

Science & Health

NEWS



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

VOLUME 11, NUMBER 1

WINTER 2015-16



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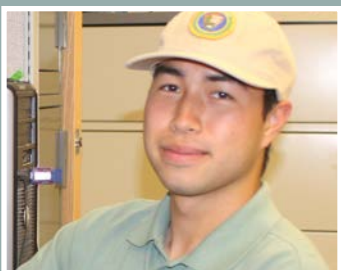
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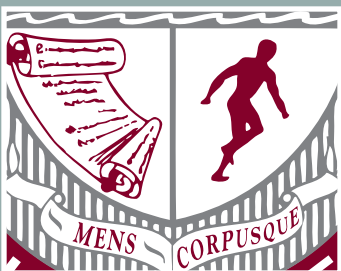
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Science & Health NEWS

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RESEARCH REWARD

UNDERGRADUATE RESEARCH, CREATIVITY GROWING

The University of Wisconsin-La Crosse has a long history of supporting undergraduate research and creative endeavors. In 1996 we hosted our first campus-wide undergraduate research symposium and in 1999 and 2000 UWL founded and hosted the first two UW System symposia.

We are also one of only three universities in the nation to have hosted the National Conference on Undergraduate Research (NCUR) more than once. We encourage faculty to create course assignments that send their students to our Celebration of Student Research & Creativity as a way of exposing more students to the research opportunities at UWL.

In the past few years, 130-150 students have given presentations and an additional 900 have attended conferences. While these numbers are impressive, it is important to remember that significant undergraduate research cannot happen without outstanding faculty research. We are fortunate to have gifted and dedicated research mentors at UWL.

As a primarily undergraduate institution the majority of faculty research is done in collaboration with undergraduates. Undergraduate research students can also collaborate with graduate students, exposing undergraduates to graduate school.

GRANTS AND PRESENTATIONS POPULAR

UWL has multiple funding sources for undergraduate research during the academic year and summer. Undergraduate Research

and Creativity Grants (URCC) are campus wide and can be used during the school year.

The college of SAH Dean's Distinguished Summer Fellowship program provides students a stipend to do research for 10 weeks during the summer and is modeled after the National Science Foundation Research Experience for Undergraduate (REU) program.

The McNair Post-Baccalaureate Achievement Program is funded by the U.S. Department of Education and SAH to prepare low-income, first generation and traditionally underrepresented students for graduate school. The Wisconsin Alliance for Minority Participation (WiscAMP) assists traditionally underrepresented students in the STEM fields.

UWL also hosts and sends students to multiple conferences each year where they can share their research results in oral and poster presentations.

Continued on next page.



Student teams and their advisors listen to Assistant Professor Chad Vidden's presentation on contest rules.

A hybrid team of students from UWL and Winona State University brainstorms ideas for the solution to Xcel's pilot program.

Continued from previous page.

FACULTY RESEARCH MENTORS ARE KEY

For students to be engaged in meaningful research they need guidance from faculty mentors actively engaged in research themselves.

An excellent example is Assistant Professor Jennifer Klein, Biology, who recently received a three-year grant from the National Institute of Aging, a division of the NIH, for \$329,000 to study how oxidation affects muscle proteins, a concern in aging populations. Her goal is to explain in molecular detail how age-related muscle degeneration is related to the oxidation of muscle proteins by biological oxidants. This comprehensive study will delineate age-related changes from the level of protein structure to the organismal level.

In addition to the students that Klein mentors in her research lab, she has been involved in a novel course-embedded undergraduate

research project in which students enrolled in her Molecular Biology Lab course work on real research projects for faculty members. Many of these students go on to work in a research lab after being trained in class.

RESEARCH NETWORKS ARE POPULAR

Course-embedded research is becoming more popular on campus. That growth has led to four different research networks being developed to provide students and instructors with ready access to clients and projects.

In the Policy Research and the Non-profit Research networks, legislators and leaders of non-profits provide topics they would like students to research. Two newer networks being piloted this year include businesses and biomedical researchers as partners.

This fall a Biomedical Research Partnership was formalized with Gundersen Health

System. Two pilot projects are underway with Drs. Barbara Bennie and Douglas Bauman mentoring students on a biostatistics project in which they analyze a national database on breast cancer surgeries to predict which variables best correlate with successful outcomes.

The Wisconsin Mathematical Modeling Challenge (WMMC) is a mathematical modeling contest for undergraduate students organized by the Math Department. Starting in October 2009, the WMMC has challenged teams of regional university students from various disciplines to apply their math skills to solve open-ended, real-world problems. This year the program is being led by Assistant Professors Song Chen and Chad Vidde, both Mathematics, and the students will be solving industrial problems posed by Fastenal and Xcel Energy.

The Eagle Apprenticeship Program is in its second year. In this program, freshmen

UNDERGRADUATE RESEARCH AT UW-LA CROSSE

	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015
URCC Grants	\$118,676	\$105,882	\$124,744	\$163,520	\$154,144
Dean's Distinguished Fellowships	\$80,000	\$44,000	\$48,000	\$48,000	\$52,000
McNair	\$53,200	\$49,400	\$53,200	\$53,200	\$53,200
WiscAMP	\$18,000	\$12,000	\$18,000	\$27,000	\$18,000
STUDENT PRESENTATIONS					
Celebration of Student Research	245	128	*	147	146
NCUR	28	30	*169	54	23
UW-System Symposium	7	7	*	12	15
Posters in Rotunda	6	3	6	6	3

*In 2013 UWL hosted NCUR and did not offer the campus Celebration of Student Research.



