



Science & Health NEWS

UNIVERSITY OF WISCONSIN-LA CROSSE COLLEGE OF SCIENCE AND HEALTH NEWSLETTER

VOLUME 14, NUMBER 1

WINTER 2018-19



LOOKING toward the *future*

Celebrating 20 years of Dean's Distinguished
Fellows — program fosters inquisitive,
career-ready grads

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Science & Health NEWS

UNIVERSITY OF WISCONSIN-LA CROSSE
COLLEGE OF SCIENCE AND HEALTH
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CLASS NOTES POLICY

Update your address and provide a class note for the Lantern at www.uwlalumni.org.

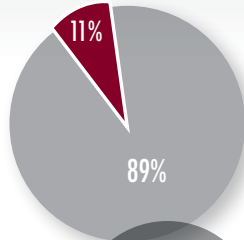
ON THE COVER: Senior Jackson Radenz worked with Assistant Professor Niti Mishra during his Dean's Distinguished Fellowship. Radenz worked with a company in a local rock quarry to generate 3D maps of space and stockpiles to help the company determine rock lost.

The College of Science and Health

WHO WE ARE

CURRENT CSH ENROLLMENT:
5,179

● UNDERGRADUATE
● GRADUATE



CSH POPULATION

FEMALE **57%**

MALE **43%**

55%
CSH students with internships

10%
U.S. students of color

35%
CSH first-generation students

94%
CSH grads job placement rate

CSH student body comes from:

78%
WISCONSIN RESIDENTS

41
STATES

17
COUNTRIES

5 MOST POPULAR UNDERGRADUATE MAJORS

- BIOLOGY
- EXERCISE & SPORT SCIENCE
- COMPUTER SCIENCE
- HEALTH PROFESSIONS
- RECREATION MANAGEMENT & THERAPEUTIC RECREATION

CSH supports several inclusive excellence programs including the McNair Scholars and the First Year Research Exposure programs

UWL is a national leader in training students in adaptive physical education

Each year hundreds of students from seven college departments participate in field-based instruction out of the classroom

Since 1999, CSH has awarded over 300 Dean's Distinguished Undergraduate Summer Research Fellowships

>50% of all UWL undergraduates have majors in CSH

CSH ACADEMIC PROGRAMS

48 undergraduate
22 graduate
1 doctoral

CSH FACULTY PROFILE

246 faculty

>70% hold a Ph.D. or terminal degree

55% tenured or tenure-track

Since 2010

>1,450 undergraduates engaged in faculty-mentored research

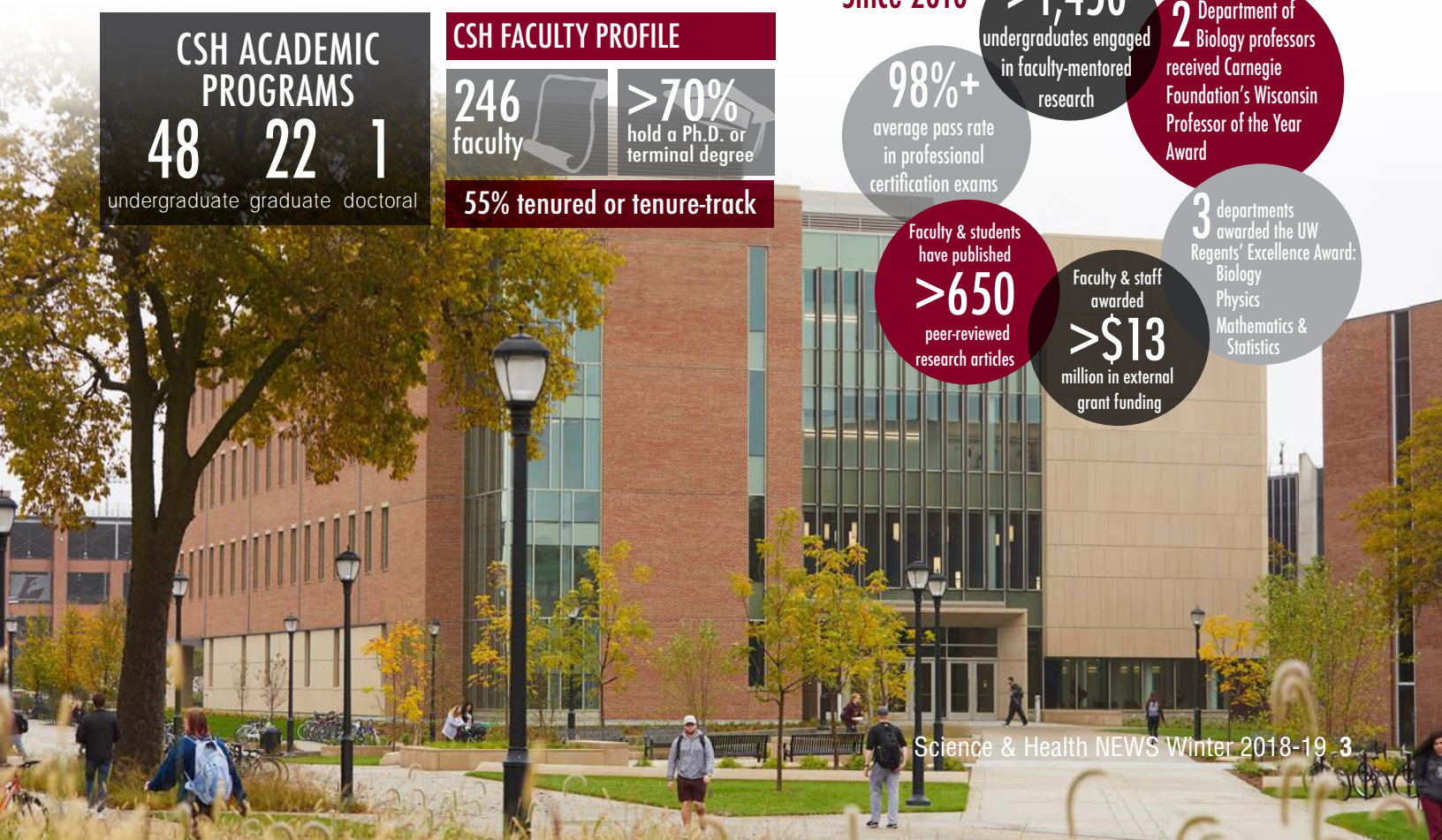
2 Department of Biology professors received Carnegie Foundation's Wisconsin Professor of the Year Award

98%+ average pass rate in professional certification exams

Faculty & students have published **>650** peer-reviewed research articles

Faculty & staff awarded **>\$13** million in external grant funding

3 departments awarded the UW Regents' Excellence Award: Biology, Physics, Mathematics & Statistics



20 years of Dean's Distinguished Fellows

Program supports
summer undergrad
research experiences
to foster inquisitive,
career-ready grads

In her career at USGS, Ecologist Kristen Bouska, '06, a former UWL Dean's Distinguished Fellow, uses 20 years of data related to fish, water quality and more to ask questions about the long-term health and resilience of the Upper Mississippi River Ecosystem and inform decision makers about restoration resources. After earning her environmental biology degree at UWL, Bouska went on to earn a master's degree in biology from Kansas State University in 2008 and a doctorate in environmental resources and policy from Southern Illinois University in Dec. 2014.



In summer 2005 Kristen Bouska was hiking deep into Beartooth Mountains of Montana. In awe of the surrounding snowy white peaks and alpine lakes, Bouska was traveling to the remote location to study the effects of UV radiation on microscopic plants called phytoplankton.

The UWL undergraduate didn't know that as she marched deeper into those mountains, she was also heading further into a career in ecological science. Today, more than decade later, Bouska is an ecologist with USGS, Upper Midwest Environmental Sciences Center, where she studies the long-term health and resilience of the Upper Mississippi River ecosystem.

She is one of more than 300 alumni of UWL's College of Science and Health Dean's Distinguished Fellowship Program, which is celebrating its 20th anniversary. The long-term fellowship program provides resources for both a student and faculty member to have a 10-week, in-depth research experience during the summer months. Faculty select students to participate and students write an independent research proposal based on questions developed with their faculty mentor.

