Dear friends and colleagues,

In 2016, Montana State University celebrated and honored the legacy of Maurice Hilleman, the College of Letters and Science’s—and arguably MSU’s—most world-changing alumnus.

Hilleman graduated from MSU in 1941 with degrees in chemistry and microbiology. He pursued a career as a microbiologist, specializing in vaccinology and developing over 40 vaccines, an unparalleled record of productivity. Of the 14 vaccines routinely recommended in current vaccine schedules, he developed eight: those for measles, mumps, hepatitis A, hepatitis B, chickenpox, meningitis, pneumonia and Haemophilus influenzae bacteria. He also played a role in the discovery of the cold-producing adenoviruses, the hepatitis viruses and the cancer-causing virus SV40. He is credited with saving more lives than any other medical scientist of the 20th century.

In April of this year, MSU held the Maurice Hilleman Vaccine Symposium, featuring some of the nation’s most noted experts in vaccine. At the symposium, which was free and open to the public, internationally recognized experts gave research updates on vaccine work for worldwide problems, such as HIV and Ebola, as well as updates on vaccine efforts of particular relevance to Montana, such as brucellosis. Paul Offit, director of the Vaccine Education Center at the Children’s Hospital of Philadelphia, as well as the Maurice R. Hilleman Professor of Vaccinology and a professor of pediatrics at the Perelman School of Medicine at the University of Pennsylvania, delivered the keynote lecture on “Maurice Hilleman: The Perilous Quest to Save the World’s Children.”

Also in 2016, MSU inaugurated the Hilleman Scholars Program and selected 51 of Montana’s best and brightest high school seniors for the first class of scholars. Hilleman Scholars are selected based on personal essays, nomination letters, grades and financial need, as well as evidence of significant academic, leadership and career potential. The program provides these worthy graduates from Montana high schools with exceptional financial and academic support throughout their four years at MSU so that they, like Maurice Hilleman, can realize their full potential and actively contribute to their communities.

In this issue of Confluence, you’ll read about other, more recent graduates from the College of Letters and Science whose lives were equally transformed, and their career paths launched, by the education they received in the college. We hope you’ll enjoy reading their inspiring stories.

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. 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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**Thank you to MSU News Service.**

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**This Page**

In the Greater Yellowstone Ecosystem, ice patches exist at or above treeline and can contain ancient biological and cultural materials. *Photo courtesy of INSTAAR/Craig Lee.*

**Back Cover**

Nathan Chellman, a doctoral student with the Desert Research Institute at the University of Nevada-Reno, carries ice cores packed in dry ice across the alpine tundra from a coring location to a waiting vehicle. *Photo courtesy of INSTAAR/Matt Stirn Photography.*
A RACE AGAINST TIME:
CLS ALUMNI WIN PRESTIGIOUS PRIZE FOR ICE PATCH ARCHAEOLOGY

Top: His Serene Highness the Sovereign Prince Albert II of Monaco, left, presented the Camp Monaco Prize to (from left) Craig M. Lee, Gregory Pederson and David McWethy at ceremonies held June 30 at the Salle des Etoiles in Monaco. Photo by FPA2, JC Vinaj. Used with permission.

Middle: Scott Dersam and Sari Breitenfeldt, both MSU undergraduates majoring in anthropology, log an ice patch in the Greater Yellowstone Ecosystem. Photo courtesy of Craig Lee.

Bottom: Spirally fractured long bones from bighorn sheep suggest that hunters may have eaten the nutritious, high fat marrow after the hunt. Photo courtesy of INSTAAR/Tara Hornung.

Background: Chronologically stratified ice recovered from ice cores provides context for archaeological and paleobiological materials exposed by current melting. Photo courtesy of INSTAAR/Matt Stirn Photography.
“Ice-patch research provides a unique opportunity to discover the timing and scope of human use in the region’s most fragile ecosystem—the alpine zone.”

- CRAIG LEE

Two alumni of the College of Letters and Science, who are frantically working to save ancient material revealed by melting patches of ice in the mountains of the Greater Yellowstone Ecosystem (GYE), are part of a research team that won the 2016 Camp Monaco Prize from the Buffalo Bill Historical Center’s Draper Natural History Museum, the University of Wyoming’s Biodiversity Institute and the Prince Albert II of Monaco Foundation-USA.

Craig Lee is an archaeologist who studies archaeological material exposed with the thaw of ice patches at high elevations. A Bozeman native and resident, who earned his bachelor’s degree in anthropology from the Department of Sociology and Anthropology. Lee teaches at MSU in addition to serving as a research scientist with the Institute of Arctic and Alpine Research (INSTAAR) at the University of Colorado.

Dave McWethy, an assistant professor in the MSU Department of Earth Sciences who received his doctorate in environmental sciences from the Department of Ecology, is the ecosystem specialist on the team. McWethy will examine pollen, charcoal and insect remains from sediment layers embedded in ice cores from the patches.

A third member of the team, Gregory T. Pederson, also a MSU alumnus with a master’s in environmental science through the College of Agriculture, is a paleoclimatologist for the U.S. Geological Survey’s Northern Rocky Mountain Science Center and research associate in the Department of Earth Sciences.

The $100,000 prize was conferred in Monaco by His Serene Highness the Sovereign Prince of Monaco Albert II at ceremonies held July 1 in the Salle des Etoiles in Monaco. Lee, McWethy and Pederson traveled to Monte Carlo to accept the award. The scientists say they plan to use the prize to help them study the ancient material uncovered by rapidly retreating mountain ice patches to develop “a better understanding of environmental change and past human activity in the high elevations of the Greater Yellowstone Ecosystem” over a period of 10 millennia.

“Ice-patch research provides a unique opportunity to discover the timing and scope of human use in the region’s most fragile ecosystem—the alpine zone,” Lee said.

Pederson, whose research specialty is the study of how variations in the climate drive drought and other changes in water resources in mountainous areas of the West, will study tree rings of remnant wood found in the patches to chart the ancient climate.

Pederson said that one of the surprises of the ice patch research was the discovery of trees in near perfect preservation that perished in growing ice patches over 5,000 years ago. Each of the preserved trees grew for more than 400 years in a position well above modern tree line, making them optimal candidates for reconstructing climatic conditions during the mid-Holocene.

The second notable discovery was the fact that the trees were a five-needle pine species, and most likely white bark pine; indicating a dynamic range shift to higher elevation by the species during a historic period of harsh regional climate conditions.

The proposal that the three submitted for the Camp Monaco prize explores the dynamic past of the GYE, including its seasonal use by Native American groups over thousands of years. The team will explore how wildlife and people intensified their use of the alpine zone in the face of hot and dry conditions in the valleys, or lessened their presence during colder and wetter conditions. According to their proposal, a goal of the research is to determine if human and animal use cluster around known periods of unusual climatic conditions such as droughts and warm intervals.

“This project represents a great example of why interdisciplinary research is needed; to better understand what happened in the past we need a team with skills in archeology, paleoclimatology and paleoecology,” McWethy said.

The committee that judged the prize agreed. “One of the exciting aspects of the retreating ice fields project is that it takes advantage of a newly emerging source of information to understand our past and perhaps help predict our future,” said Charles R. Preston, jury co-chair and founding curator of the Buffalo Bill Center of the West’s Draper Natural History Museum.

Lee said that while the scientists study ancient materials, the changing climate dictates a certain urgency to their work. The prize will help them put their research on the front burner.

“The melting of mountain ice-patches provides a great opportunity to understand what happened in the past, but we need to intercept the materials before they degrade and are lost forever,” Lee said.

“I think it’s wonderful that the granting bodies, including a foreign entity, put such value on the scientific and cultural understanding of a resource precious to so many Native American tribes, scientists, government agencies, policymakers and members of the general public.”

Awarded every three years, the “Camp Monaco” Prize is named in honor of the camp established in 1913 near Yellowstone National Park by Prince Albert I of Monaco and William “Buffalo Bill” Cody.

Excerpted from Carol Schmidt, MSU News Service
For Angela Des Jardins and Michelle Larson, passion led to success as the women walked across the graduation stage not once, not twice, but three separate times. These women earned their bachelor’s, master’s and doctoral degrees in physics from Montana State University, having graduated for the last time in 2001 and 2007 respectively. Now, Des Jardins and Larson are putting their degrees to good use as they inspire others to learn about our universe.

Discovering Physics
Angela Des Jardins knew she wanted to study physics from the moment she stepped foot on university soil in 1997.

“Since I received my first book about space in grade school, I’ve wanted to be involved in space in some way. For a while, I wanted to be an astronaut,” said the third generation Bozemanite.

In her teens, a Bozeman High School physics teacher inspired Des Jardins, and she realized physics could provide the foundation for becoming a space researcher.

Michelle Larson, on the other hand, enrolled at MSU in 1989 in order to study engineering. The oldest of four kids raised in a military family, Larson graduated from high school while living in Alaska and was thrilled when MSU offered her a Presidential Scholarship—one of MSU’s most distinguished academic awards, which grants recipients annual tuition waivers and a generous stipend for four years.

“The truth is, I went to college not knowing what I wanted to do when I grew up,” she said. “I figured if I just stayed engaged, something would eventually present itself.”

Larson entered into the College of Engineering but found the curriculum too structured. “I had chosen to attend a comprehensive university like MSU because of the broad range of courses I would have access to,” she explained. Eager to explore anthropology—a topic she knew nothing about and desired to study “just for fun”—Larson switched to physics after faculty in the department promised the curriculum had plenty of flexibility.

“I was sold,” she said. “I graduated with an undergraduate degree in physics, but still didn’t know what I wanted to do, so I decided to continue on for a master’s. I obtained a master’s degree in physics and still didn’t know what I wanted to do, so I decided to continue on for a Ph.D.”

After receiving doctoral degrees, both women took their education—their passion—and ran with it.

Engaging with Space
Now Larson and Des Jardins occupy important positions in the space community, and both enjoy inspiring others to learn and investigate space.

“I am extremely proud of my MSU education,” Larson said. “I am a fan of the broad, comprehensive degree offerings at MSU, which offer opportunity for exploration and discovery of one’s passion.”

While Larson was completing her doctoral program, and shortly after the Internet became public, NASA asked her to help make images and movies of the sun available online. “I got hooked on working at the interface between frontier research science and engaging the public with that science,” Larson said.