Megan Eberle discussing her research with Professor Carlos Castillo-Chavez of Arizona State University. Castillo-Chavez is a distinguished scientist at the Julie Ann Wrigley Global Institute of Sustainability and executive director of the Mathematics and Theoretical Biology Institute.

are paired with a faculty mentor. Ninety-six percent continued into their sophomore year. Many of the apprentices engage in undergraduate research and present their work at conferences. As an example, Eagle Apprentice Megan Eberle presented her poster, “How Infectious was #Deflategate?” at the International Symposium for Biomathematics and Ecology Education and Research, held at Illinois State University with her mentors Assistant Professor James Peirce and Associate Professor Eric Eager, both Mathematics.

FUTURE OF UNDERGRADUATE RESEARCH, CREATIVITY IS BRIGHT

Undergraduate research allows students to form strong long-term ties with their faculty mentor and gain valuable experience that makes them more competitive in applying

for further schooling and employment. While scholarships help students pay for school, receiving a competitive undergraduate research grant has the added value of paying the student to do something that allows them in the future to decide if their major is a good career choice.

We are facing fiscal challenges and are exploring novel ways to support students in their scholarly pursuits. Through course-embedded research, Eagle Apprenticeships, faculty research grants, and our new endowment, we are continuing our strong tradition of engaging students in real world projects.



by Scott Cooper, Professor of Biology, Director of Undergraduate Research and Creativity



ROGER HARO

Stellar science

Biology Department's Roger Haro is state's top professor.

Students in Roger Haro's Freshwater Invertebrate Zoology class get their hands wet on the very first day of the semester when he brings in aquatic insects. After a few days, they head to their outdoor classroom: the nearby La Crosse River Marsh.

Those real-life classroom experiences are the hallmark of Haro's teaching. They're just one reason the University of Wisconsin-La Crosse Biology Professor has been named the 2015 Wisconsin Professor of the Year.

The recognition comes from The Carnegie Foundation for the Advancement of Teaching and the Council for Advancement and Support of Education. Haro was selected from nearly 400 nominated top professors in the U.S. Recipients were honored in a Washington, D.C., ceremony Nov. 19.

That recognition marked the fourth time in the past five years that UWL professors have earned top state honors. The others were History Professor Greg Wegner in 2011, History Professor Victor M. Macías-González in 2013, and Biology Professor Scott Cooper in 2014.

Haro's philosophy of experiential learning stretches across the 10,400-plus student campus, thanks to his work on redesigning general education biology curriculum. In 2000, he and two other colleagues

added visits to an urban marsh near campus. Heading out of the classroom, students get to experience unique ecosystems with rare wetland birds, invertebrates and plants.

“It’s important to get students out of the classroom so they can problem solve in real-life situations,” Haro explains.

Along with making classes more interesting, Haro says the on-site experiences provide students a much deeper, conceptual understanding. Both are key in helping to attract and retain students, especially students of color and those with limited access to higher education.

Haro knows how to reach those students — he was one of them. As a Mexican-American, he was a first-generation college student from a historically under-represented group.

When he started his career, Haro met few scientists with Latino and Latina backgrounds. That fueled his ambition to work with under-represented college students. He does that by directing programs that target helping these two groups: First Year Research Exposure (F.Y.R.E.) and the McNair Scholars Program.



Wisconsin State Professor of the Year for 2015 Roger Haro works with student Megan Hess in a biology lab.

Twenty years at UWL, he remains excited about doing that. “This is still my dream job,” he says. “I’m fed by the students’ enthusiasm for learning.”

Haro enjoys the collegiality among faculty on campus that opens the door for innovation. “If we work collaboratively, we can do things that need to be done to help students be successful,” he explains. “I’m not afraid of taking on risks.”

That’s one of the reasons UWL professors have received the state’s Professor of the Year award four of the past five years. “We like to interact with our colleagues and we work together,” Haro notes. “That’s a real value and a great power at UWL.”

THE ROGER HARO FILE

- UWL faculty member since 1996.
- Currently professor of biology, specializes in studying freshwater ecosystems; part of the faculty team that redesigned general biology curriculum.
- Assistant director of UWL’s River Studies Center.
- Director of the First Year Research Exposure (F.Y.R.E.) and the Ronald E. McNair Post-baccalaureate Scholars Program; more than 25 years experience working with and developing programs for under-represented students in STEM fields.
- 2014 UW System Board of Regents Diversity Award for Individuals.
- Specialty areas: aquatic entomology, river ecology, mercury transport in freshwater foodwebs; landscape ecology of watersheds.
- Education: bachelor of science in fisheries biology, Humboldt State University, Arcata, California, 1984; master of science in entomology, University of Idaho, Moscow, Idaho, 1988; doctorate in natural resources and environment, University of Michigan, Ann Arbor, 1994.

Research helps with national health care need

Methodology assists with retention of physician assistants in academia

Karen Graham, UWL clinical associate professor of Health Professions, co-wrote an article that is receiving national recognition for its important implications related to the future of the health care workforce.

