Dear friends and alumni,

In 2018, Montana State University observed its 125th anniversary with a year-long celebration full of exciting events and special programs, as well as the Bobcat Birthday Bash which was held on February 16-17. This anniversary — and history professor Robert Rydell’s coinciding preparation of his new book *Democracy by Degrees: The 125th Anniversary History of Montana State University* — provided us with the occasion to reflect on the college’s past, present and future.

Dr. Rydell’s excellent book traces the development of the college over the years, from its promotion from the Division of Letters and Sciences to the College of Letters and Sciences in 1965, to the modern institution that it is today, consisting of 15 departments and five interdisciplinary programs. When reading about the history of the college, it’s notable how the different departments and disciplines were added, subtracted and reconfigured over the years, resulting in the unique amalgamation of departments and interdisciplinary programs we have today.

It’s not always easy leading and uniting a college comprised of such a diversity of fields — ranging from physics to psychology, from mathematical sciences to Native American studies, from chemistry to philosophy. But we’re united by our shared commitment to critical thinking, clear communication, and, most importantly, active engagement with ideas.

And our diversity of disciplines does provide some exciting opportunities, including the potential for interdisciplinary research. In this issue of *Confluence*, you’ll read about several of these research endeavors — some intra-college and some inter-college — that combine the work of scientists with researchers in the social sciences or humanities. Interdisciplinary research is one of the great strengths of our college and we’re implementing several programs to cultivate and enhance these partnerships.

We hope you’ll enjoy this issue of *Confluence*, and learning about our wonderful students and faculty and the exciting projects and programs they are involved in.

We invite you to learn more about what’s happening across the college. You can visit our website at www.montana.edu/lettersandscience for frequently updated news and to find out about upcoming events. You can also follow us on Facebook and Twitter at www.facebook.com/letters.science and twitter.com/LettersScience.

Best regards,

Nicol C. Rae
Dean
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A pair of researchers in the College of Letters and Science received a $1.65 million grant from the National Science Foundation (NSF) that enabled them, and an international team of researchers, to study how human behavior contributes to the spread of emerging infectious diseases from animals to people. The collaborators come from three continents, involving 10 academic institutions and a nonprofit agency.

The grant will help fund Raina Plowright’s research on pathogen spillover from bats to domestic animals and people. The grant focuses on urban bats in eastern Australia, where there has been an influx of fruit bats into towns and cities and, at the same time, Hendra virus has been spilling over from fruit bats into horses and people.

“Periodic food shortages, combined with the deforestation of winter habitat of fruit bats, has sent the flying mammals — each with a massive wingspan that can rival that of the American bald eagle — into towns and cities looking for food,” said Plowright, an assistant professor in the Department of Microbiology and Immunology.

The urbanization of the bats is a nuisance for residents, Plowright said, as the colonies are annoyingly loud, especially in pre-dawn hours. But it’s also a health concern, as the bats often carry Hendra virus.

“The bats are living next to people’s houses and feeding off fig trees and palm trees that people have planted,” she said. “If they feed on trees in horse paddocks, horses can become infected with Hendra virus and then pass it on to people.”

Hendra virus can cause death in horses within days to weeks of initial contact, and bring about flu-like or neurological symptoms in humans that are usually fatal, she added.

“There is a Hendra virus vaccine for horses that is highly effective, yet it’s not being widely used,” Plowright said. “There is very poor uptake of vaccinating horses. For some horse owners this is due to lack of awareness about the risks of Hendra virus, and for others it is because of an anti-vaccination movement.”

The NSF grant will enable this international team of researchers, as well as a team of MSU graduate students who are already on the ground in Australia, to study how the loss of habitat is affecting human-wildlife interaction and the spread of diseases.

The grant will also enable MSU political scientist Elizabeth Shanahan to study how scientific information is communicated to people at risk of disease spillover, and how people talk about this risk.

Shanahan said that the scientific community is now realizing that lawmakers and the public better understand and respond to scientific information when it is presented in a narrative way, taking a cue from the literary world, which uses characters and a plot to tell a story.

“My part in the project is to understand how horse owners, community members and the media narrate the risks of Hendra virus outbreaks,” said Shanahan, an associate professor in the Department of Political Science.
Shanahan will also consider how the information is framed to support each point, such as whether the issue is presented as an economic risk or as a health risk.

She will then compare the different narratives to the information disseminated by the science community to see where the gaps are and in what specific ways future communications can be improved to potentially reduce the risk of Hendra virus spillovers.

Plowright said the team approach to understand and address Hendra virus spillover in Australia is driven by a “one-health” philosophy.

“This whole cascade of events — from the deforestation of the bats’ winter habitat, to the bats taking up urban residence, to the transfer of Hendra virus to horses and humans — could potentially be solved if we can restore their winter habitat and draw the bats out of the cities,” Plowright said.

Using a one-health approach would be a win-win situation, potentially providing solutions that benefit the health of the forests, bats, livestock and humans, she said. And, she added, it would restore a vital ecological function that the fruit bats play in maintaining healthy forests.

“When these bats move across the landscape, they move pollen with them, and now they’re staying put (in the urban areas) and not performing their pollination function in the forests that do remain,” she said.

The research may also lead to larger, more comprehensive solutions for other continents that are seeing the emergence of more and more infectious disease from bats, such as SARS in Asia and Ebola in Africa, where it is difficult to do detailed multidisciplinary studies, Plowright said.

“We often assume there’s some environmental driver of disease emergence, but rarely can we scientifically identify the cause and effect,” she said. “We find ourselves responding to outbreaks after the pathogen has gotten away from us rather than preventing emergence in the first place.”

“If we could identify the underlying environmental driver, as we are trying to do for the fruit bats in Australia, we can potentially reverse and eventually prevent it by getting to the root cause of this public health problem.”

Collaborators on the project also include: Nita Bharti, Penn State University; Liam McGuire, Texas Tech University; Olivier Restif, Cambridge University; Alison Peel, Griffith University; Peggy Eby, University of New South Wales; Wayne Bryden, University of Queensland; Peter Hudson, Penn State University; James Lloyd-Smith, University of California, Los Angeles; Hamish McCallum, Griffith University; Vincent Munster, Rocky Mountain Laboratories; Melanie Taylor, Macquarie University; Lillian Lin, Montana State University.

Excerpted from Skip Anderson for the MSU News Service
Left to right: Jerry Johnson, Andrea Malmberg and Jordy Hendrix.

RISK VS REWARD
Thirty-four people died in avalanches in Montana between the 2008-09 and 2016-17 winter seasons, and Montana consistently ranks among the states with the highest number of avalanche deaths annually, according to the Colorado Avalanche Information Center.

Jordy Hendrikx, an associate professor and department head in the Department of Earth Sciences, and MSU political scientist Jerry Johnson, have led several research projects and workshops on safety in avalanche terrain aimed at reducing those numbers, including a project called SkiTracks that was featured in *The New York Times*.

Now, Hendrikx, who also is director of the Snow and Avalanche Lab at MSU, and Johnson, have teamed up with Norway-based, Swedish behavioral economist Andrea Mannberg in a new project that takes their previous research a step further. This new White Heat project delves into the reasons people take risks that could potentially cost them their lives.

“We’re trying to understand the ‘why,’ and what the motivations are behind the ‘why,’” Hendrikx said. “By understanding the ‘why,’ we can then look at how we can make them safer through targeted education.”

Mannberg, who is spending her sabbatical at MSU, said she began mulling that question in 2013, when she started to examine her own behavior as a backcountry enthusiast.

“I started wondering if the risks I take are risks that I really want to take or if I take higher risks than I usually would when I’m with my friends or because I want to present myself in a certain way.”

— ANDREA MANNBERG

Mannberg was looking for a way to turn those thoughts into research when, at a conference in Norway, she heard a talk by Markus Eckerstorfer, a collaborator on SkiTracks. She hoped that she had found her project.

“She was looking for a way to turn those thoughts into research when, at a conference in Norway, she heard a talk by Markus Eckerstorfer, a collaborator on SkiTracks. She hoped that she had found her project.

“He told me to contact Jordy, and we had a really good talk and started sharing ideas and developing (White Heat),” she said.

“The project was granted funding by the Norwegian Research Council in December 2016 and started in May 2017.”

Using Mannberg’s behavioral economics expertise in both weighing costs to benefits — or risk to reward — and in decision-making theory, the team hopes this new approach will fill a void in avalanche safety training, which has traditionally focused on snow science. Hendrikx said the current trend in understanding accidents is toward looking into human actions, particularly since most people who die in avalanches are also the ones who trigger them.

“Andrea brings a whole different skillset to this research, and now we can start asking some really deep and meaningful questions about behavior and motivation that, ultimately, are going to save lives,” Hendrikx said. “That’s what it’s all about.”

He said that White Heat is the first avalanche-focused work coming from an economics perspective that he’s seen.

“It’s looking at this problem through a unique lens and connecting it to well-established theorems that are well-tested in one world and taking those ideas and that wisdom and history and literature and applying it to this really important setting,” Hendrikx said.

The work is personal, too. In 2015, one of Hendrikx’ undergraduate snow science students died in an avalanche while skiing in Colorado.

For Mannberg, it became personal in 2014 when she, her partner and her best friend — all of whom are well-versed in avalanche safety — were caught in an avalanche they triggered while on a backcountry ski tour in Sweden.

All three were partially buried in the 1,000-foot-wide avalanche. Mannberg broke both legs and a rib and cracked her chin. Her friend had more serious leg injuries, yet all three skiers made it down the mountain in a grueling trip that took most of the day.

“That was a true wakeup call that my decisions in the backcountry weren’t always the right ones, even though I see myself as very conservative in my decision-making,” Mannberg said. “I don’t like risks.”

Despite her terrifying experience, Mannberg said she still tours the backcountry because it provides the peace, exercise and cognitive training that contribute to good physical and mental health — and that’s one of the key points of this project.

“As an economist, I think of costs and benefits, and the benefits of being out in the backcountry are huge,” Mannberg said. “This work is to limit the costs so we can enjoy the benefits.”

Johnson said the work is particularly relevant given the number of MSU students who seek adventure in Montana’s backcountry.

For more information about the project, go to https://whiteheatsite.wordpress.com.

Excerpted from Denise Hoepfner, MSU News Service
NA retrieved from four bighorn sheep skulls recovered from the edge of receding mountain ice patches in the Beartooth Mountains and compared with contemporary sheep living nearby show little change over the past 3,500 years.

“It’s pretty amazing to see that the ancient samples seem to be related to the contemporary herds,” said Elizabeth Flesch, an Ecology and Environmental Sciences graduate student in the Department of Ecology who is studying bighorn genetics. “It’s a completely native herd that hasn’t been manipulated.”