Larson is currently the President and CEO of the Adler Planetarium in Chicago, which welcomes more than 500,000 guests each year. She is the planetarium’s first female in this position. According to Larson, the staff make it their full-time job to engage the public with frontier science, past and present.

Des Jardins also seeks to bring space research to the public. She is the director of the Montana Space Grant Consortium (MSGC) and NASA Experimental Program to Stimulate Competitive Research (EPSCoR). There is a Space Grant Consortium in every state in the country, and Des Jardins is one of only eight female directors.

Des Jardins is involved with offering and awarding grants to deserving Montana faculty and students and she also creates programing for youth.

“Having a part in helping someone follow his or her passion and therefore contribute to science, technology and our society is hugely rewarding,” she said.
Currently, Des Jardins is also leading the NASA Nationwide Eclipse Ballooning Project, which will happen August 21, 2017 to coincide with a total solar eclipse occurring for the first time in 40 years. In order to provide footage of the moon’s shadow sliding across the surface of the earth, dozens of balloons will be sent up from sites across the country and will send video footage live to the NASA website.

“I believe that we can make the most meaningful contributions in areas we are most passionate about,” Des Jardins said. “My passions are astrophysics, human space travel and using the excitement of space to inspire others.”

“Many point out the importance of gaining experience at different institutions throughout their advanced education,” she said. “I don’t discredit that view, but for me I am thankful for my valuable education at MSU in all its various forms. That education was the foundation for who I am as an educator, administrator, researcher and citizen.”

“Since I received my first book about space in grade school, I’ve wanted to be involved in space in some way. For a while, I wanted to be an astronaut.”

– ANGELA DES JARDINS
BEING HUMAN:
ANTHROPOLOGY ALUM RECEIVES FELLOWSHIP TO PURSUE DOCTORAL STUDIES AT HARVARD

“What’s beautiful about anthropology is that the discipline has infinite room to expand its knowledge because being human is a complex experience.”

–MICHAEL RUIZ
Michael Ruiz, a 2016 graduate of the Department of Sociology and Anthropology, received a National Science Foundation (NSF) Graduate Research Program Fellowship that he is using at Harvard University to study how cell and tissue mechanics impact the evolution of human bodies.

Ruiz, of Los Angeles, is pursuing his doctorate at Harvard. He said the fellowship, which provides $34,000 a year for three years, will allow him to concentrate solely on his research.

“The fellowship provides me a means to stay focused on my studies and what I’m going to contribute to the field,” he said. “It provides me with a professional network and professional development opportunities. It’s an amazing program.”

Ruiz added that the three-year award from the NSF will piggyback on the financial aid package he received from Harvard that provides him with five years of funding for his doctoral courses and research.

At Harvard, Ruiz is working in noted paleoanthropologist Daniel Lieberman’s Skeletal Biology and Biomechanics Lab. He is studying how cells in the skeletal system and tissues change in response to mechanical loading—applied forces to bodies and their natural resistance to those forces—and other physical forces and how those changes influence physiology and human development over time. Additionally, he is studying what ailments, such as osteoarthritis, humans might be exposed to from the impact of mechanical loading.

“I’m interested in how our post-industrial era environment and way of living are influencing our bodies; specifically, what the impacts are to our skeletal biology,” Ruiz said. “How is sitting at a desk all day going to affect you over long periods of time? Will you get osteoarthritis because of it or because you’re typing 100 words a minute nearly every day for 20 years?”

“Those are the types of things I want to understand. I have a million questions about the human body.”

Lieberman, professor of biological sciences and chair of the Department of Human Evolutionary Biology, is known for his research in mismatch diseases, a theory that human bodies, still in their hunter-gatherer state, have not yet evolved enough to be well-suited for today’s way of living.

Through his work, Ruiz is searching for answers on what it means to be human from a biological and mechanical perspective, which led him to focus on physical anthropology.

“Traditional North American anthropology didn’t fit what I wanted to do, so I found a way to balance my research interests with my courses and ensure they would satisfy my degree requirements and intellectual goals,” he said. “What’s beautiful about anthropology is that the discipline has infinite room to expand its knowledge because being human is a complex experience.”

During his junior year at MSU, Ruiz’s research into a technique to speed up the process of defleshing bones was published in the International Journal of Arts and Science. He was invited to present his findings at Harvard Medical School and at the Young Forensics Scientists forum at the American Academy of Forensic Sciences, under the mentorship of Jack Fisher, MSU associate professor of anthropology.

In 2014, Ruiz spent a year on a student exchange to Stony Brook University in New York to take courses in physical anthropology not offered at MSU. At Stony Brook, he was part of a research team that studied how and when in evolutionary history human ancestors began to walk upright. The research was published in the proceedings of the annual meeting of the American Association of Physical Anthropologists.

For his contributions at Stony Brook, Ruiz received the Wendel Wickland Student Achievement Award, given to students who demonstrate the best use of their exchange participation.

This year, Ruiz was named an IDEAS Scholar, a recognition given by the American Association of Physical Anthropologists to a young minority scholar who is increasing diversity in evolutionary anthropological sciences.

Ruiz chose to major in anthropology at MSU when his instructor explained the fundamental question of anthropology is “What does it mean to be human?” This resonated with Ruiz, who overcame depression and homelessness before enrolling at MSU in fall 2011.

“I didn’t have many supportive mentors growing up,” Ruiz said. “Not that they didn’t want to see me go to college and finish high school (which I didn’t), they just didn’t know how to support what I wanted to do.”

As a first-generation college student, Ruiz said he didn’t have the advantages his peers with college-educated family members had.

“They were able to pool resources and support during their college experience because it’s built into their family unit,” he said. “I didn’t have that, so it was quite strange telling my Hispanic working-class family that I wanted to become a scientist.”

“MSU provided me with a forum, a space and a team to empower myself through education,” Ruiz said.

After earning his doctorate, Ruiz plans to apply for a National Institutes of Health award that funds biomedical research for post-doctoral students and plans a future career in research and development.

Excerpted from Denise Hoepfner, MSU News Service
A Keeper of Knowledge

A VOICE FOR THE LAND AND PEOPLE

By Jessianne Wright
Graduating from MSU in 2015 with a master’s degree in Native American Studies, Marsha Small is a cultural preservationist, activist and keeper of knowledge. A grandmother in her 50s, Small’s recent work and activities position her alongside her ancestors.

Locating a Voice
Small grew up on a ranch on the Northern Cheyenne Reservation in Montana and after graduating from high school in 1976, she moved to Oregon to raise her daughter as a single mother. She returned to Lame Deer in 2002 in order to earn an associate’s degree from Chief Dull Knife College, which she followed with a bachelor’s degree in environmental studies from Southern Oregon University (SOU) in 2009.

“While I was at SOU, I learned how to become a voice of the people,” she said.

“I seriously would not talk in class,” Small described. At a SOU conference on education, a speaker called on Small to share her thoughts. “I literally saw rainbows, prisms. I couldn’t get the stutter out of my throat,” she said smiling. “Finally I got the stutter out of my throat… I said, ‘Never be afraid to speak. Never be afraid to share knowledge’."

Small pressed on with her education and came to MSU in 2012, compelled by a sense that an undergraduate degree just wasn’t enough. While studying at the university, she began an extensive research project that used ground-penetrating radar to map the unmarked grave sites of American Indian children who died while attending government-run Indian boarding schools.

These boarding schools operated during the late 1800s and early 1900s in order to forcefully assimilate American Indians into a growing white society, described in 1892 by Army officer Richard Pratt as “kill the Indian…save the man.”

“I locate the voice of the children,” Small said. For her master’s degree, Small studied a cemetery outside of Salem, Ore. Now she is looking to expand this project to 23 off-reservation cemetery sites across the country—locations where many graves were left unmarked and where many children, some as young as six, faced physical and sexual abuse.

“When I go to sleep at night I can hear their echoes, their voices… ‘We have work to do yet. We have work to do yet’,” she said.

A Voice of the People
In addition to locating children’s voices of the past, Small is eager to bring a voice to people today.

“If we continue racism discourse—’I’m black, I’m white, I’m brown, I’m yellow, I’m red’—I don’t think we can heal as a people,” Small said. “Without unified healing, you can’t go on to tomorrow.”

Small is a non-tenure track instructor in the Department of Native American Studies and this fall she is teaching NAS 205, “Native Americans in Contemporary Society.” This comes after outreach efforts working on two contemporary issues campaigns.

In 2015, Small worked as the Montana tribal outreach associate for the National Wildlife Federation in an effort to return free-ranging bison to regions in southeast Montana. She visited with people from tribes across the state, working to make native voices heard.

In an August 2015 letter published in the Helena, Mont. Independent Record, Small wrote, “To the people whose roots run deepest in Montana, almost nothing has inflicted more environmental and economic harm than eliminating wild buffalo.”

Small also worked on the successful effort to recognize Indigenous Peoples Day as an alternative to Columbus Day, both in the city of Bozeman and at MSU. This effort stems from growing criticism of Columbus Day and the recognition of the Italian explorer who, along with his successors, inflicted atrocities on indigenous peoples in North and South America in order to dominate and colonize the land.

October 10, 2016 marked the very first Indigenous Peoples Day at MSU and with this change, Small said, “We can celebrate all indigenous people.”

“We have to unify, we have to heal as a people,” she explained. “But I don’t think we can do that without recognizing where each person came from. It’s not that you have to hand back all the land…but know the history, the people that were there before.”

“Not only that,” she added, “but bring your own culture with you. I’m Scottish, I have my great grandfather’s bagpipes’ or ‘I have my family memorabilia.’ Bring your country, bring your people, your culture, your customs, your specific distinctions. Bring your people with you,” Small said.

“We are all on indigenous lands. So if you have land now, know the history, develop that connection. That’s your responsibility.”
College of Letters and Science alumnus Joseph Azzarelli won a prestigious business plan competition with a noninvasive, low-cost lung cancer screening technology that he played a key role in developing.

Azzarelli, who earned a bachelor’s degree in chemistry from MSU in 2010, shared the $100,000 grand prize at Massachusetts Institute of Technology’s 27th annual Entrepreneurship Competition with his teammates, three Harvard University students. The “$100K,” as the widely recognized competition is known, was held in May, while Azzarelli was completing his doctorate in chemistry at MIT.