The success of the program is best marked by its graduates who are now working in science, medicine, technology and more. A total of 130 have went on to earn advanced degrees; 59 have continued on to receive a medical or doctoral degree.

"We love working with students... We love finding diamonds in the rough and polishing them. This is the best way to do that," says

Roger Haro, interim associate dean of UWL's College of Science and Health. "When you look at the people in this program and what they've gone on to do — from a faculty point of view, it makes you well up with pride."

The program has allowed students in a variety of CSH fields to have a strong and career-shaping research experience as undergraduates. That's not typical at a comprehensive, four-year university like UWL where the primary focus for faculty is teaching, not research.

The Dean's Distinguished Fellowship program founder Mike Nelson, former CSH dean, had the foresight to realize the value of making undergraduate research a priority. He recalls a conversation with former UWL Chancellor Judith Kuipers about the opportunity to invest in a more formal research scholarship program for students more than 20 years ago.

"I said, if you hook your wagon to the undergraduate research star, I'm going to make you and the university famous," he recalls telling her. "We'll be the best in the nation."

Indeed, over the past 20 years, UWL has made a national reputation for undergraduate research, hosting the National Conference on Undergraduate Research twice and being ranked among the top 23 colleges nationwide recognized by U.S. News & World Report's Best Colleges Rankings for stellar undergraduate research and creative projects in 2016.

Nelson understood the quality of learning that happens through undergraduate

research that is incomparable to learning by reading textbooks, listening to a lecture or conducting a cook-book style lab experiment.

"I always thought that hands-on was the best way to learn, but it also taught students something about real life," says Nelson.

PREPARATION FOR LIFE

Jay Pieczynski, '04, and a DDF program alum, hadn't considered a career conducting research and teaching at the college level until he met UWL Professor Todd Weaver, who introduced him to the DDF Program and the pursuit of independent research.

"I thought it was awesome to go in and study something no one has studied before and learn about things that no one knows the answer to," says Pieczynski. "That changed my outlook on what someone can actually do with a science degree."

Weaver was using X-ray crystallography to study the 3D shape and structure of proteins. Pieczynski ended up becoming a Dean's Distinguished Fellow for two summers with Weaver as his mentor. Pieczynski studied an enzyme called fumase, which is involved in producing energy in the body.

The research experience propelled Pieczynski into a competitive, six-month U.S. Army internship working at Walter Reed National Military Medical Center's research labs. His diverse research experiences got him thinking about continuing his education.



"I feel very lucky to have been part of this program. It was formative to my career and my outlook on life,"

- Jay Pieczynski, '04, DDF program alum and assistant professor of biology at Rollins College in Winter Park, Florida.

Mike Nelson, right, former dean of UWL's College of Science and Health, came to campus with a vision for promoting undergraduate research at a time when this experience was not typical for students at comprehensive campuses like UWL. He saw the opportunity to move UWL forward in this direction through creation of the The Dean's Distinguished Fellowship Program. Today UWL celebrates 20 years of this successful



program. Here Nelson stands with former Dean's Distinguished Fellow and biology student Ben Campbell, now a biologist at Dairyland Power.

He went on to earn his biochemistry doctoral degree at the University of Michigan in 2010 and is now an assistant professor of biology at Rollins College in Winter Park, Florida.

To this day, Pieczynski credits Weaver for being instrumental to discovering his career path.

"The reason I chose to take this job is because of the mentorship Todd provided me," explains Pieczynski. "He taught me to how to work in the lab, how to work hard, how to be a listener and explain things — technical details in ways that are

understandable to novice students and drive curiosity and questions."

Nelson knew when he started the DDF program that it would be challenging for every student to have an undergraduate research experience, but he felt every student should have some type of learning experience outside of the classroom such as studying abroad or participating in an internship.

"One of the things I think undergraduate research does for the students — and even for the faculty too — is that it helps them become lifelong learners," says Nelson. "I

think that is one of the things that life is all about — being a lifelong learner."

Pieczynski says the DDF program challenged him to be invested in the information he was learning and it gave him the desire to want to learn more.

"You become a different type of problem solver by tackling big, unknown questions," notes Pieczynski.

And, in the real world, there is no shortage of those big, unknown questions.

Bouska, with USGS, is frequently coming up with new questions as she analyzes 20 years of data on the health and resilience of the Upper Mississippi River ecosystem.

"I'm finally at a place in my career where I'm pursuing my own questions," she says. "It is naturally a very interesting position where I can lead and be an expert in what I do."

Her questions will help society understand the factors that drive desirable and undesirable conditions for all forms of life in this river region and, ultimately, where limited restoration dollars should be directed.

She says the Dean's Distinguished Fellowship program, including her hike up the Beartooths in 2005, gave her new experiences and good insight into what a career in biology and research would entail.

"It gave me confidence that this is something I'm good at," she says.

20 for 20 FUND DRIVE

As the Dean's Distinguished Fellowship program celebrates 20 years, the college is seeking private funds to secure 20 Dean's Distinguished Fellowships for students each year. If interested in investing in the future of the fellowship program visit www.uwlax.edu/foundation.

A summer of research

UWL CSH students continue their excellence beyond the regular academic school year. Here's a look at some of the research that took place during summer 2018.



"The best part about doing research is that the things I do might go on and be used by other researchers or people who work in industry," says Megan Timmers. Timmers, Chemistry, who works with UWL Professor Rob McGaff to research and develop a suite of catalysts that can be used to carry out oxidation reactions in a more environmentally-friendly way. "Knowing that the things I did are being used to help other people and the environment is really cool!" she says



Drones aren't just a techy toy, they're a tool to meet business needs. Working with Assistant Professor Niti Mishra, Senior Jackson Radenz, pictured, flew a drone over a local rock quarry earlier this summer to generate 3D maps of space and stockpiles. Later, he'll do another to determine rock lost through image analysis. This helps the company manage assets easier instead of using time-consuming, manual ground surveys.



Eric Drost's research is determining locations of visible large, woody debris using aerial photography and testing the effectiveness of locating submerged debris using side-scan sonar. Large, woody debris can have several important implications for river systems that can affect planiform and structure, flow patterns, wildlife habitat, pool formation and levels of available organic material. The research is sponsored by UW System Water Research Fellowship, representing a collaboration between UW-Eau Claire and UW-La Crosse.

BUILDING DEDICATION



Chancellor Joe Gow speaks in front of those attending the PSSC grand opening celebration.



UWL celebrated the \$82 million Prairie Springs Science Center with an official dedication Nov. 15. Following a program, faculty and students led self-guided tours of laboratories on each of the four floors.



Jay and Carolyn Scott stand in front of the inside PSSC sign. The Scotts are trustees for The Paul Fleckenstein Trust, which donated \$2 million to create the Prairie Springs Endowment. The purpose of the fund is to support research and scholarship in environmental studies and education, wildlife habitat protection, wildlife protection, conservation and ecological technology.



Michael and Kathi McGinley in The McGinley Atrium. Michael is a 1982 microbiology graduate. The McGinleys support UWL through scholarships and undergraduate research fellowships.



Thomas Claflin in front of the River Studies Center with Jane and Ron Rada. The gifts from Ron and Jane Rada named the River Studies Center after its founder, Tom Claflin, a professor of biology from 1966-2001.



Professor Emerita AB Culver in front of the Culver Earth Science Laboratory. Her husband Jerry, was a faculty member of the Geography Department for 42 years. The room recognizes gifts from the Culvers who support students in multiple disciplines.

[Click to see more about the dedication](#)



Class provides hands-on experience for aspiring physical education teachers

A unique class that brings home-schooled, K-12 students to campus is helping to shape future physical education teachers

Physical Education Teaching Program Director Deb Sazama says her class of 16 physical education teaching majors was creating lesson plans and learning opportunities that align with the Society for Health and Physical Educators' K-12 National Physical Education Standards and Grade Level Outcomes. They, then, have the opportunity to teach those lessons to the children to enhance their movement skills and knowledge.

