Vandals in Focus

2020 UNDERGRADUATE RESEARCH



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t the University of Idaho, students take their education into their own hands. Whether a student wants to go into the hard sciences or the creative arts, at U of I we encourage all our students to get real-world experience in their fields of study.

Here at the premier research university in Idaho, two-thirds of our undergraduates have the opportunity to participate in hands-on research, scholarly work or creative activities. Guided by our faculty members, our students learn how to ask and answer questions about practical problems and scientific mysteries that impact real people and industries. As a result, our students are able to contribute to evolving fields of knowledge. During their research, students sharpen essential skills and gain confidence, practice collaboration and enjoy mentorship from leaders in their fields. And they can make real, lasting impacts in the community, and quite possibly, in the world.

Vandals in Focus, supported by the Office of Undergraduate Research, highlights student research projects from across U of I's colleges. This compilation wouldn't be possible without our students, both literally and figuratively as not only are the students doing the research, but undergraduates produce the stories, photos and cover art for Vandals in Focus.

The pages that follow highlight the best of the University of Idaho - our brave and bold Vandal students. I'm proud of the work chronicled here and of the learning experiences our faculty have made available to our students. I hope the stories pique your interest and that they encourage you to learn more about undergraduate research opportunities at U of I.

David Pfeiffer

Director, Office of Undergraduate Research

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News and feature stories about undergraduate research. Read more articles at **uidaho.edu/news** or follow the University of Idaho on **Facebook, Instagram** and **Twitter**.





Mechanical engineering and computer science graduates spent their senior year configuring a **ROBOTIC ARM** that moves like a human's shoulder, elbow and wrist. U of I CROSS-COLLEGE AND CAMPUS COLLABORATION brought 150 LED triangles to the Vandal Marching Band's 100th anniversary halftime performance.

The number of undergraduates who presented at the 2019 UNDERGRADUATE RESEARCH SYMPOSIUM.

3538 The number of Office of Undergraduate Research **STUDENT GRANTS** awarded since 2016.

Architecture students traveled to Togo to create **A CONCEPTUAL DESIGN FOR A GIRLS' SCHOOL**. They partnered with S H E | Style Her Empowered, an alumna-founded nonprofit that creates education and employment opportunities for local women.



While interning at the **PALOUSE LAND TRUST**, senior Sierra Hamilton worked with private landowners who have conservation easements.

A Start Bar

45.46





Medical sciences major Kade Wagers wants to be a doctor. He never thought studying **KANGAROO RATS** would help get him there.

I really wanted to get into political science to understand government and political structure so that not only can I do the research, but I can also see it instituted or mandated.

Sara Murphy

Pioneering Plant-Based Jet Fuels

WRITER:

Jordan Hawley is a senior from Emmett and is studying microbiology.

PHOTOGRAPHER:

Valerie Blackburn is a junior from Idaho Falls and is studying advertising and film and television studies.



During the University of Idaho's Palousafest, Murphy met members of the Vandal Clean Energy Club, an organization that promotes and implements clean energy and sustainable practices in and around U of I. A major initiative of the club is reacting vegetable oil waste from campus food facilities with alcohol to create biodiesel, which can then be used in university diesel vehicles.

"When I go to career fairs and talk about how I have made biodiesel and worked on a continuous flow process, that blows people out of the water," said Murphy, now the vice president of the club.

Since connecting with the club, Murphy, a 20-year-old chemical engineering major and political science minor, has researched plant-based jet fuel additives modeled after biodiesel to address two issues: cost and energy density — the energy stored in a certain amount of fuel.

According to the National Renewable Energy Laboratory, biofuel is considered a renewable energy source while petroleum-based fuels are not. In addition, biofuels burn cleaner than petroleum-based fuels. The difference in efficiency in petroleum-based fuel samples and biofuel samples is visible when watching the two burn alongside each other, especially in the amount of black soot produced, Murphy said.

"This difference is what we call the combustion efficiency," she said. "Any black soot is unburnt fuel, which represents inefficiency and a loss of money."

A PROMISING PLANT-DERIVED CANDIDATE

The basic ingredients for the jet biofuel — vegetable oil and alcohol — are derived from plants. For her study, the Boise native reacted components of vegetable oil with two plant-derived and two non-plant-derived alcohols to create different jet biofuels for testing.