Flesch wasn’t quite sure what the analysis would show, but Bob Garrott, a professor in the Department of Ecology who is leading the study, was hoping for something more.

“We expected that with European settlement and domestic sheep grazing in the Greater Yellowstone Area (GYA) that they would have changed their genetic signature,” he said.

That signature could have been altered as domestic animals infected bighorns with pathogens that can lead to deadly pneumonia, which continues to afflict bighorn herds. It’s estimated that prior to European contact, millions of bighorn sheep populated North America before their population fell to about 15,000 by the early 1900s. That number has since increased to about 80,000, but the herds are often small and isolated.

Flesch’s analysis showed no change from such a die-off that would have created a genetic bottleneck, yet the work examines relatively few samples from a herd occupying the same general area.

Only mitochondrial DNA could be recovered from the old skulls. Mitochondrial DNA shows the mother’s contribution to an animal’s genetics while nuclear DNA shows both parents’ genetics. Beth Shapiro’s lab at the University of California-Santa Cruz performed the genetic analysis.

“It’s pretty exciting to look at data that no one has seen before,” Flesch said.

Garrott speculated that more extensive nuclear DNA samples would be more likely to show such a change in bighorn sheep genes over thousands of years. But retrieving that information from ancient bone is unlikely, Shapiro told Flesch.

The examination was part of a larger, multi-year study Garrott and his colleagues at MSU and Montana Fish, Wildlife and Parks (FWP) are conducting on bighorn sheep in Montana and the GYA.

“Recent sampling of bighorn sheep populations in the region indicate that these exotic pathogens are present in nearly all population segments, suggesting that the current bighorn populations have likely been under continuous selection pressure for resilience against the exotic pathogens since they were introduced approximately 150 years ago,” an annual report on the bighorn study noted.

Two much older bighorn skulls, dated to around 5,500 years old, were more recently recovered for additional comparison, Garrott said. Those samples have yet to be genetically analyzed for comparison.

“We really have a good range of ages for the evolution of the species over 5,000 years,” Flesch said. “It’s a completely native herd that hasn’t been manipulated, a continuous line of bighorn sheep over the last 5,000 years.” She also noted that the pool of contemporary sheep samples would be expanded to 10 for the analysis, all of those coming from bighorn sheep living outside the GYA. That could show if there’s any relationship between widely separated herds thanks to sheep transplants by FWP. It could also show relatedness within herds.

The skulls used in the study were retrieved by Craig Lee, an archaeologist who specializes in ice patch archaeology and teaches in the Department of Sociology and Anthropology. To collect bighorn sheep DNA samples to test against modern sheep required a bit of sleuthing for Lee because they weren’t samples he had found.

Instead, Lee had learned about 13 bighorn sheep skull caps and horn cores collected by former University of Montana Zoology professor Don Pattie from a Beartooth Mountains ice patch in 1962. Pattie, having no use for the skulls, which also included two bison, gave them to the university.

When Lee went looking for them, however, they were nowhere to be found, and Pattie had since died. Luckily, Lee’s friend, Weber Greiser, president of the Montana Archaeological Society, was able to track them down. He found six of the bighorn remains stored in the Philip Wright Zoological Museum at U of M. They were still in the original field box.

Greiser offered to help pay part of the cost for having the remains radiocarbon dated. They dated 879; 2,210; 3,296; 3,346; 3,665; and 3,885 years before present.

Flesch is looking forward to the rest of the upcoming lab results that include the 5,500-year-old bighorn skulls.

“We’ll come up with more firm conclusions in another year or so,” she said.

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Craig Lee, an assistant teaching professor in the Department of Sociology and Anthropology, David McWethy, an assistant professor in the Department of Earth Sciences, and Greg Pederson, a research scientist with the USGS and a research affiliate in the Department of Earth Sciences, are part of a team of researchers who recently received a grant from the National Science Foundation’s Geography and Spatial Sciences Program to continue ice patch research in the Greater Yellowstone Area. The project, “Reconstructing Ancient Human and Ecosystem Responses to Holocene Climate Conditions in the Northern Rocky Mountains,” centers on developing and comparing new archaeological, climatic and environmental records to reveal how humans responded to environmental variability and adapted to extreme climate conditions, such as extended droughts and cold, wet intervals, in the alpine over the past ca. 10,000 years.
FIGHTING INFLUENZA:
PSYCHOLOGIST AND IMMUNOLOGIST COMBINE FORCES TO IMPROVE PUBLIC HEALTH

By Jessianne Castle

Neha John-Henderson and Agnieszka Rynda-Apple herald from very different fields — John-Henderson is an assistant professor in the Department of Psychology at Montana State University, while Rynda-Apple is an assistant professor in MSU’s Department of Microbiology and Immunology. But their expertise has come together over the past year on a project that could provide important insights into the health of the university’s students as well as that of communities around the state.

“The project itself could have really important benefits, especially for rural Montana where the health disparities and economic disparities are very obvious,” Rynda-Apple said.

“One of the strongest predictors of health is socioeconomic status,” John-Henderson explained. “Lower income people tend to have worse health pretty much in every outcome. Understanding whether and how social status can affect our immunity to influenza vaccination and influenza virus infection is important given that despite considerable vaccination efforts, influenza virus infections annually account for approximately 40,000 deaths and 114,000 hospitalizations in the U.S. alone.”

With this knowledge, the researchers are interested in better understanding if stress and social status impact the immune response to the influenza vaccine, as other research has indicated loneliness and small social networks among freshman students can be a factor.

And in the same way that their independent fields complement their research, these two women finish each other’s sentences when they tell you about their project.
In the first phase of the study, students who visited MSU’s Student Health Services for an influenza vaccination were approached and asked if they would be interested in participating in a paid research study. As part of the study, students completed a survey.

“For me, that’s my comfort zone,” John-Henderson said about the survey component.

“And then the analysis of blood results is my comfort zone,” Rynda-Apple added.

“And then we can put it together and see what’s there,” John-Henderson concluded.

Rynda-Apple and John-Henderson’s survey assessed social status based on individual student perceptions. Participants were asked to place themselves on a ladder where those at the bottom have the least amount of money and worst jobs, while those on the top have the most and the best.

“To me, that’s more predictive for students, who may still receive money from parents and don’t have established careers,” John-Henderson said.

Next, blood was drawn from each participating student prior to the administration of an influenza vaccine. The students returned for additional blood tests one month and three months later in order to assess seroconversion, or the development of antibodies from the vaccine that prevent getting sick.

Professionals from Student Health Services donated their time to collect all of the blood samples for the study. The study would not have been possible without their participation and the support of Sam Mitchell, the medical services director and primary care physician at the student health clinic, John-Henderson noted.

Now, while John-Henderson conducts survey analysis, Rynda-Apple is working to secure funds for further blood tests that will identify the presence of antibodies and cytokines.

“Cytokines are substances that are released by our cells in response to infections, in response to damage, in response to a lot of things,” Rynda-Apple said. “Those cytokines act as mediators. They act like little emails between cells, they tell specific types of cells where to come and were to go and what to do.”

“We’re looking at inflammatory cytokines that we know are good. We are also looking at the cytokines that are not so good and don’t do the right thing,” she added. “We’re looking to see if those types of cytokines are produced and whether it correlates with social status.”

In addition to understanding the correlation in humans, Rynda-Apple plans to experiment with an animal model this year. By exposing laboratory mice with a distinct hierarchical social structure to an animal strain of the flu, she will be able to confidently say whether social status impacts mice that get sick with the flu.

“We are able to take this correlation-based research…and do more of a cause-and-effect type of study,” she said. “Rather than saying more stress correlates with lower seroconversion, we can say that more stress affects this particular immune pathway and that causes lower seroconversion.”

Once they are able to better understand the immune response as linked to social factors, Rynda-Apple and John-Henderson might be able to conduct further research that could improve overall health. For example, Rynda-Apple described that certain modulators can be added to a vaccine to correct for a poor response.

Beyond changes in the vaccine itself, John-Henderson spoke from her psychology background, adding that, “Perhaps when we give the vaccine, we should talk about how it’s really important to get good sleep and think about sleep hygiene.”

While the women are awaiting study results, John-Henderson has given lectures during Rynda-Apple’s immunology courses on several occasions in order to discuss the benefits of interdisciplinary research.

“That has been a fantastic lecture,” Rynda-Apple said. “The students love it. When you’re taking an immunology class, you don’t think about how stress or social status can affect your immune response. I think it’s a bit of an eye opener for juniors and seniors who are stressed and probably aren’t sleeping much.”

She added that one of the best outcomes of their partnership so far is “tackling questions that we wouldn’t have resources to answer independently, individually.”

— AGNIESZKA RYNDA-APPLE

These conversations, I don’t think, would happen with just psychologists in the room or just immunologists in the room,” John-Henderson added. “It’s fun to think about the possibilities that are expanding because of the outcomes we can look at together.”
Long interested in the role of stories in influencing public policy and decision making, Elizabeth Shanahan is investigating the mechanisms of narratives that would best encourage Montanans to prepare for flooding.

Would they be more likely to act if the stories focused on heroes instead of victims? What if the victim turns into the hero? By situating science in a narrative form, Shanahan and her Montana State University collaborators are testing the effects of a narrative-based communication framework on hazard preparation.

The research team does not have the final answers but early results indicate that powerful stories contain protagonists in contrast to conventional science communication. With study sites along the Yellowstone River, they are half way through a three-year study addressing the problem of people ignoring warnings about natural hazards. The $550,000 project funded by the National Science Foundation (NSF) is expected to end in August 2019.

What is clear is the value of interdisciplinary research, said Shanahan, principal investigator on the project and associate professor in the Department of Political Science in the College of Letters and Science. Collaborating across multiple college and departmental lines has been so rewarding that she can’t see herself returning to a more traditional, disciplinary-focused way of conducting research.

“Interdisciplinary work is just so enriching. It’s reflective of life. Life doesn’t unfold in disciplines. We really need each other to solve problems,” Shanahan said.

Co-principal investigator Jamie McEvoy agrees.

“I love it,” said the assistant professor of geography in the Department of Earth Sciences in the College of Letters and Science. “Geographers really thrive on interdisciplinary research. We try to see the world more holistically.”

For the past 10 years, Shanahan has collaborated with policy scholars like herself in building what is known as the Narrative Policy Framework.

With seed money from Montana’s Institute on Ecosystems (IoE) and her NSF grant, however, Shanahan was able to pull MSU hydrologists, geographers and computer scientists into her world and vice versa. Acquainted with each other through IoE activities, they became research partners in 2016. Together, they built a successful proposal that integrates the Narrative Policy Framework with hydrology, human geography and computer...
science questions to address flood preparedness along the Yellowstone River.