Azzarelli co-invented the winning technology, called the Chemically Actuated Resonant Device (CARD), which is a postage stamp-sized sensor capable of detecting gases that indicate the presence of lung cancer. Similar to a breathalyzer, the lung cancer-specific CARD measures the quantity of those gases when a patient blows on it.

Azzarelli took a leading role in developing a low-cost interface that allows the detection results to be easily read by a smart phone or other mobile device.

“Ease of access to the technology was really the motivating factor,” he said.

Azzarelli and the team won over the $100K’s panel of judges, which consisted of high-level entrepreneurs and venture capitalists, by describing how single-use CARD devices could be manufactured for less than $1 each and produce results 10 times more accurate than CT scanning, an expensive process currently used for lung cancer screening. Lung cancer is the leading cancer worldwide, causing an estimated 1.6 million deaths annually.

The $100K prize is a capstone for the team, which won or placed as finalists in 10 other business plan competitions this year.

While at MSU, Azzarelli received the Barry M. Goldwater Scholarship for outstanding students in mathematics, the natural sciences and engineering.

“The ability to think critically and holistically about challenges really stems from the form of education that I received at MSU,” he said. “While technology can transform how we approach problems, I learned from interactions with my early mentors that ultimately it’s only one piece of the solution. When you get to the bottom of it, you really want to be answering the question: ‘Will this proposed solution, overall, bring value to society?’ It seems there is never a definitive answer to that question. But it’s a key motivating premise on which to iterate and evolve a concept that, hopefully, can ultimately be put into practice.”

“Thinking about how to commercialize technologies in a way that is meaningful, that benefits humanity—that has proven extremely fulfilling for me. I am thankful for the many mentors and friends who have helped, and continue to help, along the way,” he added.

Excerpted from Marshall Swearingen for the MSU News Service
Some people get a thrill by clicking into skis as snow wafts down through the air. Other people enjoy the comfort of a big couch and engaging prose. For Nina Erickson, it’s travel. Twenty-four-year-old Erickson opened the Treasure State Hostel in downtown Bozeman on November 19, 2015, one year after graduating from Montana State University. And one of the first things you’ll see as you walk down the stairs to the office is a decal stuck to the wall: “Traveling is the only thing you buy that makes you richer.” An avid traveler, Erickson has visited all seven continents, and was recently in Belize.

Erickson enrolled at MSU, majoring in cell biology and neuroscience, but after two years she realized it wasn’t right for her. “I couldn’t really find a big passion,” said the Bozeman native. “So I took a year off and I went travelling. I decided that if I was going to go back to school and finish my degree, I wanted to do something that incorporated international studies.”

Erickson returned to the university the following year and eagerly enrolled in the Global and Multicultural Studies Option offered through the Liberal Studies Program. She specialized in Asia as her area of study, inspired by her relatives from Japan. “Japanese is a really hard language to learn,” Erickson laughed. “I wouldn’t be nearly as motivated if I didn’t have family members who speak it.”

She graduated during the fall semester in 2014 and right away took to the road again. Erickson traveled to Antarctica and the Patagonia region of South America, then moved to California for a few months. Not long and she was boarding an airplane once again, this time visiting Turkey and Israel. “Then I came home and figured I should start looking for something,” she laughed. While taking lunch with her parents, they asked her, if she could do anything, what would she do? “I said, ‘I’d open a hostel.’”

“I’d traveled quite a bit by myself and I stayed in quite a few hostels,” she explained. “I loved the atmosphere. I loved the people. I loved how it’s affordable… I always thought someday I’d open a hostel.”

That notion of someday came true for Erickson just over a year ago. With 16 rooms, Treasure State Hostel can accommodate up to 40 people at one time and in its first year of operation, Treasure State had many nights at full capacity. “It’s a little hard, because we’re the only hostel in Bozeman, to have to turn away some people, but for the most part, it’s been really fun,” Erickson said.

“The people I get to meet. The stories I get to hear…Meeting people from all over the world and having a good time showing them all over Bozeman. That’s definitely my favorite part of owning the hostel,” she said.
Daniel Zizzamia, who earned his doctorate in history from MSU in 2015, was one of just a half-dozen scholars to join Harvard’s Environmental Fellows Program this fall. And one of the program’s few historians.

The two-year program invites recent doctoral graduates to Cambridge, Mass., to use Harvard’s resources to take on complex environmental issues.

“It’s an amazing opportunity, and I’m really excited about it,” said Zizzamia, who graduated from the Department of History and Philosophy.

Zizzamia studies environmental history, specifically that of the American West and how coal and fossil deposits have driven the civilization and identities of people west of the Mississippi.

Originally intending to study energy history on a more international scale when he came to MSU seven years ago, Zizzamia found himself instead wrapped up in western survey reports from the late 1800s and early 1900s.

Geologists and paleontologists of the time had discovered that during the Cretaceous Period, about 145 million to 65 million years ago, the middle of North America had been covered in a broad, shallow sea and had a tropical climate. Zizzamia was fascinated by the reports’ oddly florid descriptions of the ancient seaway.

“The West had been considered a great American desert for so long, a barrier to civilization, he said. “Now there was an opening, hope that the area was not what people had seen, but that it had some virtues.”

Boosters, scientists, the railroads and more used those promising descriptions to overcome Americans’ perception of the arid West, creating the image of a land ripe for settlement and exploitation.

A corresponding growth in industrialization—driven by coal—helped spur Americans’ dream of creating a lush, rich West, he said.

“There’s a natural malleability to the West,” Zizzamia said. “There was a lot of effort put into making the area what Americans wanted it to be.”

And coal played an important role.

“The settling of the American West would have been vastly different if not for the coal,” he said. “It became very much a part of American identity, the presumed abundance—the American nation has really been built on abundance.”

Zizzamia, 32, earned his bachelor’s and master’s degrees in his home state of Connecticut, and then worked in information technology. But after a while, he found that academia was calling him back.

So like the settlers he would later come to study, he looked west to MSU and joined its relatively young doctoral program in history, where he studied under—and taught with—professors like Tim LeCain, Michael Reidy and Brett Walker, who came to know him as a passionate educator and researcher dedicated to social justice and environmental sustainability.

“Dan cares about changing the world through his work,” wrote Reidy who co-chaired Zizzamia’s dissertation committee. “He writes that way, participates in seminars that way, teaches courses that way, worries about the future that way.”

LeCain, Zizzamia’s other dissertation co-chair, and Susan Cohen, the department chair, said Zizzamia’s fellowship at Harvard is a powerful endorsement of the history department and its graduate program. His other dissertation committee members were professors Robert Rydell, Mark Fiege and Walker.

“This is hugely prestigious,” LeCain said. “If you look at all the other environmental fellows he’ll be joining, every single one of them is from an Ivy League school. So what this says is that what Daniel and the department of history are doing here at Montana State is on par with anything happening at Yale or Princeton.”

“To have someone from a relatively young Ph.D. program at MSU win a fellowship like this says volumes about MSU’s program and the students coming here to study with the faculty,” Cohen said.

Zizzamia hopes to use his two years at Harvard to transform his doctoral dissertation into a book. He said his ideas have repercussions outside of history, as America ponders new challenges.

“It has to do with how we understand geo-engineering, future energy and climate policy, how we understand baselines,” he said. “Our discussions of colonizing Mars have been very similar to discussions of the American West.”

Excerpted from Denise Hoepfner, MSU News Service
TWO CLS STUDENTS RECEIVE PRESTIGIOUS GOLDFWATER SCHOLARSHIPS

In 2016, two students majoring in the College of Letters and Science received the prestigious Goldwater Scholarship, the nation’s premier scholarship for undergraduates studying math, natural sciences and engineering.

Zane Huttinga from Amsterdam, Mont., is majoring in mathematics and works with a team of researchers applying existing mathematical models to gene regulatory networks. After graduation, he plans to attend graduate school and ultimately go into research in mathematics, possibly in topology or functional analysis.

Josh Carter from Watertown, S.D., is a microbiology major (with a second major in mechanical engineering) and is part of a research team working to understand the mechanisms bacteria use to defend themselves from infection by viruses. Carter said his future plans include pursuing an advanced degree in biomedical engineering and specializing in prosthetics development.

Both recipients, who are also MSU Honors College students, will receive up to $7,500 a year for tuition, fees, books, and room and board.

MSU has now produced 67 Goldwater scholars, keeping the university one of the nation’s top institutions for number of recipients. Of MSU’s Goldwaters, 45 (67 percent) have gone to students majoring in the College of Letters and Science.

Excerpted from MSU News Service

CLS STUDENT AWARDED PRESTIGIOUS UDALL SCHOLARSHIP

Montana Duke Wilson of Poplar, Mont., was selected as a 2016 Udall Scholar in recognition of his service to his tribal community. Wilson, who is currently a senior double majoring in economics and political science with a minor in Native American studies, is an enrolled Gros Ventre of the Fort Belknap Indian Community and a member of the Assiniboine and Sioux tribes of the Fort Peck Indian Reservation.

Before coming to MSU, Wilson interned in the public defender’s office of his reservation’s Tribal Council where he wrote motions and briefs. He was so successful that the court administrator suggested he take the Tribal Bar exam as an “educational experience.” He passed the Bar and became a lay advocate for the council, winning a lawsuit against a tribal court judge accused of violating juveniles’ rights in her court.

Wilson next accepted a promotion as a deputy chief prosecutor. He was assigned to adult criminal court and also oversaw juvenile court, arrainging as many as 200 people a week, handling a number of pre-trials, bench and jury trials, and responding to motions.

After graduation, Wilson plans to work on the reservation for a year or two before heading to graduate school to study economic development. Ultimately, he wants to focus on economic development for Native nations to better life on the reservation.

“It’s about what we can do as a community to inspire hope, which is lacking in our communities,” Wilson said. “This hope can be built by strengthening and building up our institutions.”

The Udall Foundation is an independent federal agency that Congress established in 1992 to provide federally funded scholarships for college students intending to pursue careers related to the environment, as well as to American Indian students pursuing tribal public policy or Native health care careers. Udall Scholars receive $7,000 to use toward academic expenses.

Excerpted from Denise Hoepfner, MSU News Service
DOCTORAL STUDENT AWARDED NSF FELLOWSHIP TO RESEARCH IMPACT OF INTERACTIONS BETWEEN PLANTS, FIRE AND CLIMATE

Kristen Emmett, a doctoral student in the Department of Ecology, was awarded a National Science Foundation Graduate Research Program Fellowship, which gives her an annual stipend of $34,000 for three years to conduct her research.