To learn which biofuels are viable as jet biofuel, Murphy is testing the cloud point, or the point at which the fuel will freeze at cold temperatures. Jet fuel must perform well in the freezing temperatures encountered at the high elevations at which the planes fly.

"There's no point of any further testing if a fuel freezes when you're high in the atmosphere," said Murphy.

Murphy hypothesized that the structure of the alcohol molecules will influence the cloud point and determine overall fuel performance. With guidance from her research mentor, Professor Dev Shrestha with the College of Engineering, and recent master's graduate Brian Hanson, Murphy is continuing to conduct her research with the biofuel made from plant-derived alcohol isobutanol, which exhibited the lowest cloud point and hit target energy density.

"In my experiments, isobutanol-based biofuel didn't even start to freeze until minus 58 degrees Celsius, and Jet A, the typical jet fuel we use in most commercial airlines, freezes solid at minus 40 degrees Celsius," Murphy said.

Murphy is further testing isobutanol to ensure it is the best candidate for jet biofuel.



Left page: Sara Murphy studies two different samples of jet fuel burning.

Right page: Top: Murphy compares two different jet fuel samples.

Bottom left: Cotton balls were soaked in jet fuel and then lit on fire. Murphy said that they would burn for hours without dying out because the fuel is dense with energy.

Bottom right: Murphy monitors a computer program.





CAMPUS SUSTAINABILITY

While Murphy continues her research on sustainable fuel options, she is also seeking to further promote sustainability on the Moscow campus. She and the Vandal Clean Energy Club have helped U of I run their six vehicles, including the BioBug — U of I's biodiesel Volkswagen Beetle — on biodiesel produced by students in the club.

In October, Murphy met with University of Idaho President Scott Green to discuss using a 20% biodiesel blend in all diesel engines on the Moscow campus to reduce the carbon impact of the university. To that end, the Vandal Clean Energy Club won a Sustainability Center grant and refurbished an old biodiesel fuel station on campus. The next step will be to produce and distribute the biodiesel made by the students.

"President Green was really passionate about the fact that the biodiesel lab provides students with hands-on opportunities to experience advanced biofuels and to continue the history of biodiesel at the University of Idaho," Murphy said.

Plans of how to potentially distribute the biodiesel are being discussed.

BUILDING A RESUME TO MAKE A DIFFERENCE

Last year, Murphy added a political science minor to her studies after realizing the value of her jet biofuel research to create change.

"I really wanted to get into political science to understand government and political structure so that not only can I do the research, but I can also see it instituted or mandated," Murphy said. "I think it's really important that we start having more engineers or scientists creating policy."

For Murphy, this interest arose following a family vacation to Alaska her senior year of high school.

While visiting a popular glacier, Murphy noticed that the markers representing the amount of recession of the glacier over the years increased noticeably beginning in the 1990s.

"How can I sit by and not do something about this?" said Murphy, who grew up skiing and hiking and wants to continue to enjoy the outdoors. "I didn't know how I could see something this powerful and not feel obligated to do something."

Murphy thinks there's a disconnect between the scientific community and the policymakers from around the world.

"It's critical to combine the science with the politics, and having more people who understand both of those worlds and are able to bring them together is key, especially when it comes to the environment and climate change," Murphy said.



OUR GRANT: Summer Undergraduate Research Fellowship



Race and Conflict in Classrooms

WRITER:

Alexis Van Horn is a sophomore from Poulsbo, Washington, and is studying journalism.

PHOTOGRAPHER:

Cody Allred is a junior from Council and is studying public relations.



OUR GRANT: Travel Grant



avigating conversations about race can be difficult — especially in predominantly white classrooms where many students have little experience with conversations surrounding the subject.

Ben Doucette, a curriculum instruction and secondary education major, dove into a research project to investigate how middle schoolers react to information, teachers and each other when presented with historical information about race relations.

According to the Anti-Defamation League, teachers can feel uncomfortable breaching the topic of race in predominantly white classrooms because student assumptions, bias and fears can make conversations difficult to facilitate.

"Equity in education is an important thing, especially in the U.S. where we have a history of colonialism and racism. Those things need to be addressed in an educational setting," said Doucette.

