

CONFLUENCE

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**INTERDISCIPLINARY
RESEARCH**
IN THE COLLEGE OF
LETTERS AND SCIENCE





cause **AND** effect

INTERDISCIPLINARY TEAM SEEKS TO STEM THE SPILLOVER OF INFECTIOUS DISEASES

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

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

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

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

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

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

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

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

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

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

"My part in the project is to understand how horse owners, community members and the media narrate the risks of Hendra virus outbreaks," said Shanahan, an associate professor in the Department of Political Science.

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

– RAINA PLOWRIGHT



Elizabeth Shanahan, left, and Raina Plowright.

Shanahan will also consider how the information is framed to support each point, such as whether the issue is presented as an economic risk or as a health risk.

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

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

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

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

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

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

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

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

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

Excerpted from Skip Anderson for the MSU News Service

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Dear friends and alumni,

In 2018, Montana State University observed its 125th anniversary with a year-long celebration full of exciting

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



Nicol Rae.

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

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

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

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

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

Best regards,

Nicol C. Rae

Dean

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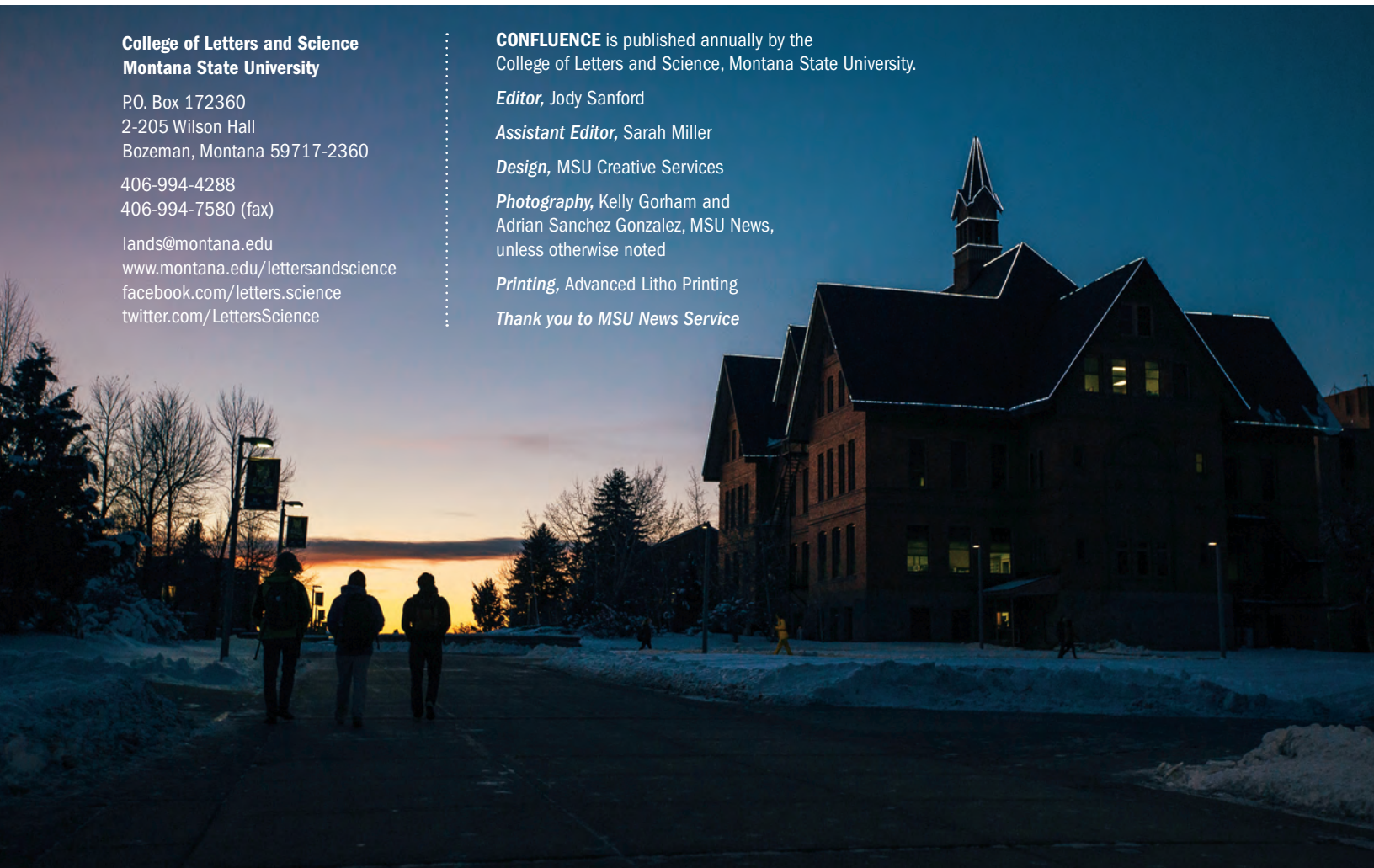
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