"Not only are the physical education majors learning to plan and implement lessons, but they are learning to assess if the home-schooled children are learning the skills and gaining the knowledge that will help them live healthy active lifestyles," Sazama says.

The physical education teacher education majors were placed into teams of two at the beginning of the fall semester in September. For 13 weeks, the students created and carried out lesson plans, says Sazama. Each student in the teaching team taught a 25-minute lesson to their age-similar "class" in Mitchell Hall. The teams taught four units over the course of the semester. Their content focused on net, wall and target activities.

"The students and parents have been very positive about the class," says Sazama. Some parents have asked for even more classes during the week.

Sazama says the weekly, one-hour class is a win-win for both the K-12 home-schooled students, as well as the college students.

Above photo: UWL physical education teaching majors are creating lesson plans and learning opportunities and having the opportunity to teach those lessons to area home-schooled children.

ATHLETIC TRAINING UPGRADE

Students in athletic training program will soon graduate with a master's degree

UWL's nearly 40-year-old athletic training Bachelor of Science program will change to a Master of Science. The UW System Board of Regents approval in June of the change responds to a recent decision by the Commission on Accreditation of Athletic Training Education (CAATE) to shift the entry-level credentials required of practitioners to the master's level. Bachelor's degrees will no longer be granted.

"The new professional education program raises the bar for the athletic training profession," says Professor Mark Gibson, director of the UWL Athletic Training Program. "It's the latest addition to the array

of graduate health professions programs for which UWL has become well known."

Gibson says the new master's curriculum was developed on the foundation of a strong undergraduate program in athletic training that has been offered on campus since 1980. It was the first accredited athletic training program in Wisconsin and offers one of the most competitive, in-depth and hands-on athletic training programs nationwide.

In the last three years, nearly 92 percent of UWL athletic training students passed the Board of Certification (BOC) Examination on their first try. Graduate placement within six

months of commencement is more than 97 percent.

The new program includes 68 credits of graduate-level education and requires 23 months to complete. Students admitted into the program beginning in June 2019 must have a bachelor's degree with science prerequisites.

[Get more information on the College of Science and Health program.](#)

UWL students graduating in athletic training will soon earn a master's degree. The change, approved by the UW System Board of Regents in June, responds to a recent decision by the Commission on Accreditation of Athletic Training Education (CAATE) to shift the entry-level credentials required of practitioners to the master's level.



SERVING THE LAKOTA PEOPLE

Providing PT services on Pine Ridge Reservation



When UWL physical therapy students collaborate with local health care providers, powerful things happen.

Third-year physical therapy student Kristin Kotzer and Dr. Mary Kerrigan, PT, DPT, NCS, teamed up through Gundersen Health System's Global Partners organization to provide pro-bono healthcare services on the Pine Ridge Reservation in South Dakota last summer.

Pine Ridge is faced with high levels of poverty, limited healthcare access, food deserts, and significantly increased morbidity rates compared to national averages. Diabetes, obesity, teenage suicide, and substance abuse are all too common problems. Kotzer was astounded to discover third-world conditions existed only 10 hours west of La Crosse.

Throughout Global Partners' 10-year relationship with Pine Ridge, this was the

first physical therapy team included on the medical team. The national opioid crisis has impacted the Lakota community particularly hard. Physical therapists have a unique skillset to treat chronic pain with safe, cost-effective methods that do not include other drugs.

These interventions proved to be invaluable to many of the patients Kotzer and Kerrigan treated. Additionally, Kerrigan applied her background as a board-certified wound care specialist to treat those with diabetic ulcers and educate local clinic staff about appropriate wound care.

When not treating patients, Kotzer was enriched by learning about Lakota culture, the ancestry of the land and the resiliency of the Lakota life. Her top five takeaways for those interested in future medical service trips include:

- Connect with cultural values that matter most, including the family structure.

The Gundersen Health System's Global Partners Team included, from left, UWL PT student Kirsten Kotzer, Dr. Mary Kerrigan PT, Western TC nursing student Lydia Russell and medical resident Laura Jacobson.

- Don't forget the basics such as location of emergency equipment. The team saved a patient experiencing a life threatening emergency.
- Be flexible to adapt because not everything will go according to plans.
- Pass knowledge along to benefit others in a sustainable way.
- The more you give, the more you'll receive.

Kotzer is grateful to the UWL Doctorate of Physical Therapy Program, Gundersen Health System's Global Partners organization, Kerrigan, and the Wanblee Clinic for making the opportunity a reality.

— Kristin Kotzer, SPT and Dr. Michele Thorman PT, DPT, MBA



UWL physical education and school health education program faculty provided a half-day of professional development for Southwestern Wisconsin K-12 health and physical educators.

A healthy collaboration with local schools

The UWL physical education and school health education programs successfully teamed up to provide a half-day of professional development for Southwestern Wisconsin K-12 health and physical educators.

The workshops were created to help prepare attendees for the 2018-19 school year, as well as provide updated skill development and understandings.

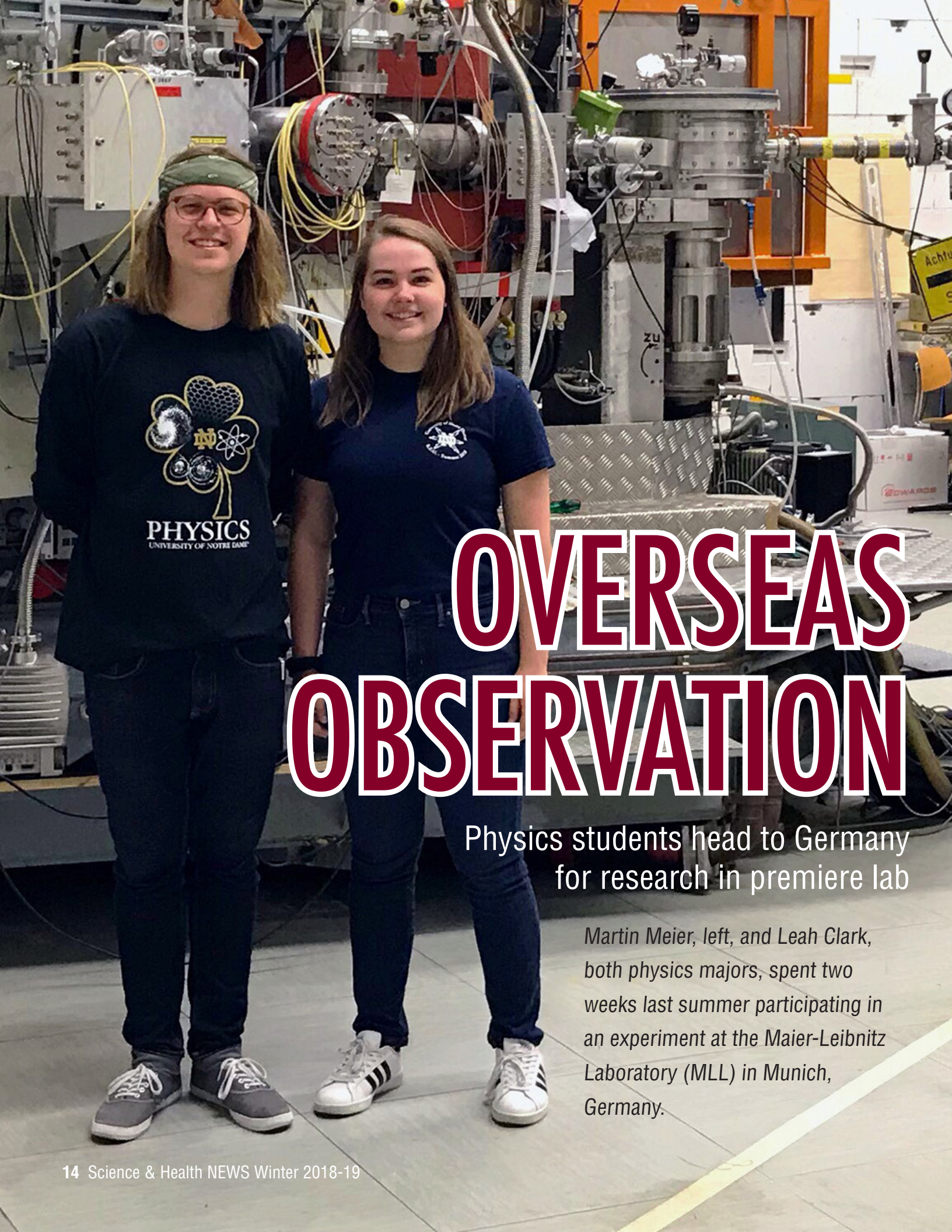
Presentations by the school health education faculty included: "Growth Mindset," "How to Cultivate a Positive Classroom Environment," and "The Birds & Bees and Skill Based Health." Physical education teacher education faculty presented strategies for teaching "Invasion Games," "Fitness Activities" and "Striking and Fielding Games."