Doucette, a 22-year-old from Bellingham, Washington, became interested in the topic while taking a course from Assistant Professor Vanessa Anthony-Stevens in the College of Education, Health and Human Sciences. He teamed up with Anthony-Stevens and her research partner, North Idaho teacher Rebekka Boysen-Taylor, halfway through the first year of the project. The three work together to introduce learning material to students, document student responses and analyze their results. The students' reactions were surprising, Doucette said. During the lessons, it was hard for him to determine if the students wanted to learn the correct terminology so they wouldn't get in trouble or if they were genuinely interested in learning about others and examining their beliefs.

"We have students who are really focused on fitting in and others who are really focused on learning about the content," Doucette said. "For some students, it can be a transformational experience where they learn about themselves and their experiences in the world in a different way, in a different light."

Doucette created transcripts of conversations and interviews so the team could analyze student interactions. They presented this information at the National Association for Multicultural Education Conference and will publish their work in the future.

Doucette graduated in winter 2019 and is considering pursuing a master's degree.

Doucette said the most pronounced way his research has affected him is that he knows when he enters a classroom one day, he will possess the ability to have these important conversations with his students.

"I think it's hard to be good at having these conversations, especially as a white male," Doucette said. "It's difficult to be the person leading that conversation, but I will have them, whether it's going to be perfect or not, whether I'm the right person for that conversation or not. It's worth doing."



ost students don't get locked behind metal doors when entering their classroom. For Kelsie Rumsey, it's just another day of college.

As a third-year sociology and

criminology student, Rumsey participated in a Department of Sociology and Anthropology program called Inside Out in which she visited the Idaho Correctional Institution-Orofino every week. There, Rumsey interacted and worked with inmates.

"I see these individuals and I am with everyday people," the 21-year-old Saint Anthony native said. "They are not necessarily the monsters that we have painted them throughout the media and the public eye."

Through her experience with Inside Out, Rumsey became interested in prison reform. In Idaho, recidivism rates — the tendency of criminals to reoffend — are some of the highest in the nation. Rumsey thinks improvements to pre-release education, or information provided to inmates before their release to decrease recidivism rates, are needed.

As part of a student research project, Rumsey found that the current program for reentry requires individuals to read booklets and take quizzes. It's something Rumsey said is not providing the inmates the skills necessary for them to function outside of prison.

In 2018, Lewis-Clark State College (LCSC), the Idaho Correctional Institution-Orofino and University of Idaho Extension collaborated to design a new two-part reentry program. Working with U of I Extension, Rumsey is helping to facilitate the launch of the new program under Assistant Professor Omi Hodwitz in the College of Letters, Arts and Social Sciences (CLASS).

"This new program is built on more of a hands-on learning experience, where the inmates will be guided through every step," Rumsey said. She added that previous research has shown that the more hands-on the lesson is the more likely the inmate will succeed.

The first stage of the program teaches inmates "soft skills" through videos and activities. Inmates learn how to get a job, find housing and build relationships outside of prison. The inmates then move to the next stage, learning "hard skills," or hands-on, practical skills they can use to pursue a degree from LCSC.

As part of her role in the program, Rumsey has built five surveys to evaluate how prepared inmates feel to reenter society. The surveys will be given to inmates who've been released through the current process, inmates helping form the new program and, eventually, inmates who will take part in the finished program.

After implementing the new design and analyzing the survey results, Rumsey and her collaborators will conduct follow-up interviews on the program's effectiveness and track whether recidivism rates have decreased.

"The people inside these institutions are still people," Rumsey said. "And we can't expect them to change if we are not giving them the keys to do so."

Her work in creating this collaborative program has inspired Rumsey to take her passion for prison reform further. After receiving her undergraduate degree from CLASS, Rumsey plans to attend graduate school, focusing on prison reform.

New Approach to Inmate Pre-Release

This new program is built on more of a hands-on learning experience, where the inmates will be guided through every step.

Kelsie Rumsey

SOCIOLOGY AND CRIMINOLOGY STUDENT

WRITER:

Brittany Slick is a sophomore from Ketchikan, Alaska, and is studying marketing and advertising.

PHOTOGRAPHER:

Skyler Martin is a junior from Moscow and is studying broadcasting and digital media.