Emmett uses a computer model based on how plants grow, compete and respond to disturbances to build “virtual” forests. She then subjects her forests to different climate and greenhouse gas conditions to see how the vegetation and fire regimes respond. Emmett said previous research in the Western U.S. has considered the effects of climate and fire on forests, but leaves out the feedback effects of forests on both climate and fire. One aspect she is interested in is how vegetation might influence fuel conditions and end up limiting fire in the future.

Emmett says she hopes her research data will provide insight for public land managers who, with limited information, are tasked with developing climate change adaptation plans for the federal and state lands they oversee. It could also benefit private landowners who are trying to manage their land.

Among contributors to her success, Emmett said, are MSU’s faculty, coursework and computing infrastructure. “The courses I’ve taken have directly informed my research; they’ve provided me with the background knowledge I need to understand the ecological processes I’m trying to represent,” she said. “Predominantly, my coursework has been in ecology, but I also took a statistics course through the math department and it was excellent. I use these and other quantitative methods I learned every day.”

After earning her doctorate, Emmett says she hopes to work as a research ecologist.

Want to know more? www.montana.edu/news/16264

Excerpted from Denise Hoepfner, MSU News Service

STUDENT SCIENTIST WINS NASA FELLOWSHIP TO EXPLORE EARLY LIFE ON EARTH, OTHER PLANETS

Melody Lindsay, a graduate student who wants to better understand early life on Earth and the potential for life on other planets, has received a one-year, $30,000 fellowship from NASA, with the potential to renew it for two additional years.

Lindsay, who is a doctoral student in the Department of Microbiology and Immunology, said the Earth and Space Science Fellowship will allow her to continue sampling hot springs in the world-class laboratory known as Yellowstone National Park. Besides examining the influence of hydrogen on microorganisms that thrive in the extreme conditions of the Norris Geyser Basin and other thermal areas, she will use her fellowship to analyze and present her findings at the NASA AbSciCon conference and, potentially, other scientific conferences.

Although she encountered a grizzly bear and two cubs on her first day in Yellowstone, Lindsay said the opportunity to study extremophiles in Yellowstone National Park is incredible.

Before coming to MSU, Lindsay earned her bachelor’s degree in ecology and evolutionary biology from Princeton University. A harpist as well as a scientist, Lindsay attended Princeton with a $50,000 fellowship from the Davidson Institute for Talent Development. Saying science won out over music, she nevertheless continues to play the harp for the Great Falls and Billings symphonies.

Want to know more? www.montana.edu/news/16244

Excerpted from Evelyn Boswell for the MSU News Service
FACULTY HIGHLIGHTS

EARTH SCIENCES PROFESSOR RECEIVES GEOSCIENCES EXCELLENCE AWARD

Earth sciences professor Cathy Whitlock received the Association for Women Geoscientists Professional Excellence Award in the academic/research category. The award recognizes exceptional women who have made distinguished contributions in their professions throughout their careers.

Whitlock, who is also a director and founder of the Montana Institute on Ecosystems, has worked with 35 Ph.D. and master’s students throughout her career and about two-thirds of them are women. “I am very honored to receive an award that recognizes my research and mentoring contributions in the geosciences,” Whitlock said.

Whitlock is nationally and internationally recognized for her scholarly contributions and leadership activities in the field of past climatic and environmental change. She and her students pull sediment cores out of lakes and use them as a storyboard for understanding the past. The pollen and charcoal preserved in the layers of lake sediments offer a rich history of vegetation and fire conditions over thousands of years. This information is used to study past climate change and its ecological consequences; by understanding how past climates affected vegetation and fire, scientists can better understand how today’s changing climate will affect current and future ecosystems.

Her research has been described in more than 150 scientific papers, and her current research projects extend from Yellowstone and the Western U.S. to New Zealand, Tasmania and Patagonia.

Excerpted from Melynda Harrison for the MSU News Service

MSU HISTORIAN RECEIVES PRESTIGIOUS AWARD FOR AMERICAN STUDIES SCHOLARS

Robert Rydell, professor of history in the Department of History and Philosophy and in the interdisciplinary American studies program at MSU, is the 2016 recipient of the Mary C. Turpie Prize from the American Studies Association. The Mary C. Turpie Prize, established in 1993, is given to the candidate who has demonstrated outstanding abilities and achievement in American studies teaching, advising and program development at the local or regional level.

“He is the author of 10 books and edited volumes including Designing Tomorrow: America’s World’s Fairs of the 1930s, which was edited with Laura Schiavo and published by Yale University Press in 2010. He has also authored 25 journal articles and book chapters. He is currently writing a history of MSU’s past 25 years that will be published in 2018 as part of MSU’s 125th anniversary celebrations.

Rydell served as the co-project director on four “Teaching American History Grants,” funded by the U.S. Department of Education. Each averaging $1 million, the first grant was awarded in 2002 and concentrated on the chronological treatment of history from Lewis and Clark through World War II. The second focused on Gallatin County and helped teachers use biographies to teach history. The third was awarded in 2007 and emphasized the significance of the American West in understanding American history. The final grant was awarded in 2010 and was used to train additional teachers on how to incorporate biographies into their courses.

Excerpted from Melynda Harrison for the MSU News Service

CONFLUENCE College of Letters and Science 2016–2017
ENVIRONMENTAL HISTORIAN NAMED WALLACE STEGNER CHAIR

Mark Fiege, a historian known for his writing and scholarship about the environment of the American West and the country’s national parks, was selected as the Wallace Stegner Endowed Chair in Western American Studies at MSU in 2016. Fiege’s appointment to the chair is a tenured full professorship and permanent position in the Department of History and Philosophy.

“I am thrilled that we have been able to attract a scholar of Mark’s stature to MSU,” said Nicol Rae, dean of the College of Letters and Science. “Mark’s appointment to the Stegner Chair in tandem with our new Western Lands and Peoples Initiative will establish MSU as a center of excellence for the study of the past, present and future of the North American West.”

Fiege’s academic degrees, all in history, include a bachelor’s degree from Western Washington University, a master’s from Washington State University and a doctorate from the University of Utah. Before coming to MSU, he taught at Colorado State University (CSU) since 1994. Fiege co-founded the CSU Public Lands History Center. He also was co-founder of Parks as Portals to Learning, an interdisciplinary research and learning project at CSU in collaboration with National Park Service staff at Rocky Mountain National Park.

An imaginative and wide-ranging writer, Fiege recently co-edited the anthology, National Parks Beyond the Nation: Global Perspectives on “America’s Best Idea,” with Adrian Howkins and Jared Orsi. The book was published this year by the University of Oklahoma Press. He is the author of The Republic of Nature: An Environmental History of the United States, published in 2012 by the University of Washington Press and Irrigated Eden: The Making of an Agricultural Landscape in the American West, published by the University of Washington Press in 1999. That book was the co-winner of the Charles A. Weyerhaeuser Award from the Forest History Society.

Fiege has also published scholarly papers and articles about Western environmental history including “The Weedy West: Mobile Nature, Boundaries, and Common Space in the Montana Landscape,” published by the Western Historical Quarterly. The article won several prizes including the Theodore C. Blegen Award from the Forest History Society, the Wayne D. Rasmussen Award from the Agricultural History Society, the Alice Hamilton Prize from the American Society for Environmental History and the Oscar O. Winther Award from the Western History Association.

Fiege is currently working on the book Elegant Conservation: Resource Management in a Time of Unprecedented Uncertainty, in partnership with Ben Bobowski, superintendent of Wrangell-St. Elias National Park and Preserve. Fiege explained that the concept for the book is based on his observation that despite the dissension in the country about many matters—characteristic of the so-called “Age of Fracture”—there is considerable grassroots activity and cooperation in conservation and resource management. He has termed this phenomenon “Elegant Conservation,” which describes “efforts to foster pragmatic, pluralistic, socially responsive, process-oriented methods that rise above fears of collapse.”

The Wallace Stegner Endowed Chair in Western American Studies at MSU continues the legacy of the late Wallace Stegner, the Pulitzer Prize-winning novelist, short story writer, environmentalist and historian who is now often called the “Dean of Western Writers.” Stegner spent part of his childhood in Montana, and he notably spoke at MSU shortly before his death in 1993. The Stegner Chair focuses on teaching and research in history, literature and philosophy with a concentration on pressing issues in the Western U.S. and is supported by the Stegner Chair Endowment.

Excerpted from Carol Schmidt, MSU News Service
**2016 AWARDS**

**L&S Dean’s Award for Meritorious Research and Creativity**
Tami Eitle, Department of Sociology and Anthropology
Kristen Intemann, Department of History and Philosophy

**L&S Outstanding Teaching Awards**
Linda Karell, Department of English (Tenure Track)
Chris Bahn, Department of Chemistry and Biochemistry (Non Tenure Track)
Torrey Lynch, Department of English (Graduate Teaching Assistant)
Danielle Pettry, Department of Mathematical Sciences (Graduate Teaching Assistant)

**L&S Kathy E. Griffith Employee Excellence Award**
Lisa Stevenson, Department of Native American Studies
Tamara Moe, Department of Agricultural Economics and Economics

**Betty Coffey Outstanding Achievement Award**
Bridget Kevane, Modern Languages and Literatures

**Spirit of Discovery Award**
Brian Bothner, Chemistry and Biochemistry

**Cox Faculty Award for Creative Scholarship and Teaching**
Patricia Simpson, Modern Languages and Literatures

**Outstanding Academic Advising Award**
Kari Cargill, Microbiology and Immunology

**Provost’s Award for Undergraduate Research/Creativity Mentoring**
Douglas Downs, English

**Provost’s Award for Graduate Research/Creative Mentoring**
Robert Walker, Chemistry and Biochemistry

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**MSU PROFESSORS RECEIVE GRANT TO STUDY RURAL VICTIM SERVICE PROVIDER NEEDS**

Kelly Knight and Colter Ellis, both assistant professors in the Department of Sociology and Anthropology, study the health and well-being of those who provide services to victims of domestic violence, elder abuse, child abuse and neglect, sexual assault and other kinds of abuse. A new two-year, $25,000 grant from the Montana Healthcare Foundation will allow them to expand their research to examine health disparities and victim service provider needs among American Indians in Montana.