The culminating event was a sharing session by participating teachers. Each presented a "classroom tested" teaching strategy or activity for the group in which many left with additional ideas, as well as increased enthusiasm to begin the school year.

Comments received from a survey following the event noted local educators desiring similar workshops in the future. The majority of participants received "a lot" or "a great deal" of benefit from the day's event.

The two programs plan to offer another workshop in fall 2019 and continue to collaborate to create innovative strategies to increase current teacher and pre-/in-service teacher knowledge and skills.





OVERSEAS OBSERVATION

Physics students head to Germany for research in premiere lab

Martin Meier, left, and Leah Clark, both physics majors, spent two weeks last summer participating in an experiment at the Maier-Leibnitz Laboratory (MLL) in Munich, Germany.

Not every student is able to engage in education abroad opportunities. But, two UWL physics students were invited to participate in an international research collaboration at one of Germany's premiere nuclear physics laboratories.

Leah Clark and Martin Meier, both physics majors, spent two weeks last summer participating in an experiment at the Maier-Leibnitz Laboratory (MLL) in Munich, Germany. Clark and Meier prepared by taking part in research with their adviser, UWL Associate Professor of Physics Shelly Lesher, at the University of Notre Dame where they worked for eight weeks on related projects.

Clark chemically prepared and produced the targets used in the experiment; she gained new skills and insight on different techniques related to this skill.

“Target making is a very niche subfield of experimental nuclear physics, but a necessary one,” explains Clark, “without targets, you can’t do an experiment! I was very lucky to have worked with some amazing people this summer and learn skills that only a handful of people in the world know.”

Those targets were transported to Germany by the group to use at MLL because it is the only lab with the necessary combination of accelerator and detectors to perform this specific experiment. Both Clark and Meier’s roles in Germany were operating the accelerator on a shift schedule, as the accelerator ran 24 hours a day for a week and a half, and solving problems as they occurred.

“I learned that expecting everything to run smoothly in a nuclear physics experiment is unrealistic, but navigating the unpredictable challenges stemming from these huge, complex accelerators and detectors is what makes the field so exciting to me,” stated Meier.

The goal of the experiment was to acquire data to learn about the structure of the nucleus and explain some of its more enigmatic properties. This work has a wide variety of implications from medicine to National Security and has been an ongoing research interest for Lesher, who is the PI of the project.

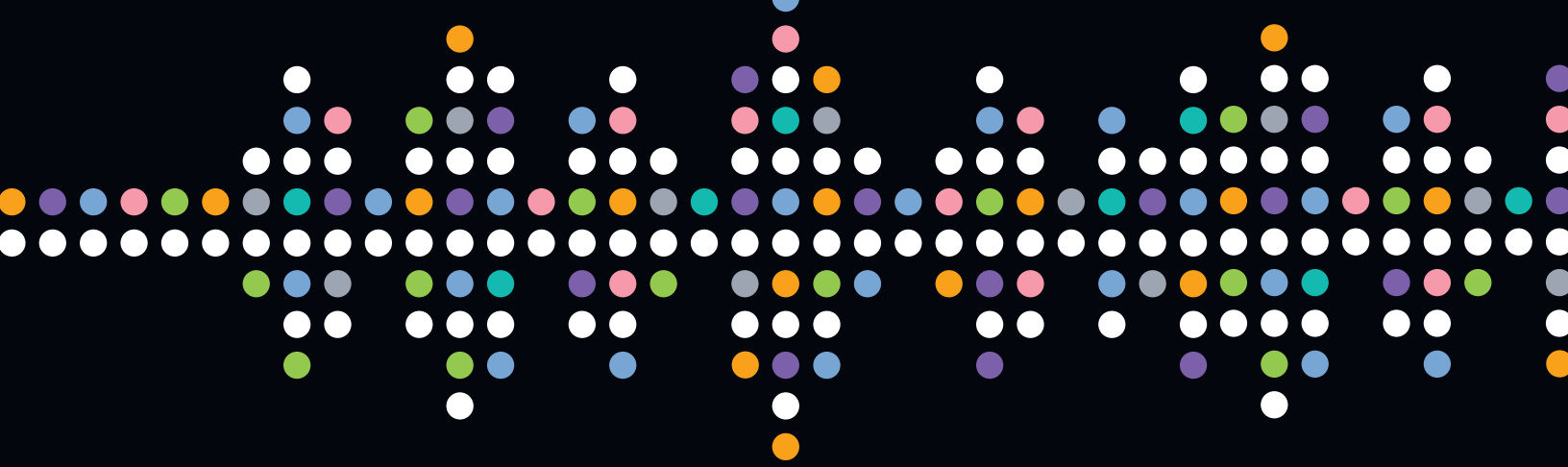
“Leah and Martin were valuable members of the research team,” notes Lesher. “They impressed both me and our collaborators with their hard work, dedication to the tasks at hand, and their curiosity in the physics questions addressed with the experiment.”

Clark and Meier plan on attending graduate school in physics or a related field next fall.

This work was funded by Lesher’s National Science Foundation grant and the University of Notre Dame’s 2018 Research Experience for Undergraduates program.

Leah Clark chemically prepared and produced the targets used in the unique experiment. Clark says she gained new skills and insight on different techniques related to the skill.





Beating her own vocal drum

In a TEDx talk, UWL beatboxer makes case for treasuring even the most seemingly unimportant passions

UWL graduate student Samantha Petite started beatboxing at age 12, inspired by a contestant on “American Idol.”

As Petite developed her skills — making drum noises with her mouth — into her teenage years, she got some push back. Some called it “useless” or “annoying.”

Some were unconvinced that Petite could ever use the skill after college. She became discouraged that her passion had potentially amounted to a useless party trick.

But Petite, now a part of UWL’s Therapeutic Recreation program, says the skill, like some of her other passions, have turned out to be important therapeutic recreation intervention tools. She hopes to serve those she works with in the future.

Petite made the case for treasuring even the most seemingly unimportant skills and talents during a TEDxFondduLac event in August.

“I believe no talents or strengths or skills are useless,” says Petite in her talk. “I believe that we only need to allow ourselves the creativity and freedom to use them, however simple or involved they may be.”

Petite says it was a UWL Facilitation Techniques class last spring with Kari Kensinger, associate professor of Recreation Management and Therapeutic Recreation, that got her thinking more about incorporating beatboxing as a recreation therapy intervention. Kensinger encouraged her to research it. Petite found other examples and further explored the potential while working as a youth counselor at an organization called The Threshold last

summer. There she worked with 10-20-year-old clients with a wide range of disabilities.

“I discovered that beatboxing, if nothing else, was a great way to bond with the clients and build rapport with them, which, in turn, made me a better employee,” she explains.

Beatboxing is an activity that seems to resonate with young people. It is also a relatively new concept in terms of a therapeutic intervention, says Laurie Harmon, department chair and associate professor of Recreation Management & Therapeutic Recreation.

“The use of various mouth parts and voice box coupled with incorporating harmonic rhythm makes it an extremely useful recreational activity to use for therapy and can be relatively easily incorporated into programs for individuals with a wide variety of abilities,” says Harmon.