OUR GRANT: Summer Undergraduate Research Fellowship



Visualizing an Ancient Giant

WRITER:

Alexis Van Horn is a sophomore from Poulsbo, Washington, and is studying journalism.

PHOTOGRAPHER:

Cody Allred is a junior from Council and is studying public relations. group of virtual technology and design (VTD) students are bringing a set of mammoth bones to life through art. Discovered in 1966, the approximately 11,700-year-old skeleton was found in Soda Springs, prompting the name for

the skeleton: Cola.

The VTD class, Design Studio: Visual Mammoth, led by Instructor Zeth DuBois, is consolidating data concerning the fossils and creating study tools for a real client, a University of Idaho geology course taught by Instructor Renee Love.

DuBois designed the class to function similarly to a professional design studio by having the students work to meet a client's needs.

DuBois said experience offered by this project provides students a glimpse into what the professional workplace is like, an opportunity that isn't typically provided in an academic environment.

"I think this gives them time to think in really broad terms about big ideas," DuBois said. "During the ideation phase, I'm encouraging them to just think of the craziest things they can think of and then subtract from there. I think it's encouraging them to think outside the box and to work in a production pipeline." It is for this reason that junior VTD major Steven Frank decided to take the class.

"In professional studios, thousands of people can work on the same project," Frank said. "We've got less than a dozen people. We have to rely on each other and everyone's unique skillsets to complete each project. None of us could accomplish the projects alone."

Junior VTD major Jesse Ross serves as a project manager for the course, which is housed in the College of Art and Architecture.

DuBois offered Ross the role of project manager because he is able to organize communication between project groups, skills he gained through an associate degree focusing on communication and cultural issues.

Ross said the Design Studio class has taught him about responsibility in a team setting among other things.

"My work isn't just about me and the grade I get anymore," Ross said. "It's about everybody's grade. And beyond a grade, I want people to feel respected and to feel like the work that they're doing matters."

MODELING THE MAMMOTH

The VTD students decided to focus on three different projects for the fall 2019 semester, decisions they made after consulting with Love and her students. The VTD

projects will help the geology students visualize and communicate their research to each other and the public.

"We're pushing the envelope on what we see as technology and access for educational purposes," Frank said. "We're trying to develop ways of helping people learn and understand."

One group of students is creating a physical model of the dig site where Cola was found. The approximately 3-foot-by-3-foot relief map will integrate with an app the students will design. The app will allow users to point their phone at the model and view details about what the habitat and geology of the area would have been like when Cola was alive.

In addition, Frank and his teammates are designing a set of flashcards that inventory Cola's bones. The cards will link to an online database that compares the bones to those of a complete mammoth fossil, named Plato, at the Smithsonian. The cards may also be made into an educational playing card game.

The last team is creating a set of small 3D-printed bones — one tenth the scale of the real mammoth — that will allow researchers and students to handle representations of the specimens with little risk of hurting the bones themselves. They hope to create models of Cola and Plato.

CONNECTION TO GEOLOGY

All three projects are reliant on Love's geology course, where students identify, measure and catalogue Cola's bones. The bone data is recorded in an interactive database shared between the classes.

Frank said the VTD students are taking information from the geology course and applying it to the digital projects.

"That way, we can have interesting facts and information based on the bone, the digging site, the Plato design or why the bone is shaped the way it is," Frank said. "We can make skeletons dance and move all we want, but we can't give you the information the geology department can provide because they're the ones who are studying the actual bones."

Throughout the research, the design students have had the opportunity to see and touch some of Cola's bones. In spring 2019, students from both courses visited Gritman Medical Center where the bones were put through a CT scanner. This supplied information about the dimensions and details of the bones through digital 3D models.

"When you're holding those bones and you're looking at them and you're seeing the coloration and all the little nicks and imperfections, you understand that there's so much information we have to get across," Frank said. Left page: Zeth DuBois, left, and Jesse Ross discuss 3D-printed mammoth bones.

Right page:

Top: Mammoth bone cards can be used by geology students to compare with real bones.

Middle: The design class created 3D visuals of a mammoth skeleton for use in a U of I geology class.

