

Vandals in Focus

2019 UNDERGRADUATE RESEARCH



University of Idaho



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You'd never choose which car to buy based solely on reading the owner's manual and car reviews. You have to test-drive the car. See how it handles. Decide if you like how it drives.

In the same vein, why would you pick a career without taking it out for a spin? Whether a student wants to go into the hard sciences or the creative arts, we encourage all University of Idaho students to get real-world experience in their fields of study.

At U of I, two-thirds of our undergraduates 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. At the premier research university in Idaho, our faculty go out of their way to teach undergraduate researchers the skills they need to succeed in their careers.

The Office of Undergraduate Research supports our student researchers and produces Vandals in Focus to highlight research projects from each of U of I's colleges. The publication is even student-driven, allowing student writers, photographers and artists a chance to publish in a professional magazine. We're proud undergraduates produce all the stories, photos and cover art for Vandals in Focus.

I hope the stories here pique your interest in the wide variety of faculty-mentored projects available at U of I. Learn more at the Office of Undergraduate Research. Completing undergraduate research will enhance your academic experience, broaden your understanding of the world and help you succeed in the future. Get involved!

David Pfeiffer

A handwritten signature in black ink, appearing to read 'David Pfeiffer'.

Director, Office of Undergraduate Research

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Undergraduate Research
at U of I

“My story
motivates me and
pushes me to make
a difference in
this world.”

Fredrick Shema

Resettlement from a Ugandan Refugee Camp

Fredrick Shema, an international studies student from Rwanda, feels a connection to a Ugandan refugee camp that many University of Idaho students probably don't know exists. The reason: he grew up there.

“I'm originally from Rwanda, but my parents moved to Uganda's refugee camp when I was 2 because of the genocide in Rwanda. That's where I lived for most of my life until I got resettled here,” Shema said. “My story motivates me and pushes me to make a difference in this world.”

Shema said his experiences as a refugee make him feel like he must do something to help refugees form connections. He wants to be the voice of people who cannot speak for themselves.

There were 25.4 million refugees worldwide in 2017, of which 102,800 were admitted for permanent residency to new countries, a process called resettlement, according to the United Nations Refugee Agency.

Shema, a 21-year-old senior, wanted to return to Uganda's Nakivale refugee camp — where he lived until he was 14 years old — to study the perceptions that refugees, the Ugandan government and nonprofit organizations have about resettlement. In addition, he wanted to find out if the people involved in resettlement understood the process.

Shema worked with Bill Smith, director of the Martin Institute in the College of Letters, Arts and Social Sciences, who helped him develop his research plans and find funding for his project.

For three weeks during summer 2018, Shema traveled to Uganda. When a question-and-answer survey of refugees didn't provide the information he was looking for, he switched to conducting interviews with the help of Erin Damman, a U of I international studies assistant professor.

Shema investigated the criteria the Ugandan government uses to resettle people from their refugee camps to more permanent homes in other nations, the reasons they need to be resettled and the main problems people face in these refugee camps.

The largest hurdle refugees faced while trying to get resettled was favoritism toward those from certain countries, Shema said.

“I figured out that most refugees resettled from the camp were Somalis and Congolese,” he said. “As a former refugee, I was really disappointed with this favoritism in the camp. They only resettle some nationalities and others stay in the camp. There's more than 10 nationalities in the camp, but the only nationalities that really get resettled are Somalis and Congolese.”

In addition, he learned the most common reason people need to be resettled is to find food, water and shelter. People eventually left the camps because they no longer felt safe. Shema learned the largest problems were theft, lack of food and healthcare.

“I did not get to talk to big influencers of resettlement, which was one of my main goals, because, when I got there, they told me I would have to apply for different paperwork to gain access to talk to them, so that was one of my only disappointments,” Shema said.

Shema hopes to use his research to figure out what people, including nonprofit organizations and governments, can do to help refugees. He wants to further examine the process of resettlement and work to resolve the issue of favoritism within camps.