Graham earned the Article of the Year Award from the Physician Assistant Education Association for the article that used an innovative way to measure a physician assistant's intention to stay in academia.

Attracting and keeping physician assistants in education is a hot topic as physician assistant programs continue to grow nationally to meet a healthcare demand. Physician assistant education has grown from 100 programs in 1996 to nearly 200 programs across the nation today, demonstrating a strong demand for physician assistants to make the transition from the clinical practice to education to administer and teach PA programs. However, because the clinical job market is good and clinical salaries outpace academic salaries, it is difficult to retain faculty.

This sparked the need for Graham's research, which aims to better understand what draws someone from clinical practice to academia and keeps them there. Graham found that "intention to stay in academia" for PA faculty is best measured by a set of factors related to a supportive work environment. She found that factors such as mentorship, a supportive administration, autonomy and support for research are very important to intention to stay.

Few studies have determined the factors that PA program directors might be able to use to identify faculty at risk of leaving, explains Tamara Ritsema, PA faculty member at St. George's University of London and a member of the PAEA Research Council, in a nomination letter. She adds that Graham's method can be a model for other PA researchers for moving the profession forward.

The research helps maintain quality education programs as they continue to grow — a problem facing health professions education in general, not just physician assistant education, notes Graham.

"Hopefully the results of my study will help PA program administrators better understand why PA faculty stay in academia, thus allowing them to better target their retention efforts," says Graham.

Graham co-wrote the paper "Development and Initial Validation of a Measure of Intention to Stay in Academia for Physician Assistant Faculty," with Svetlana Belyukova, associate professor in Research and Measurements at the University of Toledo. Belyukova was her dissertation advisor and the work is part of her dissertation research. The article was published in the March 2015 issue of the "Journal of Physician Assistant Education." She accepted her award at a PAEA forum in Washington, D.C. in November.

Karen Graham, right, earned the Article of the Year Award from the Physician Assistant Education Association for an article that used an innovative way to measure a physician assistant's intention to stay in academia.





Researching an age-old question

Inside Assistant Biology Professor Jenny Klein's lab at UW-La Crosse, students are trying to answer an age-old question – how can we prevent aging?

Klein and her students are looking into how oxidation, part of the process of aging, affects the molecular machines that power muscles.

"My part is raising zebrafish and testing how aging influences gene expression," says senior Dan Rittenhouse. The goal is to understand aging at the cellular level, giving someone else the foundation to discover treatment options.



Jennifer Klein

"Aging is under-researched," explains Klein. "We think of it as a natural part of life, but these debilitating diseases, like heart failure, are only going to become more of a problem as the population gets older."

Klein recently received a \$329,169 grant from the National Institute for Health. The money is vital to secure necessary equipment for the research.

"One thing we were stuck on is we don't have a place to hold fish for the lab. We needed fish tanks," says Rittenhouse. "Having those and better equipment gets better reactions."

Klein is also hoping to use some of that funding to pay the students for their work. Students like Rittenhouse would appreciate that, since he already "sees this as [his] part-time job."

WORKING WITH STUDENTS

Matt Hoogland, a 2015 graduate in biochemistry, has returned to campus as a graduate student. He is thankful for the opportunities to do research in a science lab. "It's the exact stuff I want to do for a career," he says.

Even better, he's taking in everything he can learn working side by side with a professor, including "picking up little techniques that may not be in the protocol, but are much more efficient."

Hoogland is one of 10 or so students working inside Klein's lab. He's also one of the only reasons you'll find Klein there.

"I don't know if I'd do research without students," says Klein. "These experiences are where students learn the most and seeing them learn, that's the joy."

More than a GAME

Investigating
student
understanding of
scaling through
Minecraft

Editor's note: If you interact with middle school aged students, you have probably heard of a game called Minecraft. Mathematics Assistant Professor Joshua Hertel and his Eagle Apprentice Jordan Pellett have been conducting ongoing research to investigate the potential of the game as a medium for mathematical investigation. Here's a brief description of Minecraft and summary of their work thus far.

Minecraft is world made up of cubes, which are commonly referred to as blocks. These cubes form a virtual environment much like the real world. Everything within this virtual environment (e.g., ground, minerals, plants, water) is partitioned into cubes. The primary focus of Minecraft is changing the environment by collecting resources (i.e., mining, harvesting, farming) and using these materials to create new objects. When a player interacts with an object in-game, they can destroy it and collect resources in the form of cubes.

For example, a player might break up a tree to collect cubes of wood. Once collected, cubes can be stacked together to form different structures (e.g., a wooden wall)



Assistant Professor Joshua Hertel, Mathematics, right, and Jordan Pellett, Eagle Apprentice, have been conducting research on the popular computerized game, Minecraft.

or refined to create new materials (e.g., wood planks can be created from wood blocks). Unlike most typical video games in which players are focused on completing specific objectives, Minecraft does not have a set storyline. In fact, aside from following a few basic rules of survival (e.g., find food, don't walk in lava), players are free to collect resources (i.e., mine) and create objects (i.e., craft) as they please. This openness creates ample opportunities for creativity and

exploration (interested readers can search YouTube for examples) and also opens the door for investigation of mathematical concepts.