“Telling a story is an important way we can communicate,” McEvoy said. “There are certain narrative elements that are more engaging and compelling.”

The collaborators come from three MSU colleges — the College of Letters and Science, the College of Engineering and the College of Agriculture — as well as multiple departments within the College of Letters and Science.

In addition to McEvoy, co-principal investigators include Geoffrey Poole, professor in the Department of Land Resources and Environmental Sciences in the College of Agriculture, Clem Izurieta, assistant professor in the Department of Computer Science in the College of Engineering, and Eric Raile, assistant professor in the Department of Political Science.

Senior research associates are Richard Ready, professor in the Department of Agricultural Economics and Economics in the College of Letters and Science and the College of Agriculture, and Ann Marie Reinhold, a research scientist in the Department of Land Resources and Environmental Sciences. Student partners are Nicolas Bergmann, a Ph.D. student in the Department of Earth Sciences, and Henry King, a master’s degree student in the Department of Computer Science.

“Our team comes from across the university, which is super cool,” Shanahan said.

Wanting to develop narratives based on local language and observations, the researchers interviewed Glendive, Miles City and Livingston residents who live in a floodplain or had experience with floods. After coding the transcripts and using natural language processing to identify different kinds of hero and victim language, the scientists developed risk narratives that incorporated different arrays of these characters and developed hydrologic science statements that contain no narrative elements. They then tested each narrative for its affective impact on individuals from the three study sites. The next steps will involve an experimental survey of households along the Yellowstone River to measure the effect of these narratives and science messages on risk perception and intended behavior.

“Audiences routinely ignore government and expert messages about risk,” the collaborators said in a preliminary report at the 2018 annual meeting of the Midwest Political Science Association. “However, Narrative Policy Framework research and other studies of narrative persuasiveness — specifically the influence of narrative characters like heroes, victims and villains — have generated promising results. We offer narratives as a potential lingua franca, or bridge language, for communication about natural hazards between experts and the citizenry.”

McEvoy said the researchers have been fascinated by the science and approaches of their teammates. She has also appreciated the good-natured interactions and friendships that have developed.

“It’s been just a fantastic team,” McEvoy said. “There’s something about having everybody here on campus. We can meet in person and develop relationships and friendships. When we reach those challenging moments because we’re not understanding each other, the friendships sort of carry us through.”

Shanahan said interdisciplinary teams take time to gel — this was the group’s first collaboration — but the results are worth it.

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Shanahan said interdisciplinary teams take time to gel — this was the group’s first collaboration — but the results are worth it.

“Our methods are even better because we were able to discuss this across the table,” she said. “I think any pair of researchers would not have come up with what we are coming up with as a group. It truly has been life-changing for me as a researcher.”
When Ada Giusti smiles, her whole face lights up. A professor of French in Montana State University’s Department of Modern Languages and Literatures, Giusti’s smile comes easily and gentle eyes indicate a genuine desire to listen.

It’s this precise ability to hear others and understand their needs that has fueled Giusti’s career in interdisciplinary research. Giusti, who is fluent in Italian, French, Spanish and English, has mentored over 80 undergraduate students as they develop life-changing service-learning projects relating to health, education and food security in French-speaking regions of Africa. Often, these students are candidates of double majors, as Giusti encourages every French major to pursue a second field of study.

Through a partnership with Florence Dunkel, an associate professor in the College of Agriculture’s Department of Plant Sciences and Plant Pathology, Giusti and Dunkel’s students have directly influenced the prevalence of cerebral malaria and the high incidence of stunted growth in Sanambélé, Mali in West Africa.

“I know that culture is really important. You go to a country and think you’re seeing things and really, you’re just seeing through your own scope.” – ADA GIUSTI

Knowing this, Giusti and Dunkel have developed interdisciplinary courses that prepare students for projects in foreign countries. These classes explore the various cultural contexts of a region so that students gain skills appropriate to their own academic majors.

“This is critically important now for higher education. We know we’re doing something of extreme importance,” Dunkel said.

“Ada was instrumental for us to bridge the gap,” she added. “By being an entomologist, with no training in sociology and no formal training in French, I need her help to navigate the nuances of culture.”

In 2017, Dunkel published a book about the importance of integrating cultural concerns and priorities into food and agricultural programs worldwide. Titled *Incorporating Cultures’ Role in the Food and Agricultural Sciences*, this book is a collaboration of 31 voices, in which Giusti’s stands out prominently.

Giusti was a co-author of three chapters and was the first author on a chapter titled “Immersion.” Throughout her writing, Giusti explores cultural proficiency in a way that is meaningful to scientists, development workers and policy makers.

Reading from the text, Giusti said that immersion has three sequential levels. First, you must study about a country, learning about the history of their culture as well as the history between...
HOLISTIC KNOWLEDGE

INCORPORATING CULTURAL CONCERNS AND PRIORITIES IN INTERNATIONAL DEVELOPMENT PROJECTS

By Jessianne Castle

your culture and their culture, “so we understand how we are perceived as outsiders.”

The second level requires you to physically immerse yourself in the culture by taking adequate time to travel to and spend time in a specific locale. The third and final phase of immersion is the point when “you’ve finally been there so long your culture and the host culture are a part of you. It’s created a new person that’s bicultural,” Giusti said.

Giusti’s deep understanding of culture is inherent in the way she grew up. Born to a couple in the Tuscany region of Italy, Giusti and her family immigrated to France while she was very young. The family immigrated once again while she was a teenager, ending up in a Spanish-speaking neighborhood in New York.

From there, Giusti obtained her bachelor’s degree in French and Spanish literature from the University of California at Santa Cruz in 1984. Following graduation, Giusti studied at Stanford University, receiving her master’s and a Ph.D. in French literature in 1987 and 1990, respectively. She began working at MSU in September 1990.

“Because I am a first-generation university graduate — my parents have 5th grade education — I wanted to work in a university that would potentially have more first-generation students so that I may have the opportunity to mentor them,” Giusti said.

Historically, disciplines were not separated into independent blocks such as art, the humanities, and the sciences. “It was a more holistic knowledge,” Giusti said, pointing out that Blaise Pascal, born in the 1600s and known for Pascal’s triangle, his contribution to the probability of theory, was as much a mathematician as he was physicist and philosopher.

“I’m educating students to be world citizens,” she said. “The world doesn’t function just in one discipline.”

Chelsea Koessel, a postbaccalaureate student studying cell biology and neuroscience as well as French and Francophone studies, is one of Giusti’s students who participated in a service learning project in Morocco during summer 2018. A pre-medical student, Koessel explored the way local people cared for their elders, working both in a nursing home and conducting interviews.

“I wouldn’t have been able to go on my trip without [Ada,]” Koessel said. “She encourages students to think outside of the box and really be themselves.”

Koessel went on to add that knowledge of both language and culture were very informative for her study. “Knowing how to address people, knowing how to create an environment where people are comfortable to speak…it made a huge difference.”

Gaining a deep understanding of a people, knowing their history, culture and current perspectives, requires dedication and a commitment. And often, it means learning about the subject from many different angles.

“I have seen so many students grow,” Giusti said. “That flexibility in being able to learn outside of this one knowledge is important. [Chelsea] was transformed by it. It is so wonderful to see students evolve like that, really learning with their heads and their hearts.”
STUDENT HIGHLIGHTS

ENGLISH MAJOR CHOSEN FOR FULBRIGHT SUMMER INSTITUTE IN ENGLAND

Lauren Adams of Belgrade, Mont. is the first Montana State University student to win a place at a Fulbright summer program in England designed to encourage young scholars.

Adams, who is currently a junior majoring in English writing in the Department of English, spent four weeks at the University of Sussex in Brighton as part of the Fulbright 2018 U.K. Summer Institute. Adams is also an MSU Presidential Scholar, the university’s most prestigious scholarship, and is enrolled in the Honors College.

Adams is one of 60 students selected by the Fulbright Commission to “undertake the demanding academic and cultural summer programs at leading institutions in the U.K.” While at the University of Sussex, Adams studied children’s literature, interacted with students from around the world and traveled to destinations throughout England studying British culture.

“Ultimately, I hope this work will enable me to establish worldwide friendships and come home a better learner and teacher,” she said.

Adams, who is also a tutor in MSU’s Writing Center, said that she plans to continue her work in the Writing Center with the incoming students in MSU’s Hilleman Scholars Program, an enrichment program for incoming Montana freshmen who demonstrate academic and leadership promise.

Excerpted from Carol Schmidt, MSU News Service

Want to know more? www.montana.edu/news/17750

CELL BIOLOGY AND NEUROSCIENCE, LIBERAL STUDIES MAJOR RECEIVES TRUMAN SCHOLARSHIP

Haley Cox, a double major in cell biology and neuroscience and liberal studies and a student in the Honors College, received a 2018 Truman Scholarships, a highly competitive and prestigious scholarship given to one college junior from each state who has demonstrated leadership potential and commitment to public service.

Cox, who is a Gurley, Neb. native and graduated from high school in Eaton, Colo., was involved in a number of activities at MSU and in the Bozeman community. She worked as a field organizer for Montana Governor Steve Bullock’s 2016 re-election campaign, as well as in Denise Juneau’s 2016 campaign for Montana’s lone Congressional seat. She won a Montana Newspaper Association Award her sophomore year for an editorial in the MSU Exponent student newspaper. That same year, Cox successfully lobbied to move a voting location to the MSU campus.

Still active in working on local campaigns, from student government elections to national elections, Cox said the best way to move the needle on issues is through one-on-one connections. “Door knocking is how you make change,” she said. Cox also has served as an advocate at the VOICE Center on campus and was appointed by Bullock to serve on the Montana Youth Justice Council.

At MSU, Cox has worked as a research assistant in the lab of Christa Merzdorf, associate professor in the Department of Cell Biology and Neuroscience, on neuroectoderm cells, or the portion of the ectoderm of the early embryo which gives rise to the central and peripheral nervous systems. She was also vice president of the Big Sky Young Democrats.

A first-generation college student, Cox plans to attend graduate school to study biomedical science policy advocacy, and would like to work in public policy in Washington, D.C. or Helena with an eventual career in law or medicine.

Excerpted from Carol Schmidt, MSU News Service
**LIBERAL STUDIES STUDENT REPRESENTS MONTANA AT “POSTERS ON THE HILL” EVENT**

Will Griffiths, a spring graduate with a degree in liberal studies, was selected as the Montana entry in the Council on Undergraduate Research’s Posters on the Hill display at the U.S. Capitol rotunda. While in Washington, D.C., Griffiths shared his research on threats to cold water fisheries from climate change with Montana’s congressional delegation as well as large audiences in the Capitol. Earlier in the year, the Bend, Ore. native presented his work at the 2018 National Conference on Undergraduate Research in Oklahoma.