WRITER:

Alexis Van Horn is a freshman from Poulsbo, Washington, studying journalism and minoring in German and wildlife resources.

PHOTOGRAPHER:

Cody Allred is a sophomore from Council studying public relations.



OUR Grant:
OUR Summer
Undergraduate Research
Fellowship award
recipient



A Fight Against Malaria

WRITER:

Seth King is a junior from Pasco, Washington, and is double majoring in English with a teaching emphasis and computer science.

PHOTOGRAPHER:

Cody Allred is a sophomore from Council studying public relations.



OUR Grant:

OUR Travel Grant and
OUR Undergraduate
Research Grant award
recipient

When most people see a mosquito buzzing around their head, they see a pest — a troublesome, aggravating and potentially disease-spreading insect meant to be smacked or repelled.

When **Reagan Haney** sees a mosquito, she sees opportunity.

Haney, a senior in the College of Agricultural and Life Sciences (CALS) majoring in animal and veterinary science, researches whether altering mosquito diets can reduce the risk of malaria in areas where the disease is a threat.

Though Haney, a native of Jerome, did not originally intend to work in research, her interaction with grant managers and undergraduate researchers during a summer internship sparked her interest. In the fall of 2017, she started working in Professor Shirley Luckhart's laboratory and was eventually awarded a grant to work on her own research.

"Research has given me a great opportunity to get to know people and to find mentors within my field," the 22-year-old said. "If all goes according to plan, this method of treating mosquitoes could become a novel way of preventing malaria."

A NEW CHEMICAL TO FIGHT MALARIA

Haney's research is based around a chemical called abscisic acid (ABA). ABA was originally known within the scientific community as a plant hormone but has since been discovered in a variety of mammals and sponges. Since then, researchers have studied the effects of the chemical on insects and mammals alike.

Luckhart, Haney's advisor, said ABA alters how its insect and mammalian hosts function. In past research, ABA has reduced the presence of the parasite in the host's blood. Now, Luckhart's laboratory strives to understand the reaction of insect and mammalian hosts to the chemical in hopes they can ultimately develop a drug to combat malaria. Luckhart works in both the College of Science and CALS.

In her own research, Haney studies how the supplementation of mosquitoes' diets with ABA may reduce the number of eggs they lay. Reducing the number of mosquitoes in malaria-prone areas generally reduces the rate at which the disease can spread, she said.

Haney runs her experiment with three batches of adult mosquitoes at any given time. The first group acts as a control — they receive no ABA in their food — while the second and third group receive food containing small and large dosages of ABA, respectively.

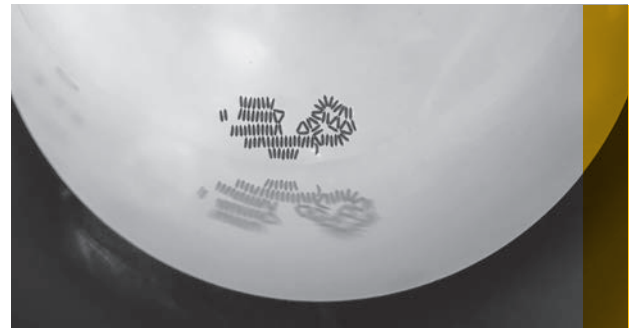


Left page: Reagan Haney looks through a microscope.

Right page:
Top left: Reagan Haney works on her laptop.

Bottom left: Reagan Haney mixes the feeding solution for the mosquitoes.

Bottom right: Small black mosquito eggs bunch together and float in a test tube.



At the beginning of each cycle, Haney feeds the mosquitoes in a process that she laughingly refers to as “making the blood.” The “blood” isn’t natural blood, but rather a mixture of nutrients and ABA. By mixing the blood herself, Haney can accurately keep track of the mosquitoes’ diets. Haney places the warmed mixture in a membrane feeder, which consists of a cup covered with a skin-like film through which the mosquitoes feed.

As the mosquitoes ingest the acid, Haney tracks which individual insects drink from the membrane. After an insect drinks, she captures it and places each mosquito in its own tube.