Our research began during fall 2014 with a goal of finding ways to have students create larger and smaller versions of geometric objects within the Minecraft environment. To accomplish this, we created a space within a Minecraft world, which we refer to as the sculpture garden. The sculpture garden was



Figure 1. The first region of the sculpture garden.

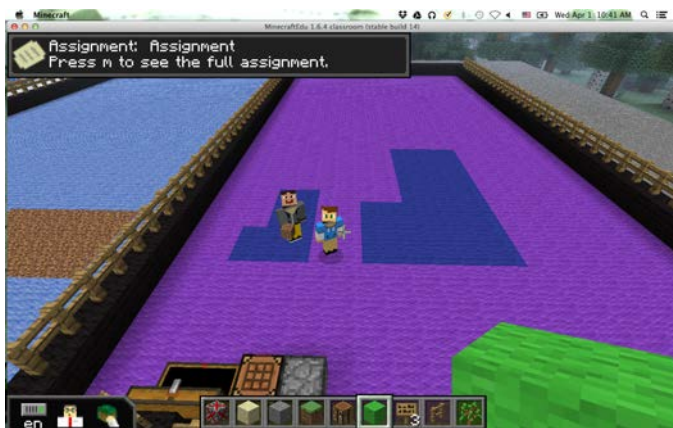


Figure 2. An example of a two-dimensional scaling task.



Figure 3. An example of a three-dimensional scaling task.

made up of four rectangular regions each of which contained specific two-dimensional patterns or three-dimensional shapes. Figure 1 shows the first region, which contained a variety of two-dimensional patterns.

Players were able to walk around the sculpture garden, but could not build within in it. Immediately adjacent to the sculpture garden we constructed work areas where players could freely manipulate objects per usual Minecraft rules. After creating the sculpture garden, we then designed a set of activities that focused on having players create scaled versions of the geometric objects within each region of the sculpture garden.

In spring 2015, we brought the sculpture garden and related activities to a 6th-grade classroom. Students worked in small groups and completed the activities over a period of five days. Figure 2 is a screen capture showing an example of one of the initial activities. Here the students were asked to create a larger version of a two-dimensional pattern. In this example, the students chose to first copy the original pattern (shown on the left) and then create a larger version (shown on the right).

The activities were sequenced so that they focused on progressively more challenging scaling tasks. Initial activities worked with symmetrical two-dimensional patterns whereas final activities focused on non-symmetrical three-dimensional shapes. Figure 3 is an example of a three-dimensional scaling task.

We collected a variety of data during the five days including; student work, screenshots, audio recordings of group discussions, written pre/post assessments, and individual interviews with participating students.

Currently, we are in the initial stages of data analysis. Our focus is on understanding how students worked through the activities, developing descriptions of student approaches to problems, identifying commonalities in student solution strategies, and identifying changes in student thinking related to scaling. Thus far, we have already noted some interesting occurrences within the data (e.g., a focus on counting over calculation even when students have produced a diagram, a disconnect between the number of resources needed to create a shape and the area of a face of the shape), however more work is needed to determine whether these are consistent trends. We plan to continue our analysis throughout the academic year and begin sharing results in mid 2016.



A PERFECT P

Alum-inspired program

Those who have gone through medical school interviews know what to expect. That's why an SAH graduate and her husband have developed a prescription for success.

In February, Yvonne and Milt Datta explored ways to give back to UWL while meeting with the university's pre-med committee. The two physicians wanted to better understand the UWL pre-med program to see if they could utilize their expertise to help out students.

The Dattas are members of medical school admissions interview committees, Yvonne at the University of Minnesota and Milt at the University of Michigan. They knew they had something to offer.

So, they helped develop the first on-campus "Medical School Mock Interview" Sept. 12, 2015. Nine physicians asked questions, four students served as patient actors and the 16 pre-med students received near real-life experience for both long-form and mini-interviews.

STUDENTS CHALLENGED BY APPLICATION, PHYSICIANS

To take part, students had to submit a 1,300-word document of three meaningful work or activities they have participated in, along with an essay, of up to 5,300 words on "why you want to enter the field of medicine."

The 16 students selected were questioned by the physicians, four of them alumni, who came to campus to take part. The doctors included:

- Brian Allen, UWL physician
- Milt Datta, Minneapolis
- Yvonne Datta, '82, Minneapolis

- Erin Morcomb, La Crosse
- David Morrell, '94, Rochester
- David Rushlow, '86, La Crosse
- Leslie Rushlow, La Crosse
- David Severance, '86, Milwaukee
- Leslie Severance, Milwaukee

Morrell thought the event was very helpful for students. "I came away extremely impressed with the UWL support of their pre-med students by providing them with helpful tips and experiences," he says. "The students were all well prepared, knowledgeable and energetic. It was enjoyable to be back on campus and to help the students in their career path."



Milt and Yvonne Datta

PRESCRIPTION

preps pre-med students for med school

Jeff Meyer, UWL Senior Development Officer in University Advancement, says participation by physicians is key. “We were able to create a truly collaborative program that enhanced the student’s interview experience of significant value for future medical school interviews,” he explains.

A THOROUGH EVALUATION GIVEN

Brian Johnson, student participant and president of the UWL Pre-Med Club, says the mock interview was a fantastic glimpse into what actual medical school interviews are.

“Experiencing a simulated interview that replicates almost all aspects of the real interview has proven invaluable and extremely advantageous in an ever competitive medical admissions process,” he says.