Griffiths is an avid fly fisherman — he began fly fishing when he was 15 and has worked as a fly fishing guide — and his passion for fishing initially led him to MSU.

“I’ve learned you have to be involved if you want things to change,” said Griffiths. “If you care about these places, then you need to become involved in conservation.”

“Will’s research is a great example of how scholarly inquiry can cut across disciplinary boundaries, in this case combining the science of climate change with a humanistic approach to understanding the impacts of change on the people who care about the West,” said Colin Shaw, director of MSU’s Undergraduate Scholars Program.

Griffiths hopes to complete a book in the next three years and continue fly fishing guiding in the summers. He also plans to attend graduate school, most likely in environmental studies or environmental journalism.

*Excerpted from Carol Schmidt, MSU News Service
Want to know more? www.montana.edu/news/17802*

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**STUDENT ATHLETE COLIN HAMMOCK RECEIVES AN INAUGURAL CAMERON PRESIDENTIAL SCHOLARSHIP**

Colin Hammock, a junior majoring in cell biology and neuroscience and an offensive lineman with the MSU Bobcat football team, was the recipient of an inaugural Cameron Presidential Scholarship, MSU’s most prestigious student scholarship.

Hammock is a National Merit and Montana University System Scholar as well as an Eagle Scout. He serves on the Student Athlete Advisory Committee, as vice president of MSU’s Health Pre-professional Honor Society and is a vice president of Phi Kappa Phi. He works as a tutor on campus and as a resident associate at Birchwood Assisted Living. He traveled to Poland this summer with several teammates on a Habitat for Humanity trip, and maintains a research position with the Stress, Adversity, Resilience and Health Lab in the Department of Psychology.

Nancy Cameron, along with her brother, David Cameron, and his wife, Tanya, provided a $4 million endowment to fund the Cameron Presidential Scholarship Program. The Cameron family homesteaded north of Great Falls more than 125 years ago and owned and operated the Dana Ranch in Cascade for more than 75 years.

Students receiving the scholarship are selected on the basis of scholastic achievement, demonstrated leadership and exemplary public service. Each recipient of a presidential scholarship receives generous financial support during their undergraduate career at MSU if they maintain a superior academic standing. All recipients are students in MSU’s Honors College.

Other College of Letters and Science recipients of Cameron Scholarships include Logan Gunderson, a sophomore double-majoring in biochemistry and cell biology and neuroscience, and Micah McFeely, a junior majoring in economics with a minor in statistics. Gunderson is a Montana University System Scholar, as well as an emergency medical technician who has served in this capacity while a student at MSU. McFeely is the outgoing ASMSU vice president and a recipient of the Governor’s Best and Brightest Scholarship.

*Excerpted from MSU News Service*
EARTH SCIENTIST CATHY WHITLOCK ELECTED AS MEMBER OF NATIONAL ACADEMY OF SCIENCES

Cathy Whitlock, a professor in the Department of Earth Sciences and a fellow of the Montana Institute on Ecosystems, was selected for membership in the U.S. National Academy of Sciences, one of the highest honors a scientist can receive. According to the academy’s announcement, members are elected in recognition of their distinguished and continuing achievements in original research, and membership is widely accepted as a mark of excellence in science.

Whitlock is the first scientist from a Montana institution to earn the distinction. She will be formally inducted at the 2019 NAS annual meeting next spring in Washington, D.C.

“Cathy’s election to the National Academy of Sciences is a great honor for the College of Letters and Science, and well-deserved recognition for an outstanding scientist whose leadership in research, teaching and mentorship will have a major impact on the future of Montana and the American West,” said Nicol Rae, dean of the College of Letters and Science.

Over the course of her nearly 40-year career, Whitlock has produced a broad body of groundbreaking research that has led her to national and international recognition for her scholarship and leadership in the field of past climate and environmental change. She has published more than 190 peer-reviewed journal articles and book chapters on the topics of vegetation, fire and climate history in leading scientific journals.

She served as founding director of the Institute on Ecosystems from 2011 to 2017. She is currently the lead investigator on the National Science Foundation Wildfire Partnership in Research and Education (WildFIRE PIRE) project and is the MSU co-investigator for Montana’s NSF Experimental Program to Stimulate Competitive Research (EPSCoR RII Track 1) project.

Excerpted from Denise Hoepfner, MSU News Service

Want to know more? www.montana.edu/news/17711

AMERICAN CHEMICAL SOCIETY RECOGNIZES CHEMISTRY PROFESSOR FOR OUTSTANDING RESEARCH ACCOMPLISHMENTS

The American Chemical Society selected Joan Broderick, professor and head of the Department of Chemistry and Biochemistry, for the 2019 Alfred Bader Award in Bioinorganic or Bioorganic Chemistry. Established in 1986, the prestigious annual award honors a scientist for outstanding research accomplishments at the interface of biology and organic or inorganic chemistry. Broderick will receive the award in April 2019, at the organization’s national meeting in Orlando, Florida.

“What an incredible surprise to find out I would be receiving this award; it is truly an honor,” said Broderick. “The award is a testament to the outstanding scientific team I’ve had the privilege to work with over the years: Will Broderick — my partner in science and life, as well as the collaborators, students and postdocs who have shared my enthusiasm for understanding the chemical details of these fascinating enzymes.”

Broderick is an internationally recognized scientist whose research focuses on radical SAM enzymes and biological metal cluster assembly in hydrogenases. Radical SAM enzymes are one of the largest enzyme superfamilies in nature, with more than 100,000 proteins found in bacteria, plants and animals. They are responsible for key biological functions, including human immune defense, synthesis of components of DNA, and synthesis and assembly of organic and inorganic cofactors in biology. This last function includes synthesis of the metal clusters in hydrogenases, enzymes that catalyze the reversible production of hydrogen gas.

Her contributions to science include the publication of nearly 100 scholarly papers and a sustained record of funding from the National Institutes of Health and the U.S. Department of Energy.

Broderick was also recognized with MSU’s first-ever Women in Science Distinguished Professor Award in 2014.

Excerpted from Denise Hoepfner, MSU News Service

Want to know more? www.montana.edu/news/18076
Neil Cornish, a physics professor whose work has contributed to some of the most important gravitational and astrophysical discoveries of the century, was named a Montana University System Regents Professor, the most prestigious designation for a Montana professor.

Cornish, who is also the director of MSU’s eXtreme Gravity Institute, said the distinction caps two exciting years during which his group played a part in the first-ever detection of gravitational waves and the first observation of colliding neutron stars using gravitational waves and light.

In September 2015, scientists for the first time observed gravitational waves — ripples in space-time — that arrived at Earth from a cataclysmic event in the distant universe. The detection, made by the Laser Interferometric Gravitational Observatory, or LIGO, confirmed the existence of black holes and the wavelike nature of gravity that Albert Einstein predicted 100 years earlier in his general theory of relativity.

Cornish’s LIGO group reconstructed the gravitational wave signal from the collision of two black holes in a galaxy 1.2 billion light-years from Earth and compared the result to the prediction from Einstein’s theory of gravity. The comparison appears in the first figure of the gravitational wave discovery paper.

Cornish has published 270 scientific papers in leading international journals and has given more than 60 invited presentations at universities and international meetings. Over the last four years, he has published 20 articles a year and has 75 publications which have been cited 75 times or more.

“Professor Neil Cornish is without question a phenomenally productive scientist of international stature and renown,” said Nicol Rae, dean of the College of Letters and Science, in the nomination letter. “He has an internationally recognized record of sustained scholarship and service to his profession and to MSU, along with a record of brilliance in the classroom and thoughtful mentoring of graduate and undergraduate students.”

Excerpted from MSU News Service

Want to know more? www.montana.edu/news/17524

Scott Creel, professor in the Department of Ecology, received a 2018 KSLA Wallenberg Professorship from the Royal Swedish Academy of Agriculture and Forestry. He is the fifth recipient of seven professorships — one awarded each year — with the aim of establishing ties with prominent international scientists who can contribute to the renewal of Swedish science in the green sector and to Swedish universities and academic institutions.

As a Wallenberg Professor, Creel is spending the 2018-2019 academic year at Sverige Lantbruksuniveristet — the Swedish Agricultural University — in Umea, Sweden. He plans to use the time to strengthen an existing relationship between his MSU research group and Umea’s molecular ecology group, with whom he is collaborating on research involving African carnivores and on how human activities isolate ecosystems.

“The wildlife and fisheries group at Umea has a strong emphasis on the use of genetics,” Creel said, “The applications of molecular genetics to conservation are changing at an incredible rate these days.”

Creel’s research in Sweden will be based on data from a long-term collaboration with the Zambian Carnivore Programme, a nonprofit headed by MSU alumnus Matt Becker that works to conserve Africa’s large carnivores and the ecosystems in which they live. Four of Creel’s graduate students recently conducted studies on carnivore-herbivore interaction that involved cheetahs, leopards, lions, hyenas and African wild dogs on three protected national parks in Zambia — Liuwa Plain, South Luangwa and Kafue. Creel’s hope is to use Umea’s expertise to determine how the carnivores in the three sites may be genetically connected to one another, for all five species.

Excerpted from Denise Hoepfner, MSU News Service

Want to know more? www.montana.edu/news/17414
Kristen Intemann, professor of philosophy in the Department of History and Philosophy, and her longtime collaborator, Inmaculada de Melo-Martín, professor of medical ethics at Weill Cornell Medicine, recently published a new book, *The Fight Against Doubt: How to Bridge the Gap Between Scientists and the Public*, where they examine disconnects over such things as climate change, childhood vaccinations, GMOs and the relationship between HIV and AIDS.

In the book, Intemann and de Melo-Martín argue that dissent can lead to confusion, false beliefs and widespread public doubt about highly justified scientific evidence. Even more dangerous, it has begun to corrode the very authority of scientific consensus and knowledge. Deployed aggressively and to political ends, some dissent can intimidate scientists, stymie research and lead to public policies that endanger health, the environment and other areas of people’s lives.

The co-authors believe in the value of dissenting views and trying to understand why people hold the different views that they do, Intemann said. That’s also what Intemann has encouraged students to do as coach of the award-winning Ethicats, an MSU team that has won regional and national contests for their skillful debating of contemporary moral issues.

“Dissent within science is incredibly important and valuable to generate knowledge and correct biases,” she said.

To better facilitate trust in scientists, Intemann and de Melo-Martín suggest that scientists do more to involve stakeholders in their research, increase transparency, reduce conflicts of interest and prioritize research that is responsive to public needs.

Because of the new book, Intemann has been invited to the National Science Foundation in Washington, D.C., and the Shanghai Academy of Social Sciences in China, a leading think tank and that country’s oldest institute for the humanities and social sciences. The journal *Science* commissioned a review of the book that was published both online and in print.