ABOUT TEDx

Petitte's talk was given at a TEDx event in Fond du Lac, Wisconsin. TED is a non-profit organization devoted to "ideas worth spreading." It created TEDx, a program of local, self-organized events that bring people together to share a TED-like experience.

UWL has also organized independently coordinated TEDx events featuring local speakers. The most recent was held in February 2018.

Samantha Petite is a UWL master's student and graduate assistant in UWL's Therapeutic Recreation program. Petite shared how she incorporated beatboxing into her future during a TEDxFondduLac event in August.



[Click to hear Petite's music therapy and learn why she does it.](#)

Targeting SUPERBUG

UWL researchers searching for answers to global health threat: antibiotic resistance

Antibiotic resistant bacteria are a growing, deadly problem worldwide.

At least two million people in the U.S. each year become infected with bacteria that are resistant to antibiotics and 23,000 of those don't survive, according to the Centers for Disease Control and Prevention. Meanwhile, some estimates indicate more than 700,000 people globally die each year due to drug-resistant infections.

Developing new antibiotics is a key part of combating the issue. Among those fighting the battle are UWL scientists — both long-term and emerging.

Several UWL faculty formed the Mycophyte Discovery group. Over the last two decades, these professors — Aaron Monte, Chemistry; Marc Rott and William Schwan, Microbiology; Anne Galbraith, Jennifer Miskowski and Thomas Volk, Biology — have been learning about microorganisms that have the potential to cause dangerous infections in humans. They are developing new antibiotics and other anti-infectives from Native American herbal remedies and wild fungi.

Alongside them are UWL student researchers, including first-year students and sophomores in UWL's Eagle Apprentice Program.

"We've had a number of papers published that included undergraduate and graduate student authors," says Schwan. "It's been a big feather in the cap of these students to have contributed to peer-reviewed science."

From left, graduate student Allison Zank, Professor William Schwan and UWL junior Lillian Schulte. In addition to studying *Staphylococcus aureus* and its biofilm formation, Schwan also studies another kind of bacteria that is the No. 1 cause of urinary tract infections: *Escherichia coli*, among other topics.

EMERGING SCIENTISTS HELP MAKE NEW DISCOVERIES

When UWL junior Lillian Schulte stepped into Professor Schwan's lab as an Eagle Apprentice her first year at UWL, she admits feeling intimidated. Yet, she found working at the bench alongside passionate researchers inspiring.

"They really cared about what they were working on," she says. "It was cool to be a part of that."

One of the biggest problems Schwan's research team was working on — and continues to work on — is an antibiotic resistant bacteria called *Staphylococcus aureus*. Categorized as a "serious concern" by the CDC, the bacteria is a major problem in U.S. hospitals as the leading cause of heart valve and blood stream infections, explains Schwan who has studied the bacteria since working at a Washington-based biotechnology company more than 20 years ago.

Staphylococcus aureus starts as a single cell that can adhere to a surface such as a man-made device in the human body. The

bacteria then multiply and create a thin film — a matrix of sugars, proteins, DNA and bacteria cells — that the body's defenses can't penetrate. Most antibiotics can't get through it either.

Schwan's research aims to more fully understand this bacterial species and how it forms a biofilm. Answers from Schwan's lab could be passed on to develop new drugs that could stop the film formation before it starts. Nine UWL students are working with Schwan on this and other projects this semester.

Schwan says Eagle Apprentices, though new to scientific research at the university level, share qualities such as enthusiasm and strong academics. He watches them grow most— as scientists.

"This is not like a lab course where nearly everything works," Schwan explains. "There is a lot of failure and you have to pick yourself up by your bootstraps and solve what went wrong with your experiment. That is a good learning experience and it builds critical thinking in our students."

Over the years, Schulte's role in the lab has grown increasingly complex, and she has moved from mentee to mentor. Last year she helped a new Eagle Apprentice get acquainted with the lab. Last summer she earned a Dean's Distinguished Fellowship, continuing to research *Staphylococcus aureus* and biofilms.

"I've learned a lot here and I apply it in my courses," she says. "Through that, I've gained a big confidence boost."

UWL junior Lillian Schulte, of New Prague, Minnesota, right, works with graduate student Allison Zank in Microbiology Professor William Schwan's lab. Schulte is a microbiology major who started conducting undergraduate research as an incoming UWL student through the Eagle Apprentice Program. This past summer she was a College of Science and Health Dean's Distinguished Fellow.

RESEARCH DEVELOPMENTS INVOLVE CROSS-DEPARTMENTAL COLLABORATION

Schwan's lab is working to understand how a particular drug may have the potential to stop *Staphylococcus aureus* in its tracks before it forms the biofilm.

The promising drug has a history with UWL.

James Cook, a distinguished professor at UW-Milwaukee, took a drug discovered by UWL researchers in the Mycophyte Discovery group and changed the structure of it to create a new one with better antibacterial activity, called SK-03-92. Through subsequent testing, Schwan's lab has found that SK-03-92 deregulates two genes that may regulate formation of the *Staphylococcus aureus* biofilm.

Both genes are thought to encode a two-component regulatory system, which UWL researchers believe regulates a gene involved in the production of sortase, important in the initial phase of biofilm formation.



Innovative CHEMISTRY

UWL chemistry professor's innovations provide classroom examples, commercial products

Innovative ideas come from all corners of Wisconsin.

UWL Professor Rob McGaff enjoys demonstrating this concept to his general chemistry students. As he scans his 120-seat lecture hall, he shares some of his latest chemical discoveries, including a patent on a product that makes chemical reactions more environmentally friendly — without waste or toxic byproducts.

He adds, “By the way, the person who did the experiment that led to this result was sitting there — in that chair — two years ago. People just like you are doing world-class science here — and that is not an exaggeration.”

McGaff's green chemistry research has implications far beyond the walls of the lecture hall and lab. His ideas are moving closer to becoming viable commercial products with the help from two Wisconsin non-profit organizations that partner with university researchers across the state.

The Wisconsin Alumni Research Foundation (WARF) is a technology transfer and investment organization that has been advancing UW-Madison discoveries since 1925. In 2000 WARF formed WiSys, an organization with the same mission that serves other UW System campuses outside of UW-Madison and UW-Milwaukee.

Since McGaff began partnering with WiSys several years ago, he has received multiple research grants totaling about \$183,000, as well as expert connections and assistance to turn his discoveries into commercial products. He was awarded WiSys' 2016 Carl E. Gulbrandsen Innovator of the Year Award for his endless curiosity and dedication to innovative programming. He will soon be working with WiSys on his second patent application, for which laboratory work is currently underway.

A pivotal advancement in McGaff's research came within the last year when he was one of three, WiSys-affiliated researchers in the UW System selected to participate in WARF's Accelerator Program. Through the program, UW System researchers meet with industry experts who provide guidance to speed the commercialization of their discoveries.

“We are leveraging an expert network that the Accelerator Program has built since it started in 2009,” says Greg Keenan, Accelerator Program manager. “These experts provide real-time advice about what the market is like, as well as general project input.”

McGaff's research aims to develop a suite of catalysts that can be used to carry out oxidation reactions in a more environmentally-friendly way. Through participation in the Accelerator Program, his

research is now focused on three specific processes for making industrially-important chemical compounds. Also, McGaff has started to explore the use of the catalysts in the remediation of pollution resulting from harmful chemical compounds.

“I have some very specific targets now,” notes McGaff. “If you know who you are selling to and what they want to buy, you are a whole lot closer to having a buyer.”

That's important to McGaff who was driven to discover green technologies because of his environmental preservation values. “If I want to make a difference, I can't just discover things that are green, but I need to discover things that are green that work better than existing technology.”

With access to supports in WiSys and now WARF through WiSys, he is moving closer to that goal.

McGaff says being involved in scientific research is also a benefit to his classroom. As a professor, it keeps his mind nimble, pondering new questions from students who help him carry out new experiments. And it shows his students that it doesn't take an “utter genius” to make important discoveries.

The No. 1 most important characteristic, he says, is being curious. And that characteristic could come from just about any seat in his general chemistry class.