Peg Maher, a pre-med adviser in the Biology Department and event observer, says students who engaged in the mock interview gained invaluable experiences with more of a traditional interview style, as well as with mini-interviews involving more than one applicant and multiple interviewers.

“These experiences challenged them to think through questions and situations designed to evaluate their communication and listening skills,” Maher explains. “It also allowed

them to interact with multiple physicians, some who actually serve on other university medical school admissions committees. Having been through such a day at least once will make many applicants feel much more confident that they can gracefully navigate to a real interview day. I highly recommended all UWL pre-med students attend a mock interview before they actually apply for medical school.”

GIVING THEM AN UPPER HAND

The process of interviewing for medical school has changed significantly. Along with regular interviews, students must participate in group mini interviews to assess teamwork skills for their evaluations. Also, they are presented with patient actors who play out a family interaction scenario process for their evaluation.



Pre-medical students Adam Wuensch and Ali Lohr engage in one of the mini-interview challenges that allow admissions committee members to evaluate communication skills of applicants.

“In light of these changes and the competitive process of medical school admission, we wanted to introduce these UWL pre-med students to new scenarios, so they then can compete with students from other universities,” explains Yvonne Datta. “We found the experience of working with these highly motivated students fun and rewarding.”

The second mock interview session is set for Sept. 10, 2016.

Math students' skills add up for Winona company



Two UWL students Jack Meyers, left, and Daniel Morrison, worked with used mathematical modeling and data science to help a Winona company reach its summer financial goals.

Two UWL students used mathematical modeling and data science to help a Winona company reach its summer financial goals.

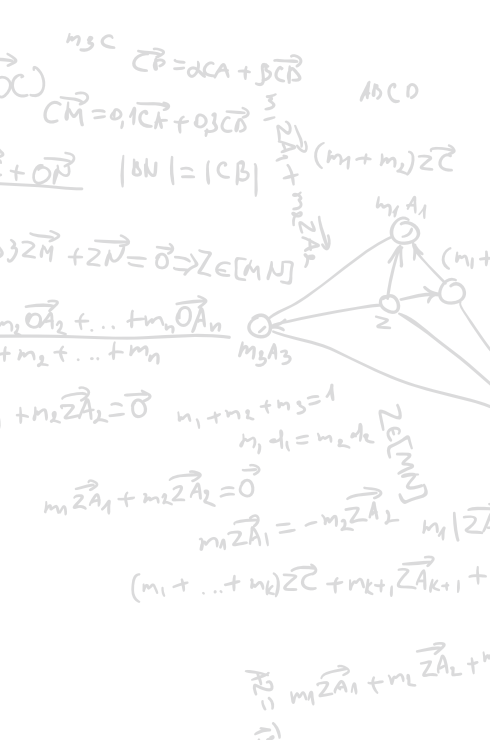
Assistant Mathematics Professors Chad Vidden and Song Chen advised UWL mathematics students Jack Meyers and Daniel Morrison in collaborating with Fastenal Co., using math concepts and language, to effectively make market predictions for the company's domestic summer sales. Through a combined application of mathematical modeling, data science, computer programming and statistical time series estimation, the two assisted Fastenal leaders in making financial market decisions.

The work is paying benefits for the students too. Stemming from the project's success, Meyers

obtained an internship with Fastenal during the 2015-16 academic year. Morrison presented his summer findings at the fall Mathematics Department Colloquium series.

The Wisconsin Mathematical Modeling Challenge (WMMC) had a two-day competition in October with participants from several regional universities. Students competed as a team of three. Representatives of Fastenal and Xcel were at the competition to network with students and discuss internship opportunities.

For more about mathematical modeling, contact Chen at schen@uwlax.edu or Vidden at cvidden@uwlax.edu.



Nobel winner explains 'holy grail' find



David Gross

David Gross won the 2004 Nobel Prize in Physics for helping explain the force that ties together the smallest pieces of matter in the universe. It was a discovery that brought scientists a little closer to what's considered the "holy grail" of modern physics — formulating a unified theory of physics — one that explains all of nature in a single theory.

During a public lecture on campus in September, Gross explored questions and proposed answers of fundamental physics, and how scientists might consider these ideas in moving forward toward a unified theory.

"I think most people are fascinated to learn

more about the universe, what it's made of, how it began and how it works. These are questions we are addressing and we have many partial answers," says Gross. "It's the same reason people like to see pictures of the Mars mission. We are exploring the unknown."

Gross says finding a unified theory of physics makes sense because unification has worked well in the past. For example, the first great advance in physical science happened hundreds of years ago when Isaac Newton realized that the same universal force that made an apple fall from a tree was also responsible for the Earth orbiting the sun — gravity.

"There is a feeling that to make progress, go even deeper and solve some of the outstanding problems, unification is required," explains Gross.

The Distinguished Lecture Series in Physics is funded by private gifts to the UWL Foundation with support from the Department of Physics, SAH and Wettstein's.

NASA NOTEWORTHY

Astronaut to speak at UWL Youth Science Camps in June



NASA Astronaut Mark Lee will be speaking at this year's Girls in Science and Boys Exploration camps Saturday, June 25 and Sunday, June 26.