Excerpted from Evelyn Boswell for the MSU News Service
STUDY LINKS COLLEGE FOOTBALL GAME DAYS TO INCREASE IN SEXUAL ASSAULT REPORTS

College football game days have long been associated with alcohol-fueled partying on campuses, but a new study shows they're also linked to an increase in reports of sexual assault.

A paper co-authored by Isaac Swensen, an assistant professor in the Department of Agricultural Economics and Economics, found that game days at top college football programs are associated with a 28 percent increase in reports of rape from college-age women.

The study, which focused on 96 U.S. colleges and universities with NCAA Division 1 football programs, examined the relationship between campus party culture and sexual assault. It found rape reports in the vicinity of those colleges surge 41 percent above average on the day of home football games, while reports of rape increased 15 percent when there are away games.

“Our results demonstrate that events that intensify partying increase reports of rape,” said Swensen, one of three authors of the paper. In addition to home games, Swensen said rivalry games and upset wins are associated with higher rates of reported sexual assault.

The researchers found the effects are larger for schools with more prominent football teams and during more prominent games.

The study’s estimates are based on panel data collected from the FBI’s National Incident Based Reporting System, a voluntary program for universities.

In addition to the findings, the paper offers recommendations for policymakers to consider and conclude that it will be important for future research to consider the degree to which game day-specific policies, such as elimination of tailgating and alcohol sales inside football stadiums, reduce incidences of rape.

“The authors hope our results will prompt administrators and university officials to think about ways to reduce the spikes of partying and alcohol consumption that happen around these events, or at least make the partying that does occur safer,” Swensen said.

Swensen, a Montana native, received his bachelor’s degree in economics from Brigham Young University-Idaho in 2007 and his Ph.D. from the University of Oregon in 2013. One area of his research at MSU focuses on understanding the effects of risky behaviors among college students. His latest research examines the link between campus sexual assault prevention efforts and student enrollment through an analysis of Federal Title IX investigations into claims that universities have failed to protect victims of sexual assault.

“Excerpted from Carmen Price for the MSU News Service
Bozeman— the fastest growing metropolitan area in the nation — is an example of the wildland-urban interface in the GYE.
NEW MSU STUDY GAUGES HEALTH OF THE GREATER YELLOWSTONE ECOSYSTEM

Professor Andrew Hansen and research scientist Linda Phillips, both in the Department of Ecology, recently published the results of a study of the Greater Yellowstone Ecosystem (GYE) — which consists of Yellowstone National Park and the surrounding area — that finds increased population and density, as well as a changing climate, are affecting the overall ecological health of the region.

“The study quantified trends in the condition of 35 ecological ‘vital signs’ dealing with snow, rivers, forests, fire, wildlife and fish,” said Hansen, who is also director of MSU’s Landscape Biodiversity Lab.

“The human population has doubled, and housing density has tripled, in the Greater Yellowstone Ecosystem since 1970, and both are projected to double again by 2050,” Hansen said. “Plus, the temperature has warmed 1.5 degrees Fahrenheit since 1950 and is projected to increase by another 4.5 to 9.4 degrees Fahrenheit by 2100.”

The paper “Trends in Vital Signs for Greater Yellowstone: Application of a Wildland Health Index,” was published in the science journal EcoSphere in August.

“These changes in land use and climate have reduced snowpack and stream flows, increased stream temperatures, favored pest outbreaks and forest die-off, fragmented habitat types, expanded invasive species and reduced native fish populations,” Hansen said.

The study uncovered good news, too, for the habitat and some animals that call it home. Large mammals, including bear and elk, are increasing in numbers and expanding in range, according to the study.

Also notable is the new methodology the MSU scientists used, called the Wildland Health Index, which resulted in a reader-friendly “report card.”

“Physicians use ‘vital signs’ such as blood pressure to gauge the health of humans,” Hansen said. “What we’re trying to do with the Wildland Health Index is something similar by adding value to data that allows a variety of people to understand the trends in ecological health.”

To do this, Hansen and Phillips evaluated the data to identify the trends over times in the GYE’s vital signs and used criteria to rate them from “deteriorating” to “stable and improving.”

“We then boil down the metrics to the six or eight key vital signs that will matter to policymakers,” Hansen said. “And, this study can be applied each year across the GYE and used for other large wildland ecosystems in the United States to better inform land managers to assist them in sustaining these special places.”

Diane Debinski, head of MSU’s Department of Ecology, said the index is a new tool that can be used to measure ecosystem health around the world.

“Because the Greater Yellowstone Ecosystem serves as an icon for wildland management, the Hansen and Phillips Wildland Health Index will have global reach, serving as a template for similar assessments worldwide,” she said.

Hansen noted that the ecological health of the region was strongest inside the boundaries of Yellowstone and Grand Teton national parks. That’s not surprising, he said, given the focus of its caretakers in managing the ecological health of the parks. He said this study shows that the greatest need for improvement is outside the parks, where private landowners don’t necessarily have access to data that may help them be better stewards of the land they own and the water that passes through it.

“There’s a real opportunity to let people know what they might worry about on their own property with regard to impact,” Hansen said.

He also indicated that there’s plenty of room in the near future for citizen scientists to gather and report data that will help policymakers as they consider the overall ecological health of the GYE, which includes tens of thousands of square miles beyond Yellowstone National Park, including Idaho, Montana and Wyoming.

“We have so little information about large river systems, especially on private lands,” Hansen said. “There’s just no consistent monitoring of water quality on those major rivers on a scale that can tell us how well they’re doing, and that’s surprising because so many people here love our blue-ribbon trout streams that we’re famous for.”

“There’s real opportunity to engage people to do the monitoring and the science to fill in the gaps,” he added. “One could visualize high school students across the GYE doing water-quality monitoring and submitting the data to a central repository. By doing so, they become heavily engaged participants.”

Excerpted from Skip Anderson for the MSU News Service.
MSU SCIENTISTS PART OF INTERNATIONAL TEAM THAT DISCOVERS NEW TOOL TO BREAK DOWN PLANT WASTE

Two researchers in the Department of Chemistry and Biochemistry were part of an international team that discovered a new class within an important family of enzymes that could speed up the process of converting plant waste into useful products.

The enzymes, together called cytochrome P450, can efficiently break down five compounds found in woody plants, said Melodie Machovina, a doctoral student in Jennifer DuBois’ laboratory in the Department of Chemistry and Biochemistry.

“That was really cool and surprising,” Machovina said.

Since hundreds — or even thousands — of other enzymes can break down only one or two compounds, cytochrome P450 offers a new tool for a critical step in converting lignin into fuel, plastic, nylon and other useful materials, she added. Lignin is a vast source of renewable carbon. It is found in the cell walls of plants, causing them to become rigid, woody and more resistant to rot.

Machovina and DuBois, along with 12 partners in the United Kingdom, Brazil and elsewhere in the United States, described the new P450 system in a paper published this summer in the scientific journal *Nature Communications*. They said it was a promising approach to bioconversion and a significant breakthrough in a long struggle to find a way to break down the compounds in lignin so they can be converted into new materials and chemicals. The two main compounds in lignin — coniferyl and sinapyl — are often part of a key bottleneck in the conversion process.

“We now have one of the most well-known, versatile, engineerable and evolvable classes of enzymes ready to go as a foothold for biotechnology to move forward and make the enzyme better,” co-author and principal investigator Gregg Beckham said in a Phys.org article about the discovery.

DuBois, an associate professor at MSU who is also a principal investigator on the project, compared lignin-eating bacteria to an animal eating corn on the cob. Like an animal trying to swallow the cob when it can only digest corn, some bacteria have problems breaking down the compounds that make up lignin.

Other bacteria and fungi, however, have enzymes that allow them to eat lignin, DuBois said. Trying to understand the mechanisms behind that valuable ability, the enzyme researchers conducted a variety of structural, biochemical and computational studies.

Machovina’s role was examining and characterizing proteins that Sam Mallinson — a U.K. graduate student and co-lead author of the paper — created. Machovina wanted to see how fast and efficient they were at breaking down lignin, and how promising they were for large-scale production.

Speed and cost-effectiveness are important when converting lignin to useful products on an industrial scale, Machovina said. “Time is money,” she noted.

Machovina became involved in the enzyme project after receiving a fellowship from the U.S. Department of Energy, specifically its Office of Science Graduate Student Research. The fellowship allowed her to spend nine months last year at the National Renewable Energy Laboratory, or NREL, in Golden, Colo., where she met Beckham from the NREL’s National Bioenergy Center and John McGeehan from the University of Portsmouth in the U.K. They told her about the enzyme project, and she
decided to join their research team. Mallinson is McGeehan’s graduate student.

“It sounded like it would have applications and turned out to be really productive,” Machovina said of the project.

Machovina said that after reading Nancy Drew and Sherlock Holmes books as a young girl, she wanted to be a detective and solve mysteries. When she took science classes, she realized she could solve mysteries on a molecular scale. She was especially drawn to biochemistry and enzymes, a field she will continue to pursue after she graduates this year and takes a postdoctoral position at the University of Illinois at Urbana-Champaign.

“I thought enzymes were so cool,” Machovina said. “All kingdoms of life have them...They are like little machines in our bodies. They keep us going. I was really fascinated with that.”

Excerpted from Evelyn Boswell for the MSU News Service.
AMERICAN INDIAN HERITAGE DAY CELEBRATES CULTURAL LEGACY, SOCIETAL CONTRIBUTIONS

Each year, MSU celebrates American Indian Heritage Day on the fourth Friday of September. The Department of Native American Studies and the Office of American Indian/Alaska Native Student Success are both sponsors and important organizers of the annual event which pays tribute to the cultural legacy and societal contributions of American Indian people in Montana and the U.S.

In 2017, the event highlighted the scholarly contributions of the American Indian community. Students, faculty and staff gave presentations highlighting research pertinent to American Indian, Alaska Native, Native Hawaiian, First Nations and similar indigenous communities. There was also a research poster symposium demonstrating current academic research by American Indian students, faculty and staff.

The 2018 event focused on the revitalization and maintenance of indigenous languages across the U.S. Joseph McGeshick, poet, writer, storyteller and lecturer in the Native American studies program at MSU Billings, gave the keynote address. McGeshick is a career educator who is Sokaogon Chippewa from Fort Peck. The author of numerous books on Native American history and culture, he served as a research intern and community scholar for the American Indian Program at the National Museum of the American Indian at the Smithsonian Institution in Washington, D.C. He previously served as a lecturer in MSU’s Department of Native American Studies.