Bottom: Steven Frank, left, and Jesse Ross brainstormed 3D visualization projects that would help their client, a U of I geology class, communicate their mammoth research to the public.





If I didn't have this direct research experience, I don't think I would have realized how much I still wanted to be able to have patient interaction.

Ren Dimico molecular biology student

Studying Night Blindness

WRITER/ PHOTOGRAPHER:

Braden Farrar is a junior from Coeur d'Alene and is studying biological engineering.



OUR GRANT: Summer Undergraduate Research Fellowship and Travel Grant



According to the 21-year-old senior from Spokane, Washington, the researchers used mice as a model organism to track how the brain is organized with mutations that are known to cause diseases in humans. By comparing development and aging of the retina in mice, the scientists hope to understand diseases in people.

The gene Dimico studies, called Down syndrome cell adhesiom molecule like-1, or Dscaml1, plays a critical role in the formation of dendrites, which are branches of a nerve cell important for neuron-to-neuron communication. Dendrites branch from the neurons they're attached to like a sea of cobwebs, receiving communications from neighboring neurons and sending the impulse down the line.

The gene Dscaml1 helps prevent the dendrites from becoming tangled. This tangling then results in the breakdown of the visual pathway, which can lead to the development of night blindness.

Previous work in the College of Science lab found mice with a mutation in the Dscaml1 gene had an increased number of unsuccessful connections of the neurons. Dimico said.

"We want to know if night blindness in humans occurs because development is abnormal or if the retinal cells degenerate over time," she said. The nature of this question requires Dimico to analyze retinas collected from mice at different ages. Dimico images the neurons and measures how many of them are properly connected, comparing normal mice and mice with a mutation in the Dscaml1 gene.

"Our hope is that by understanding how the retina develops and how this goes wrong in a disease model, we can help people with disease," she said.

The research is important because many people develop diseases that can cause blindness as they age. For example, macular degeneration occurs in more than 14% of white Americans — the race most likely to develop the disease in their 80s, according to the National Eye Institute.

After working in a research lab, Dimico said she has discovered that there's less human interaction than she was hoping for.

"I do love the collaboration and teamwork aspect that comes with working in a lab and with other researchers, but I also have a passion and desire to work more directly with people," she said.

This led Dimico to pursue a career in which she can do clinical and research work. She is a certified nursing assistant and is becoming an emergency medical technician so she can volunteer for the Moscow Volunteer Fire Department. She hopes to earn an M.D./Ph.D.

"If I didn't have this direct research experience, I don't think I would have realized how much I still wanted to be able to have patient interaction and see the end result of what the research is actually going to do," she said. s social media continues to become an essential component of everyday life, businesses both large and small have been quick to adopt an increased presence on various platforms. With a seemingly unlimited supply of

potential customers online, who could blame them? With this new media landscape comes the need for specialized marketing skills, something that students at University of Idaho are quick to develop.

Nineteen-year-old sophomore Katie Vassar leads the Vandal Solutions Social Media Team. Pursuing a marketing degree in the College of Business and Economics, Vassar joined the team last year under Professor Michael McCollough to gain hands-on experience with social media marketing. Since that time, Vassar has become adapt at utilizing social media as a business tool.

Vandal Solutions is a nonprofit, student-led group that acts as a real business, serving Moscow clients by providing professional-quality marketing and advertising services. The group allows students to develop and practice skills through project management, creative marketing and sales.

Vassar's Social Media Team oversees the accounts for their clients. Their main goals, said Vassar, are to increase engagement and followers for their clients on various platforms such as Instagram, Facebook, Twitter, Snapchat and LinkedIn.

As leader, Vassar establishes contracts with local business clients who the team then works alongside to map out their marketing needs. Then, they track from start to finish which posts or advertisements are performing well and receiving the most interaction from social media users. The company uses this data for future marketing campaigns.

"Every business needs marketing, and social media is only going to get bigger and bigger as a marketing platform," Vassar, a Lewiston native, said. "It's an easy and effective way for businesses to promote and raise awareness of themselves."

Vassar's team has improved multiple companies' social media presence. For example, the number of followers on the College of Business and Economics Facebook page rose by about 8% within one semester with the help of the Social Media Team.

"Social media is growing so fast," Vassar said. "Local companies need to jump onto this form of marketing or they are going to be left behind."