UWL Professor Rob McGaff's green chemistry research has implications far beyond the walls of the lecture hall and lab. His ideas are moving closer to becoming viable commercial products with the help from two Wisconsin non-profit organizations that partner with university researchers across the state.



A *MESSY* microscopic look

Researchers study marsh ecosystem in oil spill scenario

If a train derailed, spilling crude oil into La Crosse's Myrick Marsh, what would happen to the community?

The community of microbes — that is.

Microorganisms — such as bacteria — are nearly all invisible to the human eye, which makes them easy to overlook. However, their value in an ecosystem is great, says UWL graduate student Anna Hilger. Her master's thesis work is investigating what would happen to these microscopic organisms if crude oil spilled in the marsh. Her summer research was funded by a UWL Research, Service, and Educational Leadership (RSEL) grant, as well as the Microbiology Department and the River Studies Center.

"We hope it never happens," says Hilger. "But because there are train tracks running through the marsh and derailments happen sometimes, it would be good to know the impact."

To mimic a potential spill, Hilger and her faculty mentor, Bonnie Bratina, associate professor of Microbiology, set up containers outdoors where they introduced a mix of marsh water and sediment, as well as crude oil. Hilger separated vials of this mixture inside an air-tight box to isolate the samples from oxygen while preparing them for testing.

She wants to understand if the microbes — under the stress of an oil spill — could continue to be drivers of important reactions in their environment. In a healthy environment, microbes contribute to processes such as oxygen production, evolution, symbiotic relationships and decomposition.



To mimic a potential spill, UWL graduate student Anna Hilger and her faculty mentor, Bonnie Bratina, associate professor of Microbiology, set up containers outdoors where they introduced a mix of marsh water and sediment, as well as crude oil.

The processes have major implications for the cycle of life. For instance, during decomposition microbes produce methane, which causes dead plants or animals to break down and release nutrients that can be reused by other organisms. Without decomposition, dead animals, plants and waste would remain where they are, and nature would have less fuel for the living.

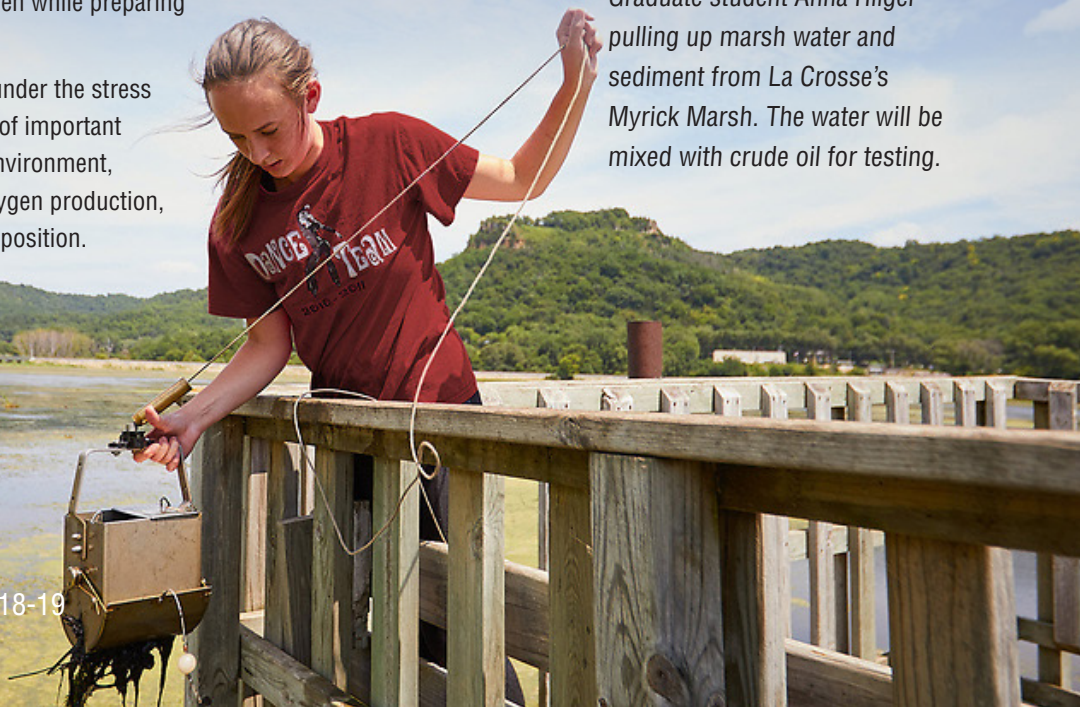
Hilger just began the testing phase of her research and has yet to determine how resilient the marsh microbes will be to the oil.

Hilger first got hooked on studying microbiology as an undergraduate at UW-Stout. She has had great

mentorship from Bratina, an environmental microbiologist who gives students flexibility to develop microbiology-related research in areas of interest.

Bratina agrees the role of microorganisms in the world is overlooked. She reflects on words of the late microbiologist and renowned inventor of vaccines, Louis Pasteur, "The role of the infinitely small in nature is infinitely great."

Graduate student Anna Hilger pulling up marsh water and sediment from La Crosse's Myrick Marsh. The water will be mixed with crude oil for testing.





PEAK performance

Exercise and sport science graduate students help UWL athletes with offseason

Most people associate football with fall colors and cooler weather. But for UWL athletes, like running back Trent Smith, and graduate students in the Human Performance graduate program, football pre-season training was in full swing in spring.

Smith, along with dozens of his teammates and other athletes at UWL, spent time in the spring semester working under the guidance of Exercise & Sport Science Professor Glenn Wright and graduate assistants.

“I like lifting with the team – you get a lot more production,” says Smith. “And with the structure and extra eyes in the room,

it really helps to make sure you’re doing everything right.”

Nineteen different athletic teams participated in the program. Each workout was designed specifically for those athletes to help them reach their peak performance potential.

The benefits of the program go both ways. For students, like Kyle Geiger, it was the hands-on experience promised on his campus tour. “It’s exactly what I was looking for,” says the strength and conditioning emphasis graduate student. “I want to be a strength coach in the future. Doing this every day and the experience I get should set me up well.”

Meredith Thomsen, Director of UWL Graduate Studies, says opportunities like that are win-win across campus. “I think this is a great example of how UWL’s graduate programs support the undergraduate mission of the university,” she says. “Because of the Human Performance graduate program, our student-athletes get more one-on-one attention in their training, helping them train safer and stronger.”

Above photo: UWL student athletes stretch before hitting the weight room as part of a collaboration between athletics and the ESS program.

[CLICK TO HEAR FROM THE STUDENTS AND ATHLETES](#)

CSH alums honored

Four College of Science & Health alums were among seven graduates receiving the top awards bestowed by the UWL Alumni Association. Honored for distinguished service and successful careers, they returned to campus in September to speak with students and receive recognition.

A SUPER SUPERINTENDENT

If a book is ever written about superintendents who saved a school district, expect Phil Ertl to be in it.

When Ertl came to the Wauwatosa School District in 2005, the suburban Milwaukee district was in crisis. The school board was divided, the administration building was for sale, an elementary building was set to close within a year and a budget deficit was projected.

Ertl turned things around. Today, the elementary building set to close houses a high-performing STEM school, the administrative building for sale is home to a high-performing Montessori and the district continues to receive national recognition for educational accomplishments.

Colleagues call Ertl a “true, visionary leader” and “inspiring” in his approach for leading the district of 7,400 students.

The Phillip Ertl file

- Superintendent of Schools in the Wauwatosa School District since 2005.
- Defensive lineman who led the UWL football team to the 1985 national championship; inducted into the UWL Athletic Wall of Fame, 2013.
- Holds a doctorate from Columbia University, 1999; master’s from Winona State University, 1993; and a bachelor’s from UWL, 1988.



A CARING ADVISER

As a student at UW-La Crosse, Houa Xiong encountered — and overcame — many academic difficulties. Now as a senior academic adviser at UW Oshkosh, she’s helping other students in similar situations reach their goals.

Xiong genuinely cares about her students and takes time to build rapport, while connecting with them and helping them achieve their goals, according to colleagues.

