blood pressure and activating the parasympathetic nervous system, countering the body's instinctual fight-or-flight response to stress. However, for some, achieving a meditative state can prove challenging, prompting exploration into adjunctive therapies, such as sound therapy.

Sound therapy emerges as a promising avenue for facilitating meditative states and harnessing the benefits of meditation, regardless of an individual's experience level. Unlike music therapy, which relies on complex compositions to evoke emotional responses, sound therapy utilizes specific frequencies and instruments to induce relaxation. Ancient instruments like singing bowls and gongs have garnered attention for their ability to evoke profound psychological and physiological responses, including reduced tension, anxiety, and depression, as well as stabilized heart rate and blood pressure.

Despite the apparent efficacy of sound therapy, the mechanisms underlying its psychoacoustic effects remain largely unexplored. Collaborative efforts between the Department of Physics and the Department of Exercise

Science seek to unravel the intricacies of sound therapy by analyzing the specific frequencies produced by ancient instruments and correlating them with physiological and psychological responses. This interdisciplinary approach aims to shed light on the therapeutic potential of sound therapy and inform tailored interventions for diverse clinical populations.

Central to this investigation is the exploration of how different sounds and frequencies elicit varied physiological and psychological responses. While computational models have proposed explanations for phenomena like acoustic beating in singing bowls, experimental verification remains elusive. By employing advanced techniques such as multipoint scanning laser Doppler vibrometry, researchers aim to conduct precise modal analysis of bowl vibrations, unraveling the intricate interplay of modal structures and vibrations.

Through this multidimensional exploration, researchers seek to deepen our understanding of sound therapy's therapeutic mechanisms and refine its application in clinical settings. By bridging the realms of ancient wisdom and modern science, sound therapy holds promise as a holistic approach to promoting mental and physical well-being in an increasingly chaotic world.

In essence, the symphony of sound therapy offers not only a path to inner harmony but also a bridge between tradition and innovation in the pursuit of optimal health and wellness. ■

# THE COLLEGE OF SCIENCE

FALL & SPRING EVENTS

2024-25

## AUG

**AUG 21:**  
UVU CLASSES BEGIN

**AUG 27:**  
**DONUTS, CLUBS & SCIENCE**  
9-11 am, Science Atrium  
UVU Students only

## SEPT

**SEPT. 23-26:**  
**MONDAY, SEPT. 23:**  
**EXPLORE THE SCIENCES DAY**  
9 am-1 pm, Science Atrium  
**SCIENCE VS HOLLYWOOD "TWISTERS"**  
1-3 pm, Auditorium  
Free to public

**TUESDAY, SEPT. 24:**  
**RESEARCH AND TREATS (POSTERS FORUM)**  
9 am-12 pm, Science Atrium  
**SCIENCE PROJECT HELP NIGHT**  
(community event) 5-8 pm

**WEDNESDAY, SEPT. 25:**  
**DOMINION ENERGY STEM CAREERS LUNCHEON**  
11 am-1 pm  
location TBD  
**SCIENCE NIGHT** (community event)  
5-9 pm, Science Building

**THURSDAY, SEPT. 26:**  
**PROVO RIVER CLEANUP SERVICE PROJECT**  
Location TBD

**FRIDAY, SEPT. 27:**  
**UVUSA AND AMBASSADOR FORUM AND DRINKS**  
Location TBD

## OCT

**OCT. 10:**  
**NATIONAL THEATER LIVE PRESENTS: "FRANKENSTEIN"**  
Community Event; See UVU's School of the Arts for Tickets  
6 pm  
Smith Theater

## NOV

**NOV. 20:**  
GIS DAY

## DEC

**DEC. 3-4:**  
**STRESS RELIEF: Puppies and Cookies**  
10 am-1 pm  
Science Atrium

## JAN

**JAN. 6:**  
SPRING CLASSES BEGIN

## FEB

**FEB. 12:**  
DARWIN DAY AT UVU

## MAR

**MAR. 14:**  
PI DAY AT UVU

## MAY

**MAY. 1-2:**  
UVU GRADUATION AND CONVOCATION



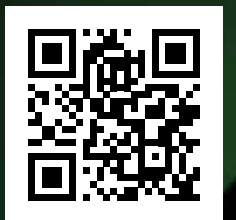
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