At the end of each contract, the team provides businesses an official report showing the effects of their marketing on social media engagement.

"I'm gaining the basic skills that I need to know about social media marketing," Vassar said. "I've learned how to build connections with clients and how to communicate with them effectively."

The Business of Social Media

Companies need to jump onto this form of marketing or they are going to be left behind.

Katie Vassar



WRITER/PHOTOGRAPHER:

Brittany Slick is a sophomore from Ketchikan, Alaska, and is studying marketing and advertising.

I love working to help ranchers and to improve agriculture to meet the needs of the growing world.

Chanelle Brusseau Animal and veterinary Science student

Improving Technology in the Agriculture Sector

WRITER:

Allison Spain is a senior from Boise and is studying journalism and international studies.

PHOTOGRAPHER:

Nawanont Richard Pathomsiri, a junior from Bangkok, Thailand, and Bismarck, North Dakota, is studying film and television and marketing.



hanelle Brusseau found her love for agriculture on her family farm in Caldwell. Her family had a variety of livestock, including cattle, goats and horses. The family also farmed their own crops and hay.

Growing up surrounded by generations of agricultural roots and a passion for being outside, Brusseau knew she wanted to pursue a career in the cattle industry before attending the University of Idaho.

Brusseau, a senior studying animal and veterinary science and microbiology, is working on a collaborative project that connects faculty and students from the colleges of Agricultural and Life Sciences, Natural Resources and Engineering. Brusseau's research is supervised by faculty members Gordon Murdoch and Karen Launchbaugh.

The goal of Brusseau's project is to create a prototype for virtual fencing, which could replace standard cattle fences by using devices to administer an electrical pulse when animals cross a defined virtual barrier. The implementation of these fences would save ranchers time, money and labor associated with fencing large areas of rangelands. "Cattle are very simple," the 21-year-old Brusseau said. "They are extremely responsive to complex and continuously repeated systems, and the majority of a herd learn the new concepts, usually within just a couple of days, which should make implementation of a virtual fence relatively easy and highly applicable."

FENCING CATTLE

The ultimate goal of Brusseau's project is to design a virtual fence to protect some areas from heavy livestock grazing. The fence, she said, needs to be designed so it is easy to implement and affordable for the ranchers.

Virtual fencing will not be useful on every ranch, Brusseau said, but the system should be adaptable for certain situations depending on the amount of cattle, their breed, ages and how small or large the grazing area is.

The prototype designed by the team is a nose device with pads that gently rest on the inside of the animal's nose. The device provides an electrical pulse to the cattle to keep them in a designated area. Improvements are being made to the prototype to ensure there is no inflammation or irritation of the animal's nose as a result of its use, Brusseau said. Chanelle Brusseau is helping design virtual fencing. Much of her work is conducted using cattle from the herd located at the U of I Palouse Research, Extension and Education Center's beef unit.





Different materials are being tested for the device itself to ensure the animals' comfort and that it does not interfere with their daily activities.

The team of students and professors completed background research on the project using U of I cattle. The project is approved under the protocol of the Institutional Animal Care and Use Committee to ensure animal welfare is upheld.

M-O-O-VERS AND SHAKERS

Brusseau said one of her biggest responsibilities throughout this project has been communicating with her family and fellow ranchers nationwide to gain input on the prototype and how they see it applying to their herds. Some individuals have expressed interest in the prototype as a way to improve their own operations and the ranching industry as a whole.

"I love working to help ranchers and to improve agriculture to meet the needs of the growing world," Brusseau said. "It is an industry with very limited technology, and virtual fencing is one way to help ranchers expand their ways of life but still stay traditional." Brusseau said consumer opinions dramatically affect the market. When consumers take it upon themselves to learn about the lifestyles, techniques and technologies farmers and ranchers are using, they tend to be more knowledgeable, understanding and even more accepting of agriculture.

"The consumer has a direct effect on ranchers' practices. It's that simple and powerful," Brusseau said.

Even though she has been involved with the agriculture and livestock industry since childhood, Brusseau said she is always learning about the field and will continue to do so.