If you know a student currently in grades 5-7, mark your calendar for a great summer opportunity. NASA Astronaut Mark Lee will be speaking at this year's Girls in Science and Boys Exploration camps Saturday, June 25, and Sunday, June 26.

Lee, who was on four space flights and has 33 days in orbit, will share his experiences with students. Both camps will also offer many hands-on workshops taught by UWL faculty and staff, along with offering an overnight experience in a residence hall. This is the 17th year for Girls in Science and the 6th year for the boys' camp.

If interested in the event, check the Youth Programs page from UWL Continuing Education at: www.uwlax.edu/conted/youth, or contact Professor Susan Kelly at skelly@uwlax.edu.

Lee's visit is sponsored by a grant from the Wisconsin Space Grant Consortium and the UWL College of Science and Health. Other costs are generated by participants' tuition. To contribute to the general program to lower student tuition fees or to help offer program scholarships, contact Kelly at skelly@uwlax.edu.



Boys Exploration



Girls in Science



by Susan Kelly,
Professor of
Mathematics

ILLUMINATING RESEARCH IN THE DEEP SEA

When a fish consumes an ostracod, the ostracod emits large amounts of luminescence in what is thought to be an anti-predator response. The light in this image is produced by an ostracod as it is being chewed by a fish.



They dive into the pitch-black waters of the Caribbean Sea 45 minutes after sunset, searching for one of the most dazzling displays in the natural world.

“The sun and moon have to be absent because they don’t like light,” explains UWL Biology Professor Gretchen Gerrish.

Gerrish, her UWL student research assistants, and a team of researchers from four other universities are searching for what Gerrish calls “a symphony of lights” or more commonly, “fireflies of the ocean.”

Gerrish recently earned a \$346,000 National Science Foundation grant to study these tiny, shrimp-like crustaceans called marine ostracods, part of a more than \$1 million collaborative grant with the four other universities. Ostracods emit tiny packets of chemicals that produce bright blue lights in the deep sea. The lights flash in specific patterns and directions to attract mates, creating a beautiful display and a puzzle for scientists.

More than 64 flashing patterns have been observed throughout the Caribbean Sea, but only one third of the ostracod species have been collected and described scientifically. Gerrish’s research will add to the body of knowledge surrounding ostracod species identification and evolution while training students in scientific research.

Gerrish’s work specifically aims to better understand the evolution of the light displays

marine ostracods emit during courtship and evolution of their ability to create light or bioluminescence. While ostracods use their bioluminescence to defend themselves from prey in waters all over the world, The Caribbean Sea is the only place where luminescent mate attraction in ostracods has been observed.

STUDIES AT SEA: GETTING STUDENTS ON BOARD

UWL student Mitch McCloskey first heard about marine ostracods during a football recruiting trip to UWL. He wanted to see a biology lab and ended up meeting Gerrish who shared her ostracod research.

McCloskey’s dream since age five was to become a marine biologist. To do that relatively close to home in Madison was a big factor in his decision to attend UWL.

Today he is no longer playing football, but his marine biology ambitions are growing. After a semester of research in her lab, Gerrish invited McCloskey to join the NSF grant research team in the Caribbean. He calls it an “honor” and thanks Gerrish for the opportunity. “To be invited to be part of research like this as a freshman and undergrad is pretty much unheard of,” he says.

More than half the NSF grant funding is to train students in techniques associated with specimen collection and preservation, DNA and behavioral analysis, writing and outreach

Above: UWL student Mitch McCloskey first heard about marine ostracods during a football recruiting trip to UWL. He wanted to see a biology lab and ended up meeting Professor Gretchen Gerrish who shared her ostracod research.

over the next three years, says Gerrish. She has watched her students — majors in aquatic science and pre-med — grow more confident in their science skills during the trip and subsequent lab research.

At first the thought of dissecting a sesame-seed sized organism under a microscope sounded undoable to biology major Alexa Aguirre. “I was like holy cow — I have to dissect that microscopic thing?” she says.

A week into the dissections, she did it with ease. Her work is helping to identify three new species of ostracods they found in the Caribbean. “Anything hands-on is such a different experience from lectures,” she says. “I’ve learned so much. I’m hands-on. That’s how I learn.”

John Frawley, a UWL senior, plans to attend medical school after UWL. He received an Undergraduate Research and Creativity grant to support his research. “Genetic techniques similar to what I’m using in lab are used in medicine to find genetic disorders,” he says. “And it’s important for me to experience field research and the frustrations that can go along with it.”

Google it

STUDENT REACHES HIGH, LANDS SOFTWARE DEVELOPMENT INTERNSHIP

UWL Senior Amy Higgins felt the nerves multiply with each keystroke. She was tackling a computer coding challenge real-time in front of interviewers from Google. She shared her thought process aloud over the phone and they watched each step as she worked the problem out online via a Google doc.

“I remember a very horrifying moment when the interviewer said, ‘That looks great, but it won’t work. Can you tell me why?’,” recalls Higgins.

Higgins, a UWL computer science major, went back through the problem line by line. One “0” needed to be changed to a “1.”

“It was really challenging, but the interviewers themselves were very understanding,” says Higgins. “They know you are going to be nervous and this could be the interview that could make or break you. They kind of want you to succeed.”

It was the second of three interviews with Google for a 12-week summer internship. Higgins had no idea how she did until she received an email two months later indicating someone from Google would be calling her. When the caller told her she’d been hired, Higgins was speechless.