Knight and Ellis began their latest research after a tribal member contacted them about addressing needs and issues common among victim service providers on the reservation, Knight said. The project will foster strategic planning partnerships among American Indian victim service providers and create a culturally responsive “toolkit” for addressing secondary trauma, or the acute stress that service providers themselves often face when helping victims, Ellis said.

The project uses what researchers call a community-based participatory research framework, which generally starts with identifying a topic of importance to a community before going on to develop an equitable partnership between a research team and the community. Ultimately, the research is intended to combine knowledge and action to create meaningful and sustainable change.

Knight said little is known about victimization and its detrimental effects on health disparities in rural Montana. But early results from Ellis and Knight’s research suggest that one of the biggest challenges is related to the professional and volunteer service providers who may be isolated from one another physically but who share a common interest in helping victims. Some providers may be former victims themselves.

“People often choose these professions because of their own victimization experiences,” Knight said. “They’re working every day with people who have had profound and traumatic experiences, which can lead to trauma of their own.”

In such cases, providers can exhibit the same symptoms as primary trauma victims, she added, including significant mental and physical health problems and substance abuse. That, in turn, may jeopardize their ability to help others in rural areas where public health resources are already scarce.

Although Ellis and Knight’s newest research will focus on American Indian victim service providers, they believe the findings could apply to rural areas statewide, which are often strapped for resources. And, the research should benefit and apply to anyone who provides services for victims, Knight said. That includes police officers, lawyers, people involved in child protective services, people addressing sexual assault, healthcare professionals and advocates of various kinds.

**Want to know more?** [www.montana.edu/news/16231](http://www.montana.edu/news/16231)

Excerpted from Amanda Eggert for the MSU News Service
Associate economics professor Christiana Stoddard and assistant economics professor Carly Urban, Department of Agricultural Economics and Economics, received a $252,000 grant from the Montana Office of Public Instruction to study whether students who were exposed to financial education in high school are more likely to make better financial aid and loan decisions as they head for college.

“We want to know, ‘Do they take out more appropriate loans? Do they figure out other ways to finance their education? Are they more likely to fill out the FAFSA (Free Application for Federal Student Aid) to apply for financial aid?’” Stoddard said. “If we find that students who take financial education classes are making better decisions later on in terms of their financial aid, then that tells all schools that this is a great policy.”

Urban said they will also be taking into consideration the rural-urban makeup of the state.

“There are parts of the state that are really rural, where people might not have a lot of access to information about banking or loans or how credit markets work, and you might see different effects in those areas than in more urban areas,” she said. “And, since Montana does have so many different areas, I think it’s useful for other states to look at us and get more of a sense of how important it is for which kinds of students in which kinds of areas.”

The duo also received $35,000 from the Spencer Foundation for a one-year study building on their research on how borrowing affects academic performance among students.

“We will be examining how financial aid decisions affect a student’s college performance and completion, and things like choice of a major,” she said. “And, if a student chooses a different financial aid package, are they more likely to go into the public sector because there are incentives for that? Or are they more stressed out by their loans that they drop out sooner?”

“Our ultimate objective is to help students make better decisions so they’re more likely to finish college or less likely to default on their loans,” Stoddard said. “So, it’s figuring out the ways that policymakers or universities or high schools can influence the decisions students make. We don’t want to discourage students from going to college or taking out student loans, but we do want them to learn to make the optimum decision.”

In October 2015, research by Stoddard, Urban and Maximilian Schmeiser, a former senior economist with the Federal Reserve Board, was featured on national television by Brendan Greeley, senior correspondent at Bloomberg News and co-anchor of Bloomberg Television’s “Bloomberg Surveillance.” Greeley highlighted their paper, “Does Salient Financial Information Affect Academic Performance and Borrowing Behavior among College Students?” in the Bloomberg Markets segment of the show. The paper was published in the Federal Reserve’s Finance and Economics Discussion Series in 2015.

Want to know more? www.montana.edu/news/15934/
Excerpted from MSU News Service
Thom Hughes, a professor in the Department of Cell Biology and Neuroscience, is part of a team that has published findings on the development of an improved tool for understanding the workings of the brain. The tool, called genetically encoded voltage indicators, or GEVIs, is a biotechnology that enables researchers to see the electrical activity of individual neural cells “light up” when active.

“Imagine staring at a living brain and watching the billions of cells within it twinkling like stars as they talk with one another. This has been the dream of neuroscientists for many years,” said Hughes. This dream of watching the cells of the brain is close to being realized through the concerted efforts of neuroscience laboratories across the world, of which MSU is a part, he added.

The technology has the potential to allow researchers to study brain function with far greater fidelity than other technologies such as functional MRI, which detects changes in blood flow.

Hughes, along with colleagues at the Yale University School of Medicine and Korea Institute of Science and Technology, summarize recent advances in GEVIs in an article published in the April issue of the journal *Trends in Neurosciences*.

While functional MRI and other technologies have led to an understanding of which parts of the brain correspond to certain behaviors and thought processes, the working of the brain’s billions of neurons—tiny, interconnected cells that transmit information through electrical and chemical signals—remains largely a mystery.

“Functional MRI is like asking, ‘Is the action in New York or Boston?’” said Hughes. With GEVIs, “we’re asking about the actual intersections and streets.”

GEVIs are made by fusing the genes that cause fluorescence from jellyfish and other sea creatures to the genes encoding voltage-sensitive proteins. The final product, a synthetic fusion gene, can then be introduced into neurons through a virus, or stably inserted into the genome of a mouse or rat. The results are nerve cells that flash when the cells are involved in a thought.

Hughes’ Molecular Motion Lab at MSU has been working since 1993 in the field and has pioneered the production of the new generation of GEVIs described in the *Trends in Neurosciences* article. The GEVIs Hughes’ lab produces for research at Yale University School of Medicine and other universities is helping advance brain research around the globe.

“Making these genes is not trivial; it involves a great deal of synthetic DNA work, which is what my lab does, coupled with extensive testing in many different kinds of neurons,” Hughes said.

“The work begins here in Bozeman, where the team builds new genes. The DNA is then shipped to laboratories all over the world that test the resulting protein sensors in many different kinds of cells. Video conferencing with sites in South Korea, Japan, Washington D.C. and Paris makes it possible to share results quickly, redesign promising prototypes, and then my lab goes back to work making the next generation,” Hughes said.

Another important advancement of the group has been the development of specialized optics, typically inserted into the brain using tiny probes, to observe in real-time how a small set of neurons light up when a rat navigates a maze, for example.

“We’re slowly getting bigger and brighter signals,” said Hughes. Hughes and his international research team hope to soon use GEVIs to simultaneously record thousands of neuron interactions during complex behavior or thought.

Hughes’ team is supported in part by the National Institutes of Health’s BRAIN Initiative, a public-private collaborative announced by President Barack Obama in 2013 that includes scientists from across North America, Europe, Asia and the Middle East. U.S. universities involved include Harvard, Caltech, MIT, Stanford, Columbia and MSU.

The BRAIN Initiative has channeled substantial funding from private foundations and federal agencies, including the National Science Foundation, toward its stated goal of “revolutionizing our understanding of the human brain.”

“Professor Hughes’ group of colleagues and collaborators is one of the leading groups in the world for developing genetically encoded sensors,” said Frances Lefcort, professor and former head of the Department of Cell Biology and Neuroscience.

“My generation was raised thinking that we could never really understand how the circuits in the brain work, that the problem was just too hard,” Hughes said. “Now we’re at a really special moment in history, because we actually have the tools and the willpower to try.”

*Excerpted from Marshall Swearingen for the MSU News Service*
MSU professor Thom Hughes, left, research professor Mikhail Drobizhev and Ph.D. student Lauren Barnett study a petri dish containing proteins in Hughes' laboratory in Bozeman.
STUDY SHOWS BAT DEATHS WORLDWIDE RISING DUE TO HUMAN CAUSES

Raina Plowright, assistant professor in the Department of Microbiology and Immunology, co-authored a new study that found that bat deaths worldwide are markedly rising due to human causes largely unique to the 21st century. Specifically, collisions with wind turbines and the outbreak of white-nose syndrome—a fungal disease that infects the skin of hibernating bats—lead the reported causes of mass death in bats since 2000.

The research, funded by the National Institutes of Health, and led by United States Geological Survey (USGS) scientists, was published earlier this year in *Mammal Review*.

Plowright was one of five scientists who combed through more than 200 years of scientific literature dating back to 1790 in search of reports of mass mortality events of bats. The researchers found 1,180 such incidents worldwide, more than half caused by humans.

That’s significant, said Plowright, who has degrees in veterinary medicine, epidemiology and ecology.

Plowright said bats are long-lived, slow-breeding mammals that play vital roles in most of Earth’s ecosystems. Bats are important pollinators and seed dispersers in tropical regions, and they serve as the main predators of night-flying insects in most parts of the world. Insect-eating bats are estimated to save farmers billions of dollars each year by providing natural pest control.

But the causes of bat mortality have not been reviewed since 1970. And because bats are well-adapted to survive in their natural habitat, human-caused mortalities can be more devastating than naturally occurring ones, which tend to be more diffuse.

“Many of the 1,300 species of bats are already considered threatened or declining,” said Tom O’Shea, a USGS emeritus research scientist and the study’s lead author. “The new trends in human-related mortality may not be sustainable.”

Researchers found that prior to the year 2000, intentional killing by humans caused the greatest proportion of mortality events in bats globally; the reasons varied with region, but bats were hunted for human consumption, killed as pests, to control vampire bats and to protect fruit crops. Although the proportion of intentional killing reports declined in recent times, such acts continue in some parts of the world.

Since 2000, however, collisions with wind turbines worldwide and white-nose syndrome in North America are the primary reported causes of mass mortality in bats. In addition, storms, floods, drought and other weather-related factors also historically caused mass mortality, and could increase in the future due to climate change.

Surprisingly, the authors did not find convincing evidence that bats regularly die in large proportions due to infectious diseases caused by viruses or bacteria. This finding comes at a time when increasing evidence points to bats as natural reservoirs of several viruses that cause disease in humans. Despite often being more social than other animals, bats may somehow avoid deaths from diseases that sweep through dense populations, the researchers said.

Plowright, who hails from Australia, is concerned about the future health of the world’s bat populations.