"Since this project is so interdisciplinary, I've learned a lot outside of my areas of study and personal experience with my own cattle herd," Brusseau said, having learned about material to build the nose devices and becoming familiar with electrical coding and signaling. "Students should pursue research opportunities because it is hands-on, which allows them to learn more and get better at what they're interested in."



OUR GRANT: Summer Undergraduate Research Fellowship

I really got interested in natural resources while watching the Idaho Public Television program 'Outdoor Idaho.'

Zachary Sanchez ecology and conservation biology student

Finding a Nest

WRITER:

Sarah Smith is a senior from Middleton and is studying crop science and horticulture.

PHOTOGRAPHER:

Skyler Martin is a junior from Moscow and is studying broadcasting and digital media.



OUR GRANT: Summer Undergraduate Research Fellowship achary Sanchez loves the outdoors. On weekends, he can be found camping, backpacking, hiking and snowboarding. But his pursuit of a career in Idaho's wildlands started with a television program.

"I really got interested in natural resources while watching the Idaho Public Television program 'Outdoor Idaho,'" said Sanchez, who earned an associate degree from the College of Western Idaho before transferring to University of Idaho in 2016.

The 33-year-old from Boise now conducts raptor research on the American kestrel.

The size of a mourning dove, American kestrels are tawnybrown with black slash markings down the face and body. The smallest falcon in North America, the kestrel preys on a variety of species including insects, small birds, reptiles and mammals. Many of their prey, particularly rodents, are deemed "pests" by humans.

Through his research, Sanchez is studying how vegetation near kestrel nesting boxes influences the birds' preference of nest location. He hopes to use his data to place the boxes in more kestrel-friendly areas.

According to Sanchez, an ecology and conservation biology major with a minor in wildlife resources, an ecosystem service is one that is provided for free by nature.

"The kestrel acts as a natural pest control to keep problematic species populations under control," he said.

Despite acting as an ecosystem service, the population of the American kestrel has declined by nearly 50% over the past half century according to the Cornell Lab of Ornithology. "Some populations have recovered or stabilized while others are still dropping, and scientists aren't sure why," Sanchez said. Many hypotheses have been proposed, he said, from climate change to variations in disease, to herbicide and pesticide use and habitat loss or degradation.

The senior has been working with College of Natural Resources Professor Kerri Vierling and Hawkwatch International Senior Scientist Dave Oleyar to conserve kestrel populations. The team predicts kestrels are less likely to nest in areas with a dense ground cover, which limits their ability to detect prey and predators.

The main components of Sanchez's project include nest site selection, number of eggs laid, success of birds reaching full maturity and how factors such as landscape and vegetation can influence these variables.

There are currently 35 nesting boxes located on U of I property. Sanchez spent the summer of 2019 checking these boxes and recording information about the inhabitants every seven to 14 days. He collected data on the habitat and vegetation surrounding each box, including box orientation and height, which he is combining with data from a geographic information system, or GIS, analysis to determine how vegetation influences nest site selection.

"It's all for the birds," Sanchez said. "This project opens the door for further research and gives the opportunity for people to collaborate and come together with other ideas to further research directed toward kestrel conservation."

After graduating in spring 2020, Sanchez plans to attend graduate school at the U of I and continue his research on American kestrels.

U of I undergraduates wrote the articles, shot the photographs and produced the cover for the 2020 Vandals in Focus.

Find out more at uidaho.edu/vandalsinfocus.

ABOUT THE OFFICE OF UNDERGRADUATE RESEARCH

The Office of Undergraduate Research (OUR) supports student engagement in out-of-class research and scholarly activities in all fields of study at the University of Idaho. OUR raises the visibility of undergraduate research, facilitates opportunities and helps students showcase their work.

OUR offers grants, information sessions and guidance for undergraduates, hosts the U of I Undergraduate Research Symposium and works with faculty interested in mentoring undergraduate researchers.

Contact OUR at our@uidaho.edu or 208-885-4109.

Learn more at uidaho.edu/undergradresearch.

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Pictured left to right: Cody Allred, Alexis Van Horn, Valerie Blackburn, Nawanont Richard Pathomsiri, Brittany Slick, Jordan Hawley, Sarah Smith and Braden Farrar. Not pictured: Skyler Martin and Allison Spain.



Office of Undergraduate Research

uidaho.edu/undergradresearch