In 2011, the Montana Board of Regents passed a resolution establishing American Indian Heritage Day and charging all campuses in the Montana University System to conduct appropriate exercises commemorating the role of Indians in Montana’s past, present and future. This legislative action granted American Indian Heritage Day the same commemorative status as Columbus Day (or Indigenous Peoples Day), Lincoln’s and Washington’s birthdays and Flag Day in the State of Montana.

“The histories and cultures of American Indians are an integral part of the history of the nation and the State of Montana. The Montana Legislature has recognized that all Montanans have an invaluable opportunity for cultural enrichment through contact with the culture and philosophy of American Indians.” Montana Board of Regents
MONTANA TRIBAL COLLEGE STUDENTS SPEND WEEK AT MSU AS PART OF INTENSIVE RESEARCH PROGRAM

In July, Christa Merzdorf, an associate professor in the Department of Cell Biology and Neuroscience, and Jennifer Forecki, a postdoctoral researcher in Merzdorf’s laboratory, led the week-long “Trails to Research” program on the MSU campus. The program brought more than a dozen students from tribal colleges around the state — including Salish Kootenai College, Little Big Horn College, Chief Dull Knife College and Blackfeet Community College — to MSU to participate in an intensive research experience.

“The goals are for students to learn the research process and gain a research mindset,” Merzdorf said. “They learn hypothesis development, how to design and conduct experiments, the importance of controls, troubleshooting, and recording, interpreting and analyzing data. They then prepare and present their findings to an audience of peers and the MSU community.”

This is the third year for the program, which gives students an opportunity to stay in MSU residence halls while focusing on a specific research project from start to completion. This year’s research project was to study the effects of different substances on the embryonic development of zebrafish. Merzdorf explained that because the fish go from fertilized egg to embryo within 72 hours, students are able to see the effects of alcohol, pollutants, medication, caffeine and other substances on the embryos.

“I’m really enjoying getting to work with all this lab equipment,” said Mariah Soldier Wolf, a sophomore majoring in allied health at Chief Dull Knife College. “I feel like we dove in and everyone has been so helpful and informative. It has been fun and a really good experience.”

In addition to the MSU-based course, Merzdorf and Forecki also takes Trails to Research on the road to tribal colleges, with new locations added each year.

Excerpted from Denise Hoepfner, MSU News Service

MSU PARTNERS WITH THE UNIVERSITY OF MONTANA AND MONTANA 4-H FOR MATHEMATICAL MODELING SUMMER CAMP

In 2019 and 2020, middle and high school youth from around the state will come to MSU for a summer camp focused on mathematical modeling. Funded by the National Science Foundation, “Montana Models: Connecting Local and Disciplinary Practices through University-Community Partnerships” aims to develop and implement modeling tasks based on issues that directly affect Montana’s rural communities.

“As a teacher I often talk about how important math is, but how often do we give youth opportunities to define and work on problems they think are important?” said principal investigator Mary Alice Carlson, an assistant professor of mathematics education in the Department of Mathematical Sciences. “When people see mathematics in their own lives and communities, they are better prepared to learn and use mathematics both in and out of school.”

This research project focuses on understanding community knowledge bases and the assets all youth bring to problem solving situations. Youth from rural or indigenous communities are often positioned using deficit framing. In deficit framing, the youth themselves, or their out-of-school histories and community-valued practices, are positioned as lacking something. This project seeks to counter that narrative.

“Folks in rural and indigenous communities have a vast amount of ingenuity and mathematical know-how. Sometimes these assets can be hidden in practical activity and therefore invisible to schools and academic mathematicians,” said Fred Peck, an assistant professor of mathematics education at the University of Montana and a co-principal investigator for the project. “We think mathematics and mathematics education can be enriched by incorporating these diverse assets and practices.”

The project leadership team also includes Elizabeth Burroughs, department head and professor of mathematics education at MSU, Katharine Banner, an assistant professor of statistics at MSU, and David Thomas, professor of mathematics at the University of Providence in Great Falls, Mont.
AMERICAN NOVELIST AND POET LOUISA HALL TO SERVE AS THE WESTERN WRITER-IN-RESIDENCE AT MSU

Louisa Hall was selected as the new Western Writer-in-Residence at Montana State University, beginning her one-year appointment in September. She will be housed in the Department of English during her time at MSU.

Hall is the author of the 2016 novel *Speak*, which explores the rise of artificial intelligence and its impact on human communication, connectedness and understanding. National Public Radio’s book review said, “Speak is one of a kind, the type of novel that seemingly comes out of nowhere and hits like a thunderbolt. It’s not just one of the smartest books of the year, it’s one of the most beautiful ones, and it almost seems like an understatement to call it a masterpiece.” *The New York Post* described the book as “strange, beautiful and unpputdownable.”

Her third book, *Trinity*, was released in October and is a kaleidoscopic novel about Robert Oppenheimer — father of the atomic bomb — as told by seven fictional characters.

While at MSU, Hall will teach an advanced creative writing workshop. She will also participate in community outreach events such as book-signings, readings and lectures.

“Louisa is a wonderful addition to our department,” said Kirk Branch, professor and department head in the Department of English. “She’s a great and highly visible writer who loves to teach, and who has already become a dynamic force with our students. We’re lucky to have her.”

The college developed the Western Writer-in-Residence position to attract a major author, who is from the western region or who writes on the subject of the North American West, to MSU on a visiting basis for a period of one to three years. This position raises MSU’s profile in the field of creative writing, and as a research and educational hub in the study of the American West.

Award-winning author Rick Bass served as MSU’s first Western Writer-in-Residence from 2015 to 2018.

MSU ANNOUNCES $12 MILLION GIFT TOWARD $20 MILLION AMERICAN INDIAN HALL

MSU will receive a major portion of the funding needed to build a state-of-the-art American Indian Hall thanks to a $12 million pledge from The Kendeda Fund, a private grant-making foundation with a long history of supporting conservation and community led projects in Montana. The Kendeda Fund’s pledge will serve as the lead gift for the $20 million project that will be built on the eastern edge of MSU’s Malone Centennial Mall.

“Place is extremely important to American Indians,” said Walter Fleming, department head in the Department of Native American Studies. “We appreciate that The Kendeda Fund understands that this isn’t necessarily just a building that we would like to build, but a spiritual facility that signifies a commitment to American Indians and a permanence in our campus’ history.”

During her announcement of The Kendeda Fund gift, MSU President Waded Cruzado noted that in addition to the Kendeda pledge, more than 60 generous donors have contributed an additional $4 million since 2005 when the project was first proposed. The Associated Students of Montana State University Senate have committed $2 million in student building fees to support the project.

The MSU Alumni Foundation is working to secure the final $2 million from donors by the end of December, which will bring the project to $20 million, Cruzado said. The university plans to hold a ceremonial groundbreaking for the building the last week of March.

The new facility, which is planned to open in fall of 2021, will house the offices of the Department of Native American Studies, which are currently in Wilson Hall. The building will hold numerous classrooms for use by all students, as well as an auditorium for lectures. Also planned are rooms for tutoring, counseling and advising.

*Excerpted from Carol Schmidt, MSU News Service*  
*Want to know more? [www.montana.edu/news/18066](http://www.montana.edu/news/18066)*
AGRICULTURAL ECONOMICS & ECONOMICS

Mark Anderson, associate professor in the Department of Agricultural Economics and Economics, was named a faculty research fellow with the National Bureau of Economic Research (NBER).

The NBER, based in Cambridge, Mass., is the country’s leading nonprofit economic research organization. More than 1,400 professors of economics and business are NBER researchers and members, and many are considered leading scholars in their field. There have been 27 Nobel Prize winners in economics and 13 past chairs of the President’s Council of Economic Advisors with NBER affiliations.

At MSU, Anderson researches aspects of public health such as risky behavior, juvenile crime and health economics. Anderson is currently exploring the role of public health interventions from a historical perspective. He’s exploring the effectiveness of the anti-tuberculosis movement at the turn of the 20th century to better understand infectious disease mortality.

His three-year NBER fellowship began this fall. At the end of his appointment, Anderson will be eligible for promotion to a research associate with the organization. Anderson has been appointed to the organization’s Health Economics Research Group, one of only three professors in the country selected to the group in 2018. As a health economics fellow, Anderson will participate in meetings and conferences that emphasize studies on the economics of substance abuse, obesity, health determinants and factors influenced by the cost of medical care.

Greg Gilpin, head of MSU’s Department of Agricultural Economics and Economics, said Anderson’s NBER appointment brings national attention to MSU’s faculty expertise in economics.

“Dr. Anderson’s research related to health and risky behaviors is timely and highly relevant to understand how public policies and initiatives improve individuals’ welfare,” he said. “His NBER fellowship recognizes the significance of his research within our profession and its associated impact on policymakers.”

Excerpted from Jenny Lavey, MSU News Service

CELL BIOLOGY & NEUROSCIENCE

James Mazer, an associate professor in the Department of Cell Biology and Neuroscience, recently published research in Neuron, a leading neuroscience journal, revealing how the brain maintains attention on an object even while the eyes are making many rapid, voluntary movements.

The brain has evolved to be very efficient about how its limited amount of attention is used, said Mazer, which includes circuits for making sure attention is always directed toward exactly the right spot in the field of view.

Mazer said that past studies have shown that the brain can anticipate eye or body movements, readying itself for what is about to occur. He explained that attention acts like a spotlight in the brain’s sensory maps, shining extra light on the scene where it’s needed. This “predictive coding” helps to make sure that light gets to the right place in the map at the right time. Mazer’s recently published study reveals that this “spotlight” anticipates eye movements and shifts before the eye starts to move so that the spotlight is at the right place the instant the eyes stop moving.

“This is the idea of predictive coding; the brain has access to our intentions and uses that information to anticipate changes in body posture or eye position so we’re always prepared for whatever is coming next,” Mazer said.

Mazer says this research is basic science that provides a foundation for future development of new therapies or drug treatments for attention-related brain disorders, including conditions like attention deficit hyperactivity disorder, autism spectrum disorder or schizophrenia.

“These are all clinical conditions thought to be associated with disruption of the brain’s ‘executive control system’ where sensory processing, memory and cognition come together to determine where and how to deploy attention,” Mazer said.

Excerpted from Denise Hoepfner, MSU News Service

Want to know more? www.montana.edu/news/17772

Excerpted from Jenny Lavey, MSU News Service

James Mazer.
CHEMISTRY & BIOCHEMISTRY

Arianna Celis Luna, a doctoral student in the Department of Chemistry and Biochemistry, received the K. Patricia Cross Future Leaders Award from the Association of American Colleges and Universities recognizing her as a future leader of higher education.

The award recognizes graduate students who show exemplary promise as future leaders of higher education; demonstrate a commitment to developing academic and civic responsibility in themselves and others; and whose work reflects a strong emphasis on teaching and learning.