“Bats cannot easily rebound from mass mortality events, and climate change may create additional stressors on bat populations,” Plowright said.

The researchers conclude that bats could “benefit from policy, education and conservation actions targeting human-caused mortality.”

Plowright, who joined MSU’s faculty in fall 2014, teaches in the WIMU Regional Program in Veterinary Medicine, which is a cooperative program between MSU, Washington State University, the University of Idaho and Utah State University.

“Raina brings an absolutely unique, internationally recognized infectious disease ecology research program to the department and MSU,” said Mark Jutila, professor and head of the Department of Microbiology and Immunology. “Her research is focused on emerging diseases of wildlife with potential for spillover into livestock and humans, which is of particular relevance in Montana.”

In addition to Plowright and O’Shea, co-authors of the study were Paul M. Cryan with USGS, David T.S. Hayman with Massey University in New Zealand and Daniel G. Streicker with the University of Glasgow in Scotland.

Excerpted from Jodi Hausen for the MSU News Service, with material from the USGS.
Raina Plowright. Image courtesy of Raina Plowright.
OUTREACH

AVALANCHE WORKSHOP AND RESEARCH IMPROVES SAFETY FOR BACKCOUNTRY RECREATIONISTS

Several faculty members in the College of Letters and Science are increasing avalanche awareness, and backcountry skiing and riding safety, through a variety of outreach and research projects. Jordy Hendrikx, an associate professor in the Department of Earth Sciences and director of MSU’s Snow and Avalanche Lab, and Jerry Johnson, professor in the Department of Political Science, are collaborating to understand decision-making using a smartphone app to record how groups move in backcountry terrain.

Hendrikx and Johnson, both lifelong skiers, collect crowd-sourced data through the smartphone app SkiTracks. The app records a skier’s entire day on the mountain using global positioning (GPS) data from a skier’s phone and registers the skier’s exact location, terrain and their days’ worth of tracks. After the trip, users send their data directly to the Snow and Avalanche Lab. Users then use their smartphone to complete a short post-trip survey that asks questions about the skier’s behavior, group dynamics and decision-making for that day.

“The data collection is twofold,” Hendrikx said. “The GPS app tracks technical terrain features like slope and angle, and the survey gathers information like group size, gender and the day’s goals. We’re then able to combine geography and terrain with the behavioral side of the skier, which allows us to investigate how and when backcountry skiers make their decisions about where to ski. We essentially consider the ski track as a geographic expression of the group’s decision-making.”

In addition to avalanche research, in 2015 MSU hosted its first all-day Snow and Avalanche Workshop (SAW) aimed at MSU students, the Bozeman ski and snowmobile community and regional avalanche professionals. The free event, which was sponsored by the College of Letters and Science, the Department of Earth Sciences and the American Avalanche Association, focused on decision-making and evaluating risk on local terrain.

Participants attended talks by a variety of snow and avalanche professionals, including local avalanche forecasters from the Gallatin National Forest Avalanche Center who are important partners in the avalanche research and outreach efforts at MSU. Workshop attendees also had the chance to get acquainted with some of the best technology available, from beacons, to airbag-deploying backpacks, to smart probes and shovels.

Since MSU is one of the nation’s leading universities in training avalanche and snow-safety professionals, research posters of snow and avalanche research from the College of Letters and Science and the College of Engineering were also on display.

“The MSU Snow and Avalanche Workshop was a staggering success and is the only SAW hosted at a university—it embodies our ‘Mountains and Minds’ ethos,” said Hendrikx. “Avalanche accidents and deaths continue to be a reality in our community, but we hope that through continued efforts like this workshop, the regional avalanche forecasting and our research, that we can keep our students safe and well-prepared when they venture into Bozeman’s backcountry.”

The 2015 workshop was so successful that it was offered again in November 2016.

Want to know more?

To view a short video documenting terrain use in a backcountry area adjacent to Bridger Bowl ski area: https://youtu.be/lIuHcz4yS0I.

To learn more about the MSU Snow and Avalanche Workshop: www.montana.edu/snowscience/workshop/index.html
YELLOWSTONE WRITING PROJECT, WHERE TEACHERS LEARN TO BE WRITERS AND BETTER WRITING TEACHERS

Every summer, for the past seven years, several Montana K-12 teachers join the Yellowstone Writing Project (YWP) at MSU for a summer institute focused on writing and the teaching of writing. Participants collaborate extensively in writing workshops, and they research and present about the teaching of writing in all grade levels and content areas. This addresses a core philosophy of the program that teachers of writing must be writers themselves.

Directed by Allison Wynhoff Olsen, assistant professor, and Kirk Branch, professor and department head, in the Department of English, and Aaron Yost, a teacher at Belgrade High School, YWP works to develop a culture of professional development among teachers. YWP teachers have offered workshops for schools in the Montana communities of Bozeman, Belgrade, Livingston, Gardiner and Big Timber, and are currently supported by the Bill and Melinda Gates Foundation to assist the school district in the eastern Montana town of Savage to develop a district-wide approach to teaching writing.

“We believe in providing the resources and support for teachers to shape curriculum and instruction in the schools,” says Branch. “We trust teachers to identify challenges and work in their community to determine the best ways to address them.”

“Through my participation in YWP, I have found the courage within myself to teach the best way I know how, colleagues whose dedication to the profession astounds me, and a platform for discussion of educational issues that simply doesn’t exist in typical learning communities,” said Katie Duncan, a reading and math teacher at Sacajawea Middle School in Bozeman, who has developed and run YWP workshops in Gardiner and Big Timber.

MODERN LANGUAGES PROFESSOR RECEIVES SEED GRANT TO DEVELOP CHINESE LANGUAGE PROGRAM IN AREA ELEMENTARY SCHOOLS

Hua Li, associate professor of Chinese and interim director of the Asian Studies Program in the College of Letters and Science, received a 2016 seed grant from the MSU Outreach and Engagement Council to develop a program where MSU students teach Mandarin Chinese to students in grades K-5 at Bozeman’s Irving, Hylate and Whittier elementary schools.

The program is a partnership between MSU’s Department of Modern Languages and Literature, the Greater Gallatin United Way, Friends of World Language and World Language Enrichment and the three Bozeman elementary schools.

Through the program, elementary school students will gain exposure to Chinese language, culture, art and cooking, regardless of their ability to pay for extracurricular classes. At the same time, MSU students will gain in-classroom experience and build strong relationships with community partners.

Organizers will also study whether the program could be a replicable model that could be expanded beyond Bozeman and into other Montana communities.

Li called the seed grant “indispensable to the project,” along with the educators who will participate in the program.

“The coordinators and teachers in the three elementary schools’ world language programs—Elizabeth Williamson, Christina Clark and Karen Filipovich—play a key role in carrying out the project,” Li said.

In 2015, the Outreach and Engagement Council launched the seed-grant program for outreach and engagement activities involving faculty, students and staff in collaboration with local and regional partners. The council awards grants on a competitive basis to address the needs of citizens in Montana and beyond, and to encourage external and multidisciplinary partnerships.
Students put a fresh coat of paint on the “M.”

DEPARTMENT HIGHLIGHTS
CHEMISTRY AND BIOCHEMISTRY

Ben LaFrance, a 2014 graduate of the Department of Chemistry and Biochemistry, was awarded a National Science Foundation Graduate Research Program Fellowship that will provide him with funding to continue his research in cell division.

LaFrance, a Bozeman native, was chosen as one of just 2,000 students to receive the fellowship out of 17,000 applicants, which will give him up to $34,000 a year for three years to pursue his research.

“Over the next few years, this funding will propel my graduate research regarding cell division, as well as provide support for ideas I have about community outreach projects,” he said.

LaFrance said he also intends to use some of the funds to connect with world-class researchers by traveling to conferences around the globe in order to benefit his research.

LaFrance currently conducts his research at the University of California, Berkeley, in the lab of Eva Nogales, a Howard Hughes Medical Institute investigator and professor of biochemistry, biophysics and structural biology. At Berkeley, LaFrance uses cryo-electron microscopy to study proteins involved with cell division. These enormous cryogenic microscopes allow scientists to understand the architecture and function of proteins and, therefore, provide insight into how cells divide and pass on genetic material.

“In a human lifetime, cells divide about 1.5 quadrillion times,” LaFrance said. “If one single error occurs during that time, the cell can die or become cancerous. This research is important in furthering our understanding of the fundamental processes that drive cell division and enlightening us toward the prevention of cell death and cancer.”

LaFrance’s future plans include a hoped-for return to Montana to continue his research. He said ideal scenarios could include a position at Rocky Mountain National Lab in Hamilton, conducting research with a start-up company or a teaching position at MSU.

DEPARTMENT HIGHLIGHTS

CELL BIOLOGY AND NEUROSCIENCE

Frances Lefcort, a professor in the Department of Cell Biology and Neuroscience, was appointed as the newest Letters and Science Distinguished Professor, the highest honor the College of Letters and Science bestows upon a faculty member in the college.

She received the three-year appointment in recognition of her contributions to the college, MSU and the scholarly community.

Lefcort is a researcher of national and international stature due to her seminal contributions in the field of nervous system developmental biology. She studies how stem-like “mother” or progenitor cells multiply, migrate and differentiate into the myriad of specific cell types found in the mature nervous system.

In recent years, her work has focused on the genetic disease, familial dysautonomia, which devastates the sensory and autonomic nervous systems. Lefcort’s lab has successfully created several animal models of this disease, which will allow scientists to test a variety of drugs to treat the disease in humans. She has published more than 35 articles in some of the most prestigious peer-reviewed journals in her field, including Proceedings of the National Academy of Sciences, Nature Neuroscience and Nature Communications. Her work has been continually funded by the National Institutes of Health since 1995.

“Dr. Lefcort is an outstanding scientist whose scholarly achievements have brought international recognition to the college,” said Nicol Rae, dean of the College of Letters and Science. “We are delighted to honor her scholarship with this award.”

To see a list of past Letters and Science Distinguished Professors, please visit: www.montana.edu/lettersandscience/endowed_professorships.html.
DEPARTMENT HIGHLIGHTS

EARTH SCIENCES

In a paper published in August in the international journal *The Auk: Ornithological Advances*, David Varricchio, associate professor of paleontology, and assistant research professor Frankie Jackson examined the evolution of bird reproduction through a series of distinct stages, from pre-avian dinosaurs to the birds of today.