During her 15 years on campus, Xiong has become a mentor, advocate, role model and support person for students from all walks of life. Students consistently share that she is kind, caring, supportive and understands their needs and goals.

The Houa Xiong file

- Respected student counselor with a passion for helping struggling students.
- Senior academic adviser in the Undergraduate Advising Resource Center at UW Oshkosh.
- Bachelor’s of Science in recreation management, 1998; Master’s of Science in Education, College Student Development and Administration, 2000, both from UWL.





AN ADAPTED ADVOCATE

Joonkoo Yun not only is an advocate and proponent for those with disabilities, he's mentoring others to follow his lead.

Yun, professor and Endowed IMPACT for Life Faculty Scholar at Oregon State University, is known for his "student first" approach and the welcoming learning environment he provides.

Yun has published over 40 papers, with nearly all of them written with a current or former student. His work has appeared in "Adapted Physical Activity Quarterly" and "Research Quarterly for Exercise & Sport," leading journals in the adapted physical activity field.

Yun also has been successful in securing extramural funding for movement studies in disability. He has procured over \$7.5 million in grants and contracts including nearly \$5 million as a principal investigator from the U. S. Department of Education. The training grants help develop leadership in adapted physical education among his master's and doctoral students.

The Joonkoo Yun file

- Scholar, teacher, productive contributor and mentor in the fields of kinesiology and adapted physical activity.
- Professor, Endowed IMPACT for Life Faculty Scholar at Oregon State University.
- Bachelor's of Physical Education, Sung Kyun Kwan University, 1987; Master's of Science in Special Physical Education from UWL, 1992; Doctor of Philosophy in Human Performance, Indiana University, 1998.



CORPS LEADER

It all started with a simple stone wall along a hiking trail. It's now a path for others to help conserve Wisconsin's natural resources and pick up needed work skills.

Matthew Brantner has taken his love for the environment from the labs of Cowley Hall to Vermont and then back to La Crosse.

Following graduation in 2005, Brantner headed east to become a crew leader with the Vermont Youth Conservation Corps. There, he worked up to become a program manager where he developed and managed an inclusive program for people with disabilities.

Returning to La Crosse four years later, Brantner set his sights on bringing a similar environmental program for youth to his home state. With state government funding for a youth conservation corps cut, he created a non-profit corps that quickly became financially self-sufficient: The Wisconsin Conservation Corps, commonly called WisCorps.

WisCorps leads teams of youth to build trails, boardwalks, gardens and other environmental projects. But not only do the youth feel a sense of accomplishment, they also learn self-esteem, self-sufficiency and determination.

The Matt Brantner file

- Dedicated conservation advocate.
- Founding executive director of WisCorps, a statewide conservation corps. Executive director since 2009.
- Bachelor's of Science in biology from UWL, 2005.



For the bees

To be ‘solitary,’ bees are embedded in a community of thousands

Venture onto the lawns near Hoeschler Tower after the ground thaws in spring and you can witness a hovering mass of hard-working, buzzing insects with pollen and nectar in tow.

At a glance, they resemble honey bees (*Apis mellifera*), but the whirling mass of UWL denizens constitute distant relatives, known as plasterer bees (Family Colletidae). Docile and industrious, these pollinating bees serve important ecological functions.

Each spring, plasterer bees rapidly construct and stock their nests with pollen and nectar from flowering plants nearby. Each is solitary, constructing underground chambers intended for her offspring alone.

Social interaction, therefore, is unexpected, yet these pollinators produce dense nest aggregations numbering in the thousands that predictably reappear annually in the same locations. One unique plasterer bee species emerges by Murphy Library, while another emerges by Wittich Hall.

Undergraduate Aidan Karlsson is investigating possible mechanisms underlying plasterer bee aggregations on campus. With contributions from the Warner Memorial



An illustration of one of the plasterer bee species on campus, penned by undergraduate Aidan Karlsson.



Flagging on Wittich Hall lawn, prior to the current building renovation, marks a subset of plasterer bee nests.

A female plasterer bee guards her nest entrance.

The cuckoo bee, a parasite of the plasterer bee, emerges from a plasterer bee's nest.

Fund, Karlsson filmed scores of nests and collected nest samples to test if aggregative behavior provides protective benefits from threats from parasitic cuckoo bees, which selectively target the species found near Murphy Library.

One aim will be to genetically identify the community of inhabitants associated with the explosive emergence of plasterer bees. Supported by a Green Fund Grant, Karlsson and fellow undergraduate, Dylan Baldassari, plan to design informative, on-site signage to spread awareness of the emergence and nesting event.

Annual study of this unique biological phenomenon, found right on campus, provides an opportunity to better understand and develop conservation strategies for a native pollinator during an era of significant ecological change.

— Aidan Karlsson, undergraduate student and Associate Professor of Biology
Barrett Klein

Photos by Barrett Klein.



UWL gains access to SUPERCOMPUTERS

Decades ago at the dawn of the computer age, computers were huge beasts that filled dedicated rooms. They were rare and tremendously expensive.

Today, computers are ubiquitous and cheap. We carry them in our backpacks and take them for granted. However, the huge beasts still exist and they are more powerful than ever.

They are called supercomputers and are indispensable to researchers in many disciplines. Solutions to problems such as weather modeling, cosmology simulations and genome mapping are possible due, in part, to supercomputers.

Of course, most academic institutions do not have the resources to acquire and maintain a supercomputer, creating a gap between need and availability. The National Science Foundation is bridging that gap with the eXtreme Science and Engineering Discovery Environment (XSEDE).

This program, now in its second five-year funding cycle, allows academic researchers at member institutions to request time on high-performance computing resources it controls at several U.S. universities. UWL is now an XSEDE member institution.

The resources available are impressive and varied. They include machines with hundreds of thousands of cores, GPU systems, virtual machine servers, and more — all with terabytes of memory and petabytes of disk storage.

The computer resources include Stampede-2, currently the 15th fastest

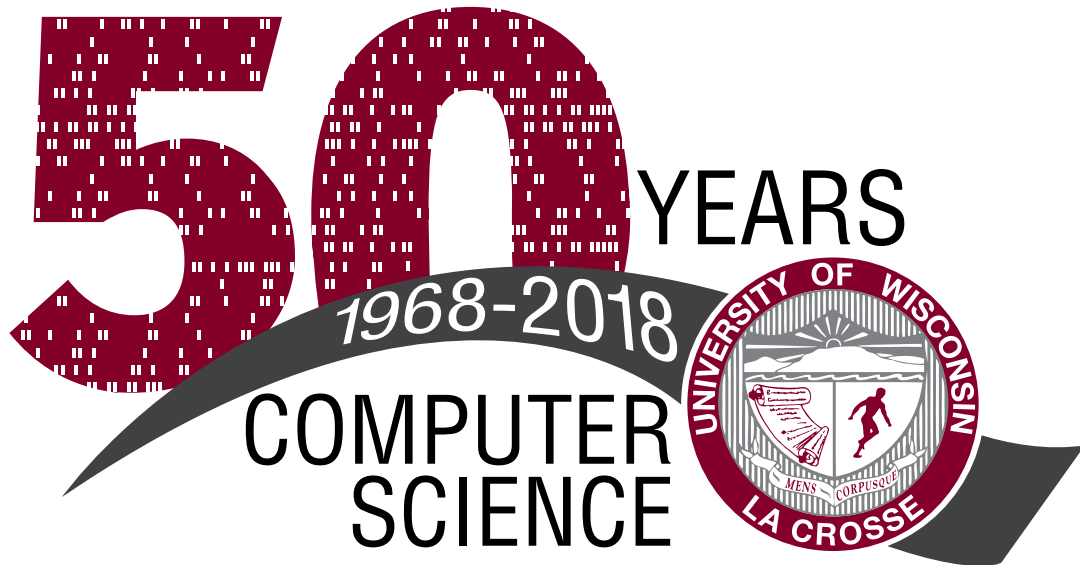
Above photo: UWL faculty and student researchers can now access the eXtreme Science and Engineering Discovery Environment (XSEDE) thanks to a National Science Foundation program. The Stampede, pictured at the Texas Advanced Computing Center, is home to some XSEDE resources.