Previous rejections had left her worried she wouldn’t have the internship. Now she’d be developing new software for the multinational technology company. Higgins started at Google May 25.

SEEKING OUT CAMPUS SUPPORT

Higgins is grateful for assistance preparing for general interview questions with UWL Career Services, as well as practice solving challenging technical problems with Computer Science faculty.

Andrew Berns, assistant professor of Computer Science, practiced mock phone interviews with Higgins, challenging her to explain the logic behind the problems they reviewed. Helping students prepare for interviews is something Berns is happy to do. It’s part of the culture of the Computer Science Department.

Berns loves to see students find success — however they define it — whether working for Google or finding their future in a completely different field. He says Higgins’ success is largely because of her own dedication. She’s a student who consistently seeks out a deeper understanding of the curriculum.

“Seeing her success makes you feel lucky to be in a department that attracts students like that,” says Berns. “It’s just impressive to watch them succeed.”

HIGGINS’ CONFERENCE CONNECTION

Higgins found out about the internship opportunity during The Grace Hopper Celebration of Women in Computing, the world’s largest gathering of women technologists. She met a professional who worked for Google in New York City who was interested in helping her connect to an internship opportunity at the company.

This is Higgins’ second internship with Google. Her first, in summer 2014, was working on an internal project using Python. Last summer her responsibilities were greater: developing software that Google’s customer service staff use to look up charges for Google Play or other Google accounts.

“I’m trying to learn as much as I can,” she says. “If there is ever an opportunity to learn a new language or skill, I take it.”



Amy Higgins, a UWL computer science student, had an internship at Google last summer.



STUDENT SCHOLARS

McNair program finding success

The McNair Scholars program is accomplishing its main goal of encouraging students to prepare for and continue with graduate studies. Since its inception on campus in 2009, 72 percent of the program's alumni have enrolled in graduate studies. That is nearly double the rate of graduate enrollment reported by UWL's Career Services Office.

McNair Scholars must be either low-income, first-generation college students and/or identify as members of a traditionally underrepresented group in their field of study (usually African American, Latino/a, Native American or Pacific Islander). The program is funded by the U.S. Department of Education, with additional support from SAH and UWL Academic Affairs.

McNair Scholars make themselves competitive for graduate study through summer research internships. Last summer, four students were selected for competitive paid undergraduate research programs. Here are their summaries:

KANDYCE DUNLAP
Community Health Education

Hometown:
Wausaukee

Dunlap was selected for the Summer Research Opportunities Program (SROP) at Purdue University, where she conducted a cross-sectional analysis of three Indiana food pantry inventories under the direction of Heather Eicher-Miller (Department of Nutrition Science). Her research was presented at Purdue University and the McNair National Conference in Delavan, Wisconsin, in October 2015.



mammals in several regional floodplain sites of the upper Mississippi River. The research was presented at an NGGREC conference and at the UW-L SAH summer research poster session.

KINGSLEY OZONGWU
Biology

Hometown:
Milwaukee

Ozongwu traveled to Boston University to participate in a NIH-funded project with Dr. Andrew Henderson (School of Medicine). They studied the persistence of HIV-1 latency within human cells that were co-infected with a bacterium. Ozongwu presented the research at the 2015 Annual Biomedical Research Conference for Minority Students in Seattle.



DYLAN MONTOURE
Biology

Hometown:
Green Bay

Montoure worked closely with Professor Meredith Thomsen, Biology Department, to complete a paid research internship with the National Great Rivers Research and Education Center (NGGREC) in Illinois. Together, they designed and implemented a study examining edge effects on the behavior of small



MICHAEL FUERTE
Biology

Hometown:
Kenosha

Fuerte was selected for the Mosaics in Science program, a competitive summer internship coordinated by the Geological Society of America. Fuerte worked with federal research scientists at Glen Canyon National Recreation Area in Arizona on a field-monitoring project to produce an inventory of park bats.



by Jessica Thill,
McNair Scholars
Program Coordinator

ARIZONA ANALYSIS

McNair Scholar Michael Fuerte shares about his experience last summer in Arizona.

Tell us about your involvement with McNair Scholars at UWL.

Applying for the McNair Scholars program has given me many unexpected educational returns. With help from the program and my faculty mentor Professor Emeritus Robin Tyser, Biology, I conducted ecological monitoring in the La Crosse marsh in 2013 and 2014. I presented this research at regional and national conferences. In addition, the program has prepared me for the graduate school application process with campus visits, academic advising, and GRE test prep.

What were your responsibilities as a Mosaics in Science summer intern?

As a Biological Research Assistant at Glen Canyon Recreation Area (GLCA) in Arizona, I worked with a team of park biologists. We launched a field monitoring effort for bats (chiroptera), using bioacoustics to distinguish bat species based on their nocturnal echolocation calls. We also physically captured bats using mist-nets deployed over isolated pools of water. Using these two methods, we created a park inventory, which identified and verified several new and rare bat species in the park.

How did this experience prepare you for graduate study?