Celis Luna conducts research in the lab of Jennifer DuBois, associate professor in MSU’s Department of Chemistry and Biochemistry. There, she researches how certain pathogenic bacteria, like Staphylococcus aureus, make the essential molecule called heme. She is trying to figure out how a recently discovered enzyme responsible for the last step of this process works and whether that enzyme can be targeted to act as an antimicrobial treatment.

“Arianna is not just a good student and motivated scientist, she is downright inspiring,” DuBois said. “She is one of the most well-rounded students that I’ve ever mentored — a great scientist, an athlete, a leader and a friend.”

Over the course of her academic career, Celis Luna has published six papers in leading journals, including the Journal of the American Chemical Society, Journal of Biological Chemistry and ACS Biochemistry. She is also the event coordinator for the Chemistry and Biochemistry Graduate Student Association, for which she helps raise funds for graduate student travel grants, and organizes professional development and social events for graduate students.

She said that after earning her doctorate, she is considering seeking postdoctoral opportunities and ultimately would like to pursue a career in scientific research and education.

“I would like to educate future scientists and inspire and support them the way my mentors have inspired and supported me,” she said.

Excerpted from Denise Hoepfner, MSU News Service

EARTH SCIENCES

Over the summer, geology and paleontology undergraduate students from the Department of Earth Sciences participated in a month-long field course, visiting sites in Utah, Wyoming and southwest Montana.

As part of a long tradition in field-based education, students participated in a rigorous field course where they created geological maps and interpreted geological histories at focus areas in Utah — including Moab, the Uinta Mountains and other locations in the western part of the state — as well as Grand Teton National Park in Wyoming and southwest Montana.

Assistant professors Devon Orme and Andrew Laskowski, who both joined the MSU faculty in 2017, redesigned the course to cover more ground and provide snapshots of the diverse geological features that comprise mountain ranges in the Western U.S. The course focused on training students to understand spatial and temporal changes through Earth’s history, which are all driven by tectonics, or the process that controls Earth’s structure, landscape, climate and biogeography.

Students worked independently in small groups during exercises and were responsible for the daily operations at camp, including planning and cooking group dinners. On rest days, students explored their surroundings by rock climbing and hiking in Moab, rafting on the Snake River in Grand Teton National Park and visiting nearby museums and national parks.

Feedback from the course highlighted the advantages of experiential, field-based learning for illustrating geology concepts and providing career training.

Summer Geology Field Course 2018 at the Unitia Fault Zone, northern Utah. Photo courtesy of Devon Orme and Andrew Laskowski.
In addition to her work as a scholar and a teacher in the Department of English, associate professor Gretchen Minton serves as the dramaturg and academic consultant for Montana Shakespeare in the Parks (MSIP).

MSIP is MSU’s traveling acting company that has been bringing Shakespeare directly to the people of Montana since 1973, including many underserved rural communities who would not otherwise have the opportunity for live theater.

A dramaturg is a literary adviser in a theater company who researches, selects, adapts, edits and interprets scripts and texts. The dramaturge also provides historical background to plays, and consults with actors, directors and production teams to provide a deeper understanding of a script.

Since becoming the MSIP dramaturg in 2013, Minton has been part of the production team for six seasons of MSIP performances, including the most recent season that featured Othello and Love’s Labour’s Lost. She also serves on the production team for Shakespeare in the Schools, which is MSIP’s educational outreach program in schools.

Minton is an award-winning Shakespearean scholar whose research program is focused on the overlapping categories of Shakespeare and his contemporaries, textual editing, the English Reformation, performance criticism and the reception of Shakespeare in the American West. She has published three books, including her most recent, The Revenger’s Tragedy: The State of Play. She is currently working on a new book about Shakespeare in Montana.
HISTORY AND PHILOSOPHY

Brett Walker, a Montana University System Regents Professor of history, published a new book, *A Family History of Illness: Memory as Medicine*, earlier this year.

The book project, which is half-memoir and half-history, began when Walker fell gravely ill at age 44 and was eventually diagnosed with common variable immunodeficiency, or CVID. An infusion of immunoglobulins saved his life and he must receive the treatment monthly to stay alive.

Immediately upon leaving the hospital, Walker began searching his family tree and scouring his childhood memories for clues, seeking to answer the question about whether he had a family history of the illness.

“Here I was, a historian. I could tell you almost everything there is to tell about 17th century Japan or world environmental pollution, but I couldn’t tell you anything about my own story,” he said.

In the book, Walker, who is recognized worldwide for his work in environmental and Japanese history and is the recipient of a prestigious Guggenheim Fellowship, traces the experiences of his Montana family from their native Yugoslavia to the illnesses that ravaged small towns in America as his ancestors were making their way West. He also braided writings about his own family’s story with a history of CVID and how it was discovered.

“It became about how (my) body remembers in the form of immunity, about how people remember in the form of stories, and about how communities remember in the form of history,” Walker said.

Excerpted from Carol Schmidt, MSU News Service

Robert Rydell, a professor of history in the Department of History and Philosophy and director of the American Studies Program, authored the new book *Democracy by Degrees: The 125th Anniversary History of Montana State University*, which was published in 2018 in celebration of MSU’s 125th Anniversary.

Rydell, who has been an award-winning professor at MSU since 1980, has kept copious notes about MSU’s last 25 years. He also conducted extensive interviews to fill in gaps and provide perspective. Rydell said he was aided by a group of dedicated graduate and undergraduate students who searched the university archives for photographs and records necessary to the project.

Rydell said that the book examines MSU’s trajectory of growth, its rapid rise to top-tier research and engagement status — “a stunning achievement” — while also pointing out the struggles the institution faced in the last quarter century.

Rydell said working on the MSU history reminded him that it is important for institutions to reflect on both where they have been and where they are going on the occasion of major anniversaries. It also reminded him of his passion for MSU and for the unfolding of history.

“It was a labor of love,” Rydell said.

Democracy by Degrees is available for $24.95 through the MSU Bookstore.

Montana State University hosted the annual conference of the Society for Cognitive Studies of the Moving Image (SCSMI) in June. Dan Flory, associate professor of philosophy in the Department of History and Philosophy, served as the conference organizer.

SCSMI is an interdisciplinary organization comprised of scholars interested in cognitive, philosophical, aesthetic, neurophysiological and evolutionary-psychological approaches to the analysis of film and other moving-image media. The organization’s international membership examines how the theories and findings of empirical science can shed light on the art and craft of film, television and other audiovisual media.

SCSMI conducts an annual conference and in recent years the conference has been held in locations such as Helsinki, London and Berlin. Nations represented at the Bozeman conference ranged from China to Hungary, from India to the Netherlands. Many different academic disciplines were represented at the conference, including philosophy, film production, computer science and educational psychology.

Some examples of conference sessions included: “Using Psychology to Redesign How We Teach Film,” “The Illusion of Choice in Videogames,” and “The Role of Prior Belief on Attentional Selection and Subsequent Memory in Political Videos.”

www.montana.edu/lettersandscience
MATHEMATICAL SCIENCES

Robin Belton, a doctoral student in the Department of Mathematical Sciences, received a Graduate Research Fellowship from the National Science Foundation. This competitive fellowship, which will provide Belton with $34,000 per year for three years, will support her research in the mathematical field of topological and geometric data analysis (TGDA).

Currently, pathologists use images of prostate cancer to classify the severity of a patient’s cancer. Characteristics such as the size, shape and distribution of glands are topological and geometric features that can be analyzed using mathematics, and specifically TGDA. Researchers hope that the use of TGDA will result in more consistent diagnosis and prognosis of prostate cancer and eliminate the inconsistencies that sometimes arise when pathologists interpret images.

Belton is part of MSU’s Computational Topology and Geometry (CompTaG) research group that is developing TGDA methods to measure distances between topological and geometric features in different images. Just as it’s difficult to measure the distance of a hike that goes over mountains and along creeks using a straight ruler and a paper map, a new kind of distance measurement is required to measure the important distances in cancer cell images. Belton’s research is focused on developing and understanding a useful measure of distance in these images.

Belton is also using TGDA to develop a method to extract and cluster the melodic and harmonic features of songs in order to categorize music in a consistent manner. Belton hopes that this project could eventually lead to automated systems for creating music playlists.

While earning her bachelor’s degree in mathematics from Kenyon College, Belton had the opportunity to work on research projects related to medical imaging and bioinformatics that resulted in the publication of two journal articles.

MICROBIOLOGY & IMMUNOLOGY

Eric Dunham, a doctoral student in the Department of Microbiology and Immunology, received a prestigious National Science Foundation Graduate Research Fellowship that will allow him to continue his research on microbial communities that live beneath glaciers.

The fellowship, which will provide him with $34,000 a year for three years, will also allow Dunham to continue mentoring MSU undergraduate students and working with Native American interns from Salish Kootenai College.

For his research, Dunham has traveled to Iceland where he collected sediments from beneath four glaciers. The NSF fellowship will allow him to conduct a second round of experiments on microorganisms that live without oxygen and are isolated from sunlight in those sediments. Life on Earth’s surface tends to be supported by photosynthesis, the transformation of sunlight into energy. Microbes that live in the sediments beneath glaciers are fueled by chemical sources of energy, in particular hydrogen and minerals.

“It’s a really cool project,” said Eric Boyd, an assistant professor in the Department Microbiology and Immunology and Dunham’s adviser. “It’s highly relevant to the potential for finding life on other planets. It’s also highly relevant to the processes that supported life when Earth was in the ‘snowball stage’ at an early time. How were complex life and Earth’s biodiversity sustained under those conditions?”

The “snowball stage” refers to at least two long periods of Earth’s history when it was covered almost entirely in ice or slush.

Dunham graduated in 2013 from the University of Montana with a double major in cell and molecular biology and biochemistry. He plans to earn his doctorate in the next three years and eventually become a university professor.

Excerpted from Evelyn Boswell for the MSU News Service

Want to know more? www.montana.edu/news/17689
MODERN LANGUAGES & LITERATURES

Patricia Catoira, an associate professor of Spanish in the Department of Modern Languages and Literatures, has been instrumental in the development and implementation of the new Global Health Minor in the Liberal Studies Program.

The Global Health Minor provides students with an interdisciplinary course of study of major health issues — including infectious and non-communicable disease — in communities across the world. Examples of topics include the transmission of zoonotic diseases and the pathophysiological mechanisms underlying infectious disease; the impacts of climate change and human-environmental interactions on the spread of diseases; women’s health; dietary transitions and their implications for nutrition and health outcomes; and an appreciation for culturally-appropriate best practices. The goal of this new minor is to support training of students who are better equipped to address health disparities in underserved populations.