.....

computer in the world. For those with an appropriate research need, gaining access to these machines is not difficult. For interested students, XSEDE supports summer research experiences for undergraduates.

UWL's liaisons to XSEDE are Samantha Foley and David Mathias, in the Department of Computer Science. Contact them for additional information.

Computer Science Department celebrates



The Computer Science Department celebrated its 50th anniversary Oct. 5 with activities ranging from a meet and greet to a historical program.

The meet and greet allowed students to talk with alumni in an informal setting about what they do in the field.

Members on an alumni panel, with alums selected from each decade of the program's existence, talked about their experiences as students and working in the field. Discussion reflected on what has and hasn't changed about computer science over five decades, as well as a deep perspective on what to expect in careers.

The dinner program highlighted Professor of Chemistry John "Jack" Storlie, who founded the department, as well as its evolution. Faculty recognized friends of the department who have supported it through scholarships and funding for the Distinguished Lecturer Series in Computer Science, along with influential students.

The department looks forward to the next 50 years.



John "Jack" Storlie started UW-La Crosse's Computer Science Department. His children, who are UWL alumni, and wife returned to celebrate the department's 50th Anniversary in October. From left, Cindy Patza, Jean Storlie, Lois Storlie (wife), John (Jr.) Storlie, Chris Storlie and Barb Cooper.

John "Jack" Storlie and wife, Lois Storlie, founded the John and Lois Storlie Scholarship Fund 20 years ago in 1998. The Jack Storlie's family honored him with an additional donation to the scholarship fund of \$1,500 during the 50th Anniversary celebration. Image courtesy of Murphy Library Special Collections.

See more about the department's founder, Jack Storlie, at: <http://lantern.uwlax.edu/computer-connector/>



THE MUSCLE DEMYSTIFIER

Adam Kuchnia, '06, uses diagnostic imaging to enhance the understanding of human muscles and explore better treatments for muscle-wasting diseases

Story courtesy of Nicole Sweeney Etter, UW-Madison Life Sciences



As a wrestler at UW–La Crosse, Adam Kuchnia lost a lot of pounds so he could compete in a particular weight class. And that didn't always lead to the best nutritional choices.

"I started to notice how good and bad nutrition felt when I was competing and the outcomes of poor nutrition," says Kuchnia, who is now an assistant professor in the Department of Nutritional Sciences. "When I was eating poorly, whether it was too few calories or a lot of fast food, I saw my energy levels decline. My performance declined drastically — I didn't have any energy to compete at the level that I was capable of competing at because I wasn't following the proper nutrition prescription. So that really snowballed into wondering how nutrition, specifically protein, changes the body and affects the way we move, perform and think."

"I feel like I have a responsibility to the state of Wisconsin to give back."

It was a wake-up call that would inspire Kuchnia to shift his career focus from exercise science to nutritional sciences. And even after he hung up his collegiate wrestling shoes, he continued to stay

active and look for ways to enhance his own fitness. "I was always into exercise and always had this interest in trying to maintain and build muscle," he explains. "My interest in proteins, amino acids, athletics and performance really pushed me into clinical nutrition. I wanted to get a deeper understanding of how nutrition impacts your body at a cellular level."

Now Kuchnia's research lab is focused on developing imaging techniques to more accurately evaluate muscle as it responds to aging and disease and how to best treat muscle wasting.

What is it about muscle that fascinates you?

It's important for everything. You need muscle to build an immune response when you're sick. It's important for movement, for function. To be healthy, you have to have an adequate amount of muscle — and healthy muscle to boot. It's just paramount. And yet, knowing how important muscle is to health and wellness and mobility, we still don't have good objective markers to characterize it.

Why is it important to characterize muscle in aging in disease?

We're looking at how we can characterize muscle quantity and, more importantly,

muscle quality. Currently, clinicians and nutrition professionals are subjectively palpating muscle, and it's not as accurate as I think this sort of assessment needs to be.

We also look at muscle to diagnose malnutrition, and we're still using some of the same techniques to assess nutrition that people used to observe illness over 1,800 years ago — looking at the fat pads under the eyes, ribs, clavicles, shoulders. We're trying to say something about nutritional status just by looking and touching; and nutrition professionals, clinicians and physicians are forced to use this visual inspection because there's nothing better. Someone might seem nourished just by looking at them because you may not see any obvious muscle degradation, but if you get advanced imaging data, you might actually see signs of muscle loss.

There's so much imaging and technology that's available now that I think we can get a better, more accurate picture of what's going on inside the muscle. Essentially, we are trying to come up with an imaging-based biomarker of muscle quality that can be used to appraise and guide therapeutic intervention. Utilizing more invasive procedures, such as MRI, CT, DXA (which measures muscle mass and bone density), and



Adam Kuchnia stands in front of a projected 3D image of human torso muscles created from dozens of cross-sectional CT scans.

Photo by Michael P. King

biopsy, we hope to develop noninvasive and inexpensive methods that can objectively characterize changes in muscle. All of this can be used to improve functional status, independence, quality of life and mortality.

Why is it important to look at muscle quality as well as quantity?

Muscle quality is still a vague term; we're still trying to figure out what that means. Back in the late 1990s, early 2000s, researchers were looking at older people and saw their muscle quantity had gone down a little, but their physical function had dropped drastically. What is accounting for this discrepancy? Today there is good evidence that a loss of muscle quality precedes loss of muscle quantity.

Are there particular populations that would especially benefit from this type of muscle assessment?

It's very important for everybody but especially for people who are hospitalized. When people go into the hospital, they're immobile. They have an immediate inflammatory response that leads to muscle loss. Then, when you add in disease that leads to muscle wasting, such as critical illness or cancer, the effects are catastrophic.

If we can identify these changes in muscle earlier, we can intervene earlier.

So once we can better characterize muscle decline, what can we do about it?

We can intervene in many different ways, but I'm focused on nutritional intervention, specifically protein and amino acids. When people are going through cancer or are in the ICU and are having this huge inflammatory response, we don't really know the right levels or types of proteins and amino acids to give them. If we give them too much, we could be harming them. But if we give them the right amount and type, we could help increase protein synthesis, reduce protein breakdown and reduce muscle wasting.

We're trying to improve patient outcomes so they get out of the hospital sooner, and so, when they leave, they have a quality of life that's meaningful for them.

When does age-related muscle loss start to happen? Is there anything we can do to lessen its effects?

Sarcopenia, which is what we call age-related muscle loss, starts to happen in mid-adulthood. We lose roughly 3 to 8 percent of our muscle mass per decade after the age of 30, and that increases substantially as you

hit 60. But that's just muscle quantity. I'm trying to look at muscle quality. How much is actually active, functional muscle?

Even the healthiest people we know lose muscle as they age, but you can definitely slow down the process with proper nutrition, regular exercise and an overall healthy lifestyle.

What's next for your lab?

I've been here less than a year, so the next thing is growing my lab, really carving out the physical space and hiring the right students and lab assistants. Then it's trying to get to the bottom of these muscle-wasting syndromes.

You're a product of the UW System. What's it like to be back at a UW campus as a faculty member?

It's pretty special. I grew up in Twin Lakes, did my undergrad degree at UW-La Crosse and then went to UW-Stout for my master's degree. I feel like I have a responsibility to the state of Wisconsin to give back. We talk a lot about the Wisconsin Idea here — giving back not only to the university but to the community at large. I really like that my research can help benefit the place where I grew up.

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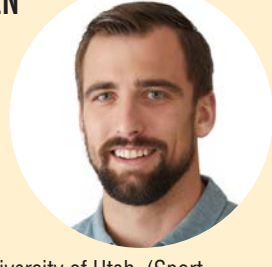


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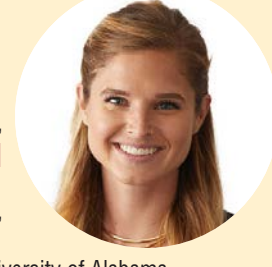


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