The MSU paleontologists suggest that the nesting habits of some Mesozoic-era dinosaurs further bolsters the theory that all birds evolved from dinosaurs that lived millions of years ago.

In an unorthodox move, Varricchio and Jackson chose to publish their work in *The Auk*, an international journal pertaining to birds, rather than in a paleontological publication, in an attempt to work toward a consensus that has divided scientists in the respective disciplines.

“Ninety-nine percent of paleontologists believe that all modern birds are dinosaurs, but, there’s still some resistance from ornithologists on that point,” Varricchio said.

That Varricchio and Jackson are inviting criticism of their work by publishing in *The Auk* shows their dedication to furthering science, said Mary Hubbard, head of the Department of Earth Sciences.

“As a department, we are proud to have David and Frankie working on such cutting-edge science and the fact that they are reaching out to scientists who might criticize their work sets a nice example for their students to see,” Hubbard said. “One of the ways that science advances is through controversy.”

David Varricchio.
ECOLOGY

Andrew Hansen, a professor in the Department of Ecology, co-authored and co-edited the new book *Climate Change in Wildlands: Pioneering Approaches to Science and Management* with the goal of helping land managers tackle issues facing America’s wildlands that are caused by climate change and land use. Island Press published the book in June.

“The book is meant to be somewhat of a primer on how climate has changed over the past century and how it is projected to change in the coming century and what that might mean for forests, wildlife and fish communities in the Rockies and Appalachian Mountains,” said Hansen, who is the lead editor of the book and author of several of its chapters.

Hansen was also the lead principal investigator of NASA’s Landscape Climate Change Vulnerability Project, the five-year research project that spurred the book’s creation.

What makes the book a unique resource, Hansen said, is that in addition to providing the latest climate change information, it also includes examples of scientists and land managers working together to come up with management solutions to deal with climate change impacts.

“We worked closely with colleagues in the National Park Service and the (U.S.) Forest Service and other federal agencies in devising what science questions should be addressed and in trying to come up with actual management actions that could be used, and then evaluating the likely outcomes of those actions so the managers have a good basis for implementing them,” he said.

Other editors of the book include Tom Olliff with the Great Northern Landscape Conservation Cooperative; William Monahan, quantitative analysis program manager at the U.S. Forest Service; and David M. Theobald, senior scientist at Conservation Science Partners.

ECONOMICS

In April, assistant professor Mark Anderson received an Arthur H. Cole Grant from the Economic History Association for his project, “Technological Innovation and Health: Evidence from the Refrigeration Revolution.”

The United States experienced a dramatic reduction in mortality due to infectious diseases at the turn of the 20th century. Much of this reduction is attributable to public health officials. For instance, researchers have estimated that nearly half the reduction in overall mortality from 1900 to 1936 was attributable to the adoption of clean water technology such as filtration and chlorination.

In contrast to clean water technology, the refrigeration revolution was almost entirely driven by private market forces. On the demand side, consumers were willing to pay a premium for clear ice without any suspended particles. On the supply side, the ice industry was completely transformed by a series of technological innovations that eventually put all but a handful of natural ice purveyors out of business.

Anderson’s project will examine the effect of the refrigeration revolution on mortality by cause (e.g., mortality due to typhoid) using data on over 500 cities from the U.S. Census Bureau’s annual Mortality Statistics for the period 1900-1922. These data will be matched with city-level information on ice plants and their capacity from the Ice and Refrigeration Blue Book and Buyers’ Guides for the years 1904, 1909, 1911, 1915 and 1919.

Although there is ample anecdotal evidence that the introduction of mechanical ice had a profound impact on how Americans lived and what they ate, no previous study has attempted to estimate its impact on health outcomes.
ENGLISH

Faculty in the Department of English published five books in the past year.

Susan Kollin, Letters and Science Distinguished Professor and co-director of the Western Lands and Peoples Initiative in the College of Letters and Science, edited the new book *A History of Western American Literature*. This history explores the myriad genres and cultural movements in Western American literature, from ecocriticism, settler colonial studies and transnational theory to race, ethnic, gender and sexuality studies.

In his new book, *From Truth to Technique*, professor Philip Gaines addresses key questions raised by the proliferation of advocacy advice texts, including manuals, handbooks and other how-to guides, written by lawyers for lawyers to help them be as effective as possible in trial advocacy. Gaines explores the role “metavalues,” or ideas about the values of truth and justice, play in discussions about tactics and techniques in these advice texts.

Assistant professor Zack Bean published the book *Man on Fire*, a collection of short stories. Bean’s stories have also been published in literary journals such as *Fiction, The Cream City Review* and *Pank*, and selected for *The Best Small Fictions 2015* by Queen’s Ferry Press.

Award-winning author and English instructor Glen Chamberlain published her second collection of short stories, *All I Want Is What You’ve Got*. The book contains non-traditional love stories: an unhappy mother who loves her children, a woman motivated to commit an unthinkable act by her passion for nature, an old woman who recalls an earlier, short marriage in which she watched her husband die. All of the stories have a link to the landscape of the Northern Rockies.

Last but certainly not least, award-winning author Rick Bass published a new collection of short stories, *For a Little While*. Bass is currently serving as the Western Writer-in-Residence at MSU, which is housed in the Department of English. The book has drawn critical acclaim; in a book review for *The New York Times*, Smith Henderson wrote, “Bass is, hands down, a master of the short form, creating in a few pages a natural world of mythic proportions.”
HISTORY AND PHILOSOPHY

Faculty, students and alumni of the Department of History and Philosophy had a busy year. Here are some highlights:

- Mark Fiege was hired as the Wallace Stegner Endowed Chair in Western American Studies.
- Amanda Hendrix-Komoto, a scholar who studies the American West, was hired as an assistant professor.
- The 38th Annual Hausser Lecture featured two renowned philosophers, Jay L. Garfield and Graham Priest, discussing the paradoxes of Madhyamaka Buddhism.
- Recent MSU graduates participated in fieldwork and community outreach in El Salvador with Molly Todd, assistant professor of history.
- The philosophy ethics debate team—the Ethicats—coached by associate professor Kristen Intemann, participated in the 2015 Northwest Regional Ethics Bowl, finishing tenth in the region.
- Associate professor Kristen Intemann received the 2016 College of Letters and Science Award for Meritorious Research.
- History and philosophy students participated in the Constitution Day public discussion on the pros and cons of the U.S. Supreme Court’s 2010 Citizens United v. Federal Election Commission ruling.
- Professor Robert Rydell was awarded the Mary C. Turpie Prize from the American Studies Association for teaching, advising and program development in American Studies.
- A recent Ph.D. recipient, Daniel Zizzamia, received a prestigious postdoctoral fellowship at the Harvard University Center for the Environment.
- In 2015-2016, five students received their master’s in history, and two students earned their doctorates in history.

MATHEMATICAL SCIENCES

In 2016, five teams of MSU students competed in the grueling, 96-hour COMAP mathematics modeling competition. This international contest, which is hosted by the Consortium for Mathematics and its Applications, tests knowledge, teamwork, research, communication skills and endurance.

Teams select one of six problems and use any resources they can find on the Internet or in libraries for assistance. In fact, some problems list recommended websites. Each problem is of such complexity that no ready-made answer exists on the Internet. Solutions can require up to a 20-page response. Teams were to come up with models that would allow for predictions or other actions.

For example, the team “Weapons of Math Destruction” chose to wrestle with an information network problem looking at how information was distributed in five time periods from 1870 to 2010. The team had to develop a model that showed the speed with which information was spread based on the information’s value and then predict the capacities and relationships of information networks in 2050.

Other problems challenged students to figure out how to eliminate the hundreds of thousands of bits of space debris circling the earth and threatening human space flight and satellites, or determining the best way to invest $100 million per year for five years to improve education.

“These are all real-world problems that are being pondered by governments, industry and researchers,” said assistant teaching professor Christina Hayes, the group’s faculty adviser in the Department of Mathematical Sciences. “These are really hard problems and that is what the students find so exciting. This is the application of all the skills they’ve been learning in the classroom.”
DEPARTMENT HIGHLIGHTS

MICROBIOLOGY & IMMUNOLOGY

Associate professors Deborah Keil and Jean Pfau, from the Department of Microbiology and Immunology, are part of a team of researchers from MSU and Little Big Horn College that received an approximately $500,000 grant to address well water issues on the Crow Reservation in southeastern Montana.

In conjunction with the Crow Environmental Health Steering Committee, the researchers are using the funds to continue home well water testing, conduct surveys about well water uses and well head protection, and educate well owners about the quality of their well water and any associated health risks. Additional grant funding will provide home water coolers for free to participating families with unsafe well water.

The researchers’ work is part of a collaboration with the University of New Mexico, which received a five-year, $5 million award from the National Institutes of Health and Environmental Protection Agency to open a Center for Native American Health Equity Research. Through a consortium of institutions, including MSU and Little Big Horn College, the center will examine how contact with metal mixtures from abandoned mines affects rural Native American populations through exposures related to inadequate drinking water infrastructure, reliance on local foods and other uses of local resources to maintain their traditional lifestyle and culture.

The multidisciplinary research is intended to mitigate and prevent health disparities driven by environmental causes. It is expected to focus on understanding the relationships between biological, chemical, environmental and social factors, Keil said.

In addition to Keil and Pfau, researchers involved in the project include Mari Eggers, a research scientist with the MSU Center for Biofilm Engineering; John Doyle from Little Big Horn College and the Crow Environmental Health Steering Committee; and MSU graduate student Emery Three Irons, who is a member of the Apsaalooke Nation.

MODERN LANGUAGES & LITERATURE

During summer 2016, John Thompson, associate professor in the Department of Modern Languages and Literatures, pursued three different research projects focused on historical trauma in relation to the Franco regime in Spain.

In Madrid, he interviewed María Victoria Villaverde, the author of the autobiographical novel *Tres tiempos y la esperanza* (1962). At age 94, Villaverde is one of the few remaining firsthand witnesses of the Spanish Civil War. Thompson is writing an article on her novel and the interview.