Catoira teaches one of the required courses for the minor, Spanish for Healthcare Providers. The course, which is offered every semester, prepares undergraduates to converse with Spanish-speaking patients and develop cultural competency. Emphasis is placed on the conversation and grammar required for medical interviews, cultural aspects of Latino health care and interviewing in Spanish.

Catoira also coordinates a faculty-led study abroad program in León, Nicaragua for the Global Health Minor. Participating students volunteer at a public hospital and take a one-on-one medical Spanish class. Depending on their skills, students get to perform medical tasks such as checking vital signs, running blood screens and performing EKG tests. They also learn about common third-world and tropical diseases such as insect-borne dengue and Chikungunya. Above all, students get to practice and enrich their Spanish skills and cultural attunement through their daily interaction with Nicaraguan patients and healthcare providers.

NATIVE AMERICAN STUDIES

Marsha Small, a member of the Tsitsistas (Northern Cheyenne) nation and an instructor in the Department of Native American Studies, coordinated the installation of the Indigenous Art in Time Gallery in the Strand Union Building (SUB) at MSU.

The multimedia gallery features mural-sized pieces by five artists, including Ben Pease, a member of the Apsaalooke (Crow) and Tsitsistas nations and former MSU art student who is now successfully selling his multimedia pieces around the world; John Isaiah Pepion, Piikani (Blackfeet), who is also a prominent artist known for his ledger-style art; Carlin Bear Don’t Walk, a member of the Tsitsistas and Apsaalooke nations who grew up in Busby and now lives in Billings and whose painting also graces the 2018 American Indian Council powwow poster; Casey Figueroa, a Flathead-area artist and educator of Apache, Tohono O’Odham, Yaqui, Mexican and Irish heritage who is pursuing dual master’s degrees in Native American Studies and an MFA from MSU; and Alisha Fisher, Tsitsistas and Apsaalooke, a graduating senior art student at MSU.

“This is a salute to our Homelands, because this is what this place here is — Homeland for many Montana tribes,” said Small, who is also an alumna of the Department of Native American Studies, having earned her master’s in 2015.
PHYSICS

Loren Acton, a research professor emeritus in the Department of Physics, was conferred with the Order of the Rising Sun by the Japanese government in recognition of his decades-long collaboration with the Japanese in the field of space science.

Japanese Emperor Meiji established the Order of the Rising Sun in 1875. It is the third highest order bestowed by the Japanese government, with the two higher orders reserved for heads of state or politicians. Acton and his wife, Evelyn, attended the ceremony at the National Theater in Tokyo.

“This honor means a great deal to me,” said Acton. “It is a priceless affirmation of the love and respect of my Japanese colleagues who went to the trouble of nominating me. It will be good to see them again.”

Acton served as lead investigator for the experiment that launched the Soft X-ray telescope in 1991, a collaboration between Japan, the U.S. and the United Kingdom that focused on the study of high-energy solar processes, including solar flares, eruptions and the heating of the corona that surrounds the sun. The telescope operated for a decade and was capable of capturing more than 4,000 X-ray images per day, data that enabled Earth-based scientists to study the activity within the corona, Acton said.

Acton, who was also a NASA astronaut and flew aboard the space shuttle Challenger in July-August 1985, continues to work with images gathered by the space-based telescope and has made more than 35 trips to Japan, accumulating more than a year of time spent there.

“In addition to being the first Montanan in space, Loren Acton has served Montana and MSU as an internationally recognized leader in solar physics and as an outstanding mentor and scholar,” said Nicol Rae, dean of the College of Letters and Science.

Excerpted from Skip Anderson for the MSU News Service.

POLITICAL SCIENCE

Franke Wilmer, professor and department head in the Department of Political Science, gave a keynote address to the Canadian Peace Research Association at the annual Canadian Congress of Humanities and Social Sciences in May.

Her address, entitled “Trading Places in Pluralistic Societies: Empathy as a Civil Culture,” outlined the theoretical framework for her current research in Israel and Palestine on the potential for empathic political action to disrupt conflict narratives that drive protracted and violent conflict.

Based on two previous research projects — one on Indigenous peoples’ political activism and the other on the 1990s wars in former Yugoslavia — Wilmer has developed social-psychological theories of identity political violence. She is now applying these theories to the Israeli-Palestinian conflict, asking whether empathic engagement can challenge or at least disrupt the otherwise mutually reinforcing narratives of victimization and injustice in relationships defined primarily by violent conflict. Empathetic engagement includes not only finding common ground through shared experiences among people whose identities are implicated in violent conflict, but also the capacity to imagine ourselves in one another’s shoes.

Wilmer has travelled to Israel and Palestine (the West Bank) four times over the past two years where she has conducted more than 50 in-depth interviews with leaders and activists of peace organizations, educators and members of the Knesset, Israel’s parliament.

Wilmer was asked to serve on the governing board of the Canadian Peace Research Association and will stand for election to the board at the association’s annual meeting to be held in Vancouver in June of 2019.
PSYCHOLOGY

Brandon Scott, an assistant professor in the Department of Psychology, was designated as a Rising Star by the Association for Psychological Science (APS), an international professional membership organization dedicated to the advancement of psychological science.

The APS Rising Star designation is presented to outstanding APS members in the earliest stages of their research career, and recognizes researchers whose innovative work has already advanced the field and signals great potential for their continued contributions. Individuals being considered for the Rising Star designation are evaluated for their promise of excellence in research based on significant publications, recognitions or discoveries; methodological innovations, or theoretical or empirical contributions; or work with potentially broad impact.

“The Association for Psychological Science is the premier international organization for experimental psychologists,” said Keith Hutchison, professor and head of the Department of Psychology. “Their Rising Star designation is a prestigious honor and reflects the quality and impact of Dr. Scott’s scholarly work.”

Scott’s research is in the area of applied developmental psychology. He operates the Child and Adolescent Anxiety Laboratory of Montana (CAALM), which studies how emotional factors contribute to anxiety problems in childhood and adolescence. Scott also teaches courses in childhood psychopathology and research methods for his department.

Scott was one of 94 APS members worldwide designated as a Rising Star in 2017.

SOCIOLOGY & ANTHROPOLOGY

Maggie Thorsen, assistant professor of sociology in the Department of Sociology and Anthropology, studies the social and health implications of family formation experiences. She is currently involved in a research project focused on understanding differences across federally-qualified health centers (FQHCs) in prenatal care and birth outcomes.

FQHCs deliver comprehensive medical care to over 24 million medically underserved and uninsured Americans, providing an organizational structure to address widespread health disparities across rural and urban areas. While communities served by FQHCs see improved health outcomes, there is tremendous variation across these centers in terms of their geographic location, services provided and the patients they serve.

Findings from this project suggest that aspects of the regional setting in which health centers are located, along with the sociodemographic characteristics of their patent population, are jointly related to levels of access to early prenatal care and rates of low birth weight births among patients served at health centers. Additionally, the regional and patient characteristics of health centers are related to the efficiency of these organizations in terms of their ability to translate resources like labor and funding into positive health outcomes.

“If we can better understand factors that impact the health of our youngest members of society, then this has implications for their health across their life course as well as their outcomes in other domains,” said Thorsen.

A paper focusing on part of Thorsen’s research, “Measuring Efficiency of Community Health Centers: A Multi-Model Approach Considering Quality of Care and Heterogeneous Operating Environments,” was recently published in Health Care Management Science. Other co-authors on the paper were Andreas Thorsen, assistant professor of management in the Jake Jabs College of Business and Entrepreneurship, and Ronald G. McGarvey and Rohith Madhi Reddy, both from the University of Missouri.

The study was initially funded as a pilot project through the Center for American Indian and Rural Health Equity at MSU. However, the research team was recently awarded a $120,000 grant from the National Institutes of Health to continue their pilot project for a second year.
MONTANA STATE UNIVERSITY RECEIVES GIFT FOR WRITING ACROSS MSU

In December 2017, MSU announced a $570,000 gift from Ann Jackson and her husband, Ken Wilson, to support programs and initiatives that will expand writing experiences for students and faculty in the science, technology, engineering and math (STEM) disciplines at MSU. The Jackson-Wilson gift has enabled the MSU Writing Center to expand its work with STEM students through an Innovative Teaching Grant program for STEM faculty and by hiring an assistant director for Writing Across MSU. In addition, the gift has helped fund positions for non-tenure track faculty to teach technical communications.

The Teaching Innovation Grant program is designed to build partnerships between STEM faculty and the Writing Center. Recipients of this year’s grants are Jean Dixon, assistant professor of geology in the Department of Earth Sciences; Bill McLaughlin, teaching professor in the Department of Chemistry and Biochemistry; Dave Millman, assistant professor in the Department of Computer Science; and associate professor Christa Merzdorf, lab coordinator Haley Dunkel and instructor Marc Mergy from the Department of Cell Biology and Neuroscience.

According to Michelle Miley, director of the Writing Center and assistant professor of English, STEM students need a variety of writing experiences throughout their college careers to develop good writing and communication skills. Because STEM courses are often large, and because the curriculum is focused on difficult scientific and technical content, faculty can be wary of incorporating writing assignments into their already rigorous classes. The Writing Center offers faculty partners support in assignment design, and provides students support through in-class workshops, writing groups and one-on-one tutoring. In addition, the staff in the Writing Center learn from these partnerships how they can better support MSU students across the STEM disciplines. It’s a win for all involved.

In the first semester, the Innovative Teaching Grant initiative, funded through the Jackson-Wilson gift, is already impacting Writing Across MSU.

“In 16 years at MSU, I have never had the extensive conversations about writing with faculty across disciplines and colleges that we are having now due to Ann and Ken’s generosity,” said Kirk Branch, English professor and head of the Department of English. “I am delighted and inspired. This gift will transform the culture of writing at MSU.”

Jackson and Wilson met while serving on the board of trustees at Middlebury College and married in 2014. Jackson, a graduate of Middlebury College and Columbia University, worked in publishing for decades, holding executive business and financial roles at Time Inc. She was general manager for Sports Illustrated and People magazine and launch publisher of InStyle and Real Simple magazines. Jackson left publishing to work in private equity before retiring and remains active on various biomedical research boards associated with the National Institutes of Health, as well as Cambridge and Oxford Universities.

Wilson has owned a ranch in Paradise Valley since the early 1990s and frequents the area to fish and ski. Wilson’s son, Kendrick, graduated from MSU in 2017 with a degree in business. Wilson is vice chairman at BlackRock Inc., an investment management company. He was previously an adviser in the U.S. Department of the Treasury and has had a long career on Wall Street. He holds degrees from Dartmouth College and Harvard University. He also serves as a member of the board of governors of the MSU Alumni Foundation.

For more information about giving to the College of Letters and Science, please contact Shannon Schumacher, Director of Development, at 406-994-4157 or shannon.schumacher@msuaf.org.

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