In addition to the technical skills I acquired, I also had opportunities to interpret and simplify my scientific research for the public. I worked with local high school students and the Native Conservation Corps to involve



Michael Fuerte, a senior biology major from Kenosha, spent a summer internship at Glen Canyon National Recreation Area in Arizona. He conducted a survey of bats in the park.

youth with the sciences and land stewardship in the park. I also traveled to National Park Service sites to attend workshops and meet scientists engaged in related research. My park mentor, field team, and I presented our research at a Department of Interior career workshop in Washington, D.C.

HELP WITH RESEARCH

Help support first-year science students and others performing undergraduate research by making a donation to the Datta Gift Challenge for Undergraduate Research. Your donations will be matched! Gifts of \$1,000 and above can go directly to a student in the F.Y.R.E. program by noting "F.Y.R.E. Scholarship" in the "Other Gift Information" option on the online donation form. Thanks for thinking of our students in your philanthropic plans!

Thanks to alumni, faculty, staff and emeriti faculty, we are on pace to reach our \$20K goal to match Yvonne & Milt's generous gift challenge! We need to raise an additional \$6,725 by June 30 to complete the challenge.

Help by making a gift at: www.uwlax.edu/urc or by contacting Senior Development Officer Jeff Meyer at 608.785.8502 or jmeyer@uwlax.edu.

EMBODYING “MENS CORPUSQUE”

Graduating senior Patrick Griffith embraces UWL's motto “mens corpusque” — mind and body.

Patrick Griffith has always been active. The 2015 UWL winter graduate played football, lacrosse and hockey in high school before transitioning to endurance events, including triathlons.

“I set a goal of doing an Ironman before graduating and finished one last fall,” said Griffith.

He's also pretty smart, having done enough to earn his degree in exercise and sport science in three and a half years. “I only came in with three AP credits,” he explains. “I just made sure I took enough credits every semester, including 20 this fall.”

Griffith, a Maple Grove, Minnesota native, knew he would be on this stage while he was in high school. “My mom and I toured 20 different schools, but I only applied to UW-La Crosse,” he says. “I felt at home when I visited here with the outdoor community and the awesome programs in the medical fields.

I have no doubts, no regrets. I have loved it ever since coming here.”

Griffith took full advantage of the La Crosse experience. He served as a Vanguard, a peer health educator, a writer for The Racquet and participated in a variety of clubs.

“It's a great opportunity to learn from students and others in the community, especially outside your scope of field,” he said. “You can get that free knowledge.”

He was also part of a UWL social media campaign in May encouraging students to de-stress during finals.

“Patrick models consistency, commitment and dependability and he takes initiative to live a well-balanced life,” says Kate Noelke, UWL's Wellness Coordinator. “I feel extremely fortunate to have had Patrick's energy and leadership contribute to the Wellness Resource Center. He will be dearly missed.”

After graduation, Griffith plans to become a certified personal trainer to get experience before going to grad school for physical therapy, which may bring him back to UWL.

Griffith is still exploring dream careers, including becoming a traveling physical therapist in and out of the U.S. or getting involved in endurance focused physical therapy.

“My piece of advice for anyone – UWL student or not – is put yourself in uncomfortable situations,” he says. “Getting out of my comfort zone is where I learned some of the best stuff.”



<https://youtu.be/M47m1HgYVSg>


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Projects pave path for career

Microbiology students present at 75th annual meeting

UWL students had a prime opportunity to share their research when the Department of Microbiology hosted the 75th Annual Meeting of the North Central Branch of the American Society for Microbiology in October. Nearly 140 people from Wisconsin, Minnesota, Iowa and the Dakotas attended.

A great success of the meeting was the friendly environment created, allowing students to share their research with peers and professionals, and learn about research being conducted by microbiologists at other institutions. Of the meeting's 77 research presenters, 61 were graduate and undergraduate students.

UWL microbiology and biology research was well-represented by five graduate and four undergraduate students. They presented research within the fields of environmental and medical microbiology.

Undergraduates Carli Johnson and Alyce Adesso presented a poster outlining research they are doing with Assistant Professor of Microbiology Peter Wilker. The two are developing a system to evaluate the biological importance of influenza virus genetic diversity.



Elissa Harter

Adesso, a clinical laboratory science major, says conducting research requires her to gain a deeper understanding of her work. "A thorough understanding of the materials, steps and concepts involved allows me to problem solve and plan what to do next," she explains.

After graduating with a major in microbiology, Johnson plans to pursue her goal of becoming a physician assistant.

"My experiences doing research in the lab will help me as a physician assistant to appreciate the many facets of healthcare and medicine beyond patient care," she explains.

Lauren Lipker and Elissa Harter each gave oral presentations describing

undergraduate research they are conducting with Professor of Microbiology William Schwan. Their research is part of the Emerging Technology Center for Pharmaceutical Development at UWL, including Schwan and colleagues in the Microbiology, Biology and Chemistry departments. Lipker and Harter won second and third prize awards, respectively, for their presentations.

The mission of the Emerging Technology Center for Pharmaceutical Development is to find new antibiotic chemicals that could be used to treat infections caused by superbugs, bacteria that have developed a resistance to existing antibiotic treatments.

Lipker, a microbiology major, knows her research will benefit society. "I chose microbiology because it has so much relevance in the medical field in both studies and in clinical research," she says. After earning her degree, her goal is to become a physical therapist.



by Marisa Barbknecht,
 Lecturer, Microbiology
 Department



Student Brittany Brown presented a poster on gut microbiome.