In Badajoz, Extremadura, Thompson spent one month investigating the demolition of one of the most important Republican memory sites in Spain—the city’s bullring where two thousand Republicans were executed over two days in August 1936. The bullring was replaced by a posh cultural center, therefore erasing the physical reminder of one of the worst atrocities committed by the fascists during the Spanish Civil War. Thompson was invited by the Asociación para la Recuperación de la Memoria Histórica de Extremadura to lecture on his research, he appeared on Televisión Española de Extremadura and he was interviewed on Radio Cadena Ser.

He then spent two months in Fene, Galicia, directing a community-based art project. He was inspired by Judith Baca’s new genre public art in Los Angeles, Calif. Baca has done community art since the 1970’s. In poor neighborhoods, she invites adolescents—usually minorities—to paint murals that represent the traumatic events inflicted against the original inhabitants of California and against this state’s minorities. Thompson envisioned this type of project as a way to encourage Spanish adolescents—for the most part indifferent about their Republican and fascist heritage—to partake in the country’s remembrance of Franco’s atrocities and the consequences they have on contemporary society. The project was supported and partially financed by the municipal government of Fene.

To see media coverage of Thompson’s activities in Badajoz and Fene, please visit: www.montana.edu/mll/faculty/thompson.html.
Montana State University was named one of the country’s best universities for Native students by Indian Country Today.

The university made the publication’s “Five Universities for Native Students to Check Out: 2016 Hot List,” an annual national listing of colleges and universities that offer support and scholarships for Native students.

In the story published July 11, writer Debra Utacia Krol wrote “For those who can’t abide big cities, take the immortal Merle Haggard’s advice and head to the middle of Montana—well, not quite the middle, but to beautiful Bozeman—to earn your degree at Montana State University. Named one of the top 100 minority degree producers by Diverse Education, MSU offers Natives degree programs in many sought-after programs such as sustainable food production, natural resources and rangeland ecology, and education.”

Walter Fleming, a member of the Kickapoo Tribe of Kansas and chair of the Department of Native American Studies, which is the center of MSU programs for Native students, said that the university was honored to be included in the annual list and is proud of the varied programs offered to support its Native students.

“We were challenged by past MSU President Geoff Gamble to make MSU the ‘University of Choice’ for Native students in this region,” said Fleming. “President Cruzado has embraced this philosophy by committing resources to recruit and retain Native students. The legacy of these commitments is the national recognition we receive for our Native support programs.”

“We look at it as a privilege to work with Native students and recognize that we have an enormous responsibility to our Native communities to care for the young people that they entrust to us. In recognition of the importance of family to Native people, we try to treat our Indian students like we would want our sons and daughters or nieces and nephews to be treated.”
DEPARTMENT HIGHLIGHTS

POLITICAL SCIENCE

Paul Lachapelle, associate professor in the Department of Political Science and community development specialist with MSU Extension, was a key organizer of the MSU Extension Climate Science Conference in December 2015, which featured a national slate of speakers addressing over 300 attendees. Keynote speakers included Bob Inglis, former U.S. Representative from South Carolina, who examined how free enterprise solutions could address climate change, and Michael Mann, distinguished professor of atmospheric science at Penn State University, who presented his “hockey stick” model of climate data.

During the conference, MSU Extension faculty engaged with community members, business leaders, local government officials and representatives from nonprofits to build relationships, discuss needs and determine outreach priorities related to climate change for the coming years. The conference provided the first opportunity to organize a panel discussion with representatives of the Montana Farm Bureau Federation, Montana Farmers Union, Montana Organic Association, Montana Grain Growers, Montana Stockgrowers Association and Montana Department of Agriculture providing their perspectives on the challenges for their stakeholders.

More information about the conference, including archived video of speakers, is available at: cms.msuextension.org/climate/2015ConferenceHome.html.

PSYCHOLOGY

In 2016, Neha John-Henderson, an expert in health psychology and psychoneuroimmunology, joined the faculty in the Department of Psychology as an assistant professor. John-Henderson earned a bachelor’s degree in sociology and a Ph.D. in psychology at the University of California, Berkeley. She continued to study social disparities in health as a postdoctoral fellow at the University of Pittsburgh before joining the Department of Psychology at MSU. Her research focuses on the ways in which differences in family environments and socioeconomic exposures in our early lives shape the way we cope with stress, our social interactions and health behaviors, and how these differences may affect our mental and physical health across the life-span.

In 2016, the Department of Psychology began offering a Ph.D. program in psychological science for students who want to conduct research and pursue research-oriented careers, in academia or otherwise. Psychological science is a broad term for scientific research in the core academic areas of psychology, including cognitive, developmental, health, learning, physiological and social psychology. The program prepares students for careers conducting psychological research work in a wide range of settings such as colleges and universities, health care facilities, federal and state government, small and large businesses, and many other places. The doctoral program was designed to train students to think critically about theory and evidence, gain expertise in their area of specialty, understand and use statistical procedures, and to design, conduct and publish high-quality psychological research. In fall 2016, there were 12 students enrolled in the program.
Mosquitoes. Bison bones. Hiking. Rain. Digging. And more mosquitoes. This was life last summer on the Montana Hi-Line for nine students participating in the MSU Archaeological Field School. Directed by Michael Neeley, associate professor and department head in the Department of Sociology and Anthropology, the students spent nearly four weeks excavating the Henry Smith site, a bison kill site along the Milk River near Malta. The site was heavily disturbed by looting in the 1970s and was subsequently the subject of limited testing by the Bureau of Land Management in 1980.

The MSU investigations focused on several key questions. First, how well-preserved was the site? That is, were all of the archaeological remains disturbed or were there intact deposits beneath the looted area? Second, was the site used only as a bison kill area or did processing also occur there? And third, how did drive lines at the site correspond to additional kill areas?

Regarding the first question, there was ample evidence of recent disturbance in the form of modern refuse at the site. However, minimally impacted archaeological deposits were also present: butchered remains of bison, chipped stone butchering tools and finely crafted projectiles used to kill the animals. These archaeological materials indicate that the prior looting had not completely destroyed the stratigraphic integrity of the site.

While the team was able to assess the nature of the deposits in the kill area, they did not successfully identify the location of the processing area. Reconnaissance of the landscape immediately north of the kill area failed to yield any concentrated remains that would be consistent with processing activities, such as fire-cracked rock, and burned and fragmented bone. Processing activities either occurred further afield or were not preserved in the archaeological record.

Finally, the team identified and followed drive lines located elsewhere on the landscape with an emphasis on their point of termination. Importantly, they noted that drive lines clustered in particular locations but these clusters did not reveal additional kill locations. It is possible that these drive lines were not associated with successful hunting activities, or that the remains in additional locations were not preserved.

In addition to addressing the research questions above, the project provided MSU students with a unique hands-on experience in conducting archaeological fieldwork. The students are involved in the on-going analysis of the archaeological materials excavated from the site. These hands-on learning opportunities allow students to link the archaeological material culture and interpretation of the classroom with the physical recovery of archaeological data in the field.
In fall 2016, MSU launched *What It Takes: The Campaign for Montana State University*, the university’s first comprehensive fundraising campaign with a goal of raising $300 million in private philanthropic support for the people, places and programs that are at the heart of MSU.

Here in the College of Letters and Science, we are committed to world-class teaching and research, and are proudly participating in the *What It Takes* campaign by rolling out several initiatives, including the following exciting opportunities:

**Trout and Coldwater Fisheries Initiative: Conserving Trout in a Changing World**

The environment and habitat that serve our trout and coldwater fisheries is changing at a rapid rate. There is an extraordinary demand for innovative basic and applied research to protect the incredibly valuable fisheries in the state and region. MSU is positioned to serve as a national leader in these efforts.

To do this, MSU has developed an initiative that will focus on preserving and protecting Montana’s coldwater fisheries. This fundraising initiative will strengthen MSU’s offerings and opportunities for fisheries students and significantly augment our faculty in this area. In addition, the initiative will allow us to expand trout and coldwater fisheries conservation education and outreach, training and research in the face of eminent threats to this incredible resource.

The Trout and Coldwater Fisheries Initiative will allow us to recruit an endowed chair in the Department of Ecology for an individual of distinction to lead students and faculty advancing learning and driving relevant research. The areas of research will focus on species ecology and management, including conserving native trout, invasive species and disease threats. The research will also look deeply into fisheries habitat, including climate change and warming water temperatures.

We are extremely grateful for our donors who have supported this initiative to date. Thanks to Montana Trout Unlimited for establishing a scholarship that will impact students, our future natural resource managers, studying native fish conservation and coldwater fisheries management.

With your support, MSU will lead the effort to conserve trout in a changing world.

**American Indian Student Center**

The location of MSU was first home to the ancestral hunting grounds of the Native people of Montana. The Siksika called this valley “Ahkoto Waktai Sakum,” or Many-Come-Together Country. With our goal to raise $8 million, MSU will design and construct a new American Indian Student Center.

MSU is leading the way in Native American education in the Northwest. Those who decide to attend MSU have access to a university-wide support system unequalled in the region. Over 30 Native American support programs are now in place on campus.

Currently MSU has a small, 1,000 square foot student center where Native students gather together in friendship or to seek advice. However, with 360 American Indian/Alaska Native students currently enrolled at MSU, and nowhere for the student center to grow beyond its current space, the need for a new home, a place for Native American students to call their own, is urgent.

The new American Indian Student Center will include a gathering space and a place to practice Native ceremony and culture. Additional rooms will house tutoring, counseling and mentoring, a kitchen, a drum room, space for a future Elder in Residence, and rooms for students to study.

The American Indian Student Center will serve as a bridge between Indian and other cultures, and provide a dedicated space for interchange that will focus on the education and celebration of the unique diversity we share.

We would be honored to have you be a part of this project with your support.

*Your support of the College of Letters and Science plays an integral role in our success. Thank you. To make a gift to the College of Letters and Science, please visit msuaf.org/give-CLS. For more information about giving or the initiatives outlined above, please contact Shannon Schumacher, Director of Development, at 406-994-4157 or shannon.schumacher@msuaf.org.*
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The Dean’s Circle recognizes alumni and friends whose cumulative lifetime gifts to the College of Letters and Science total $10,000 or more. We are grateful to this growing group for its loyalty and tremendous support of the college.

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The college, like the university, operates on a fiscal-year calendar. Gifts listed in the Annual Giving section were received between July 1, 2015 and June 30, 2016. If you believe we have made an error, please contact the college's director of development at 406-994-4157 so that we may recognize you appropriately and accurately in future publications.

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