“I’d say the greatest challenge of this project is working with the mosquitoes,” Haney said. “Obviously, they’re really small, and they tend not to cooperate.”

Though the process can be painstaking, Haney has found success rounding up these tiny creatures throughout each iteration of her project. Once the mosquitoes are confined to their individual tubes, Haney waits for them to lay their eggs. After the mosquitoes have deposited their eggs in the tubes, Haney takes pictures of the eggs and counts them to determine whether the ABA supplements affected the fertility of the mosquitoes.

PREVENTING DISEASE SPREAD

Scientific progress doesn’t come without setbacks and obstacles. Throughout her research, Haney has encountered a variety of difficulties. For example, 70 of the 200 mosquitoes in one of her treatment groups died with no apparent cause the first time she attempted the experiment.

And, at times, the results of Haney’s experiment are less favorable than she expected. As of November, ABA has not reduced the mosquitoes’ capacity to lay eggs, but Haney said she has only just started her work and needs to collect more data before the results are definitive. If ABA can reduce the proliferation of malaria-ridden mosquitoes, the chemical can be applied safely to stagnant water sources where mosquitoes lay their eggs.

The World Health Organization reported 216 million cases of malaria throughout the world in 2016. Haney hopes her research could eventually lead to the successful prevention of even a small percentage of those cases.

“The work in our lab is focused on understanding mosquito and human responses to malaria parasite infection,” Luckhart said. “We’ll leverage this work as a basis to develop new drugs and new strategies to prevent and treat disease in the human host and to block parasite transmission from mosquitoes to humans.”

“Research has given me a great opportunity to get to know people and to find mentors within my field. If all goes according to plan, this method of treating mosquitoes could become a novel way of preventing malaria.”

Reagan Haney



“If more people knew about research, they would want to do it, too.”

Cheyenne Myers

Grazing Efficiency in Cattle

WRITER:

Jordan Hawley is a junior from Emmett who is majoring in microbiology.

PHOTOGRAPHER:

Olivia Heersink is a senior from Fruitland who is majoring in journalism with a minor in justice studies.



OUR Grant:

OUR Summer Undergraduate Research Fellowship and OUR Undergraduate Research Grant award recipient

Ranchers love to hear experts say their cows are efficient when it comes to how well they convert food into muscle. If cattle can grow quickly while grazing, that benefits the rancher's pocketbook, society's use of land resources and the environment.

“Ranchers want to use fewer resources to feed and grow each animal,” said **Cheyenne Myers**, who majored in pre-veterinary studies at University of Idaho before graduating in December 2018. “If we can make a cow more efficient, we would use less land, less grazing time, feed use would be cut, and cattle's contribution to greenhouse gases would decrease.”

Myers, who was raised in Fruitland and always had an interest in cattle and agriculture, is working with U of I's College of Agricultural and Life Sciences and Department of Animal and Veterinary Science Assistant Professor Gwinyai Chibisa. Myers wants to identify any links between efficient weight gain in cattle, where they graze, and the rate proteins are made and broken down, which determines muscle growth and wasting.

Her colleagues fed a regimented diet with no grazing to 16 cows at the Nancy M. Cummings Research, Extension and Education Center (NMCREEC) in Carmen. Cows were deemed “efficient” feeders if they ate less than predicted and “inefficient” feeders if they consumed more than predicted. Cows from both categories were assigned to the pasture at NMCREEC and the rangeland at Rinker Rock Creek Ranch in

Hailey. Rangeland cattle should face greater rigors involving weather and exercise than the cattle in pasture, Myers said.

Myers extracted mRNA — instructions based on DNA used to construct proteins — from tissue samples taken from each cow. Specifically, she is interested in mRNA from 10 specific genes involved in the creation and breakdown of proteins. She will look for any links between the amount of mRNA in the tissue, how efficiently the cows build and break down proteins and the cattle's grazing location. Her findings will help scientists understand the role of genes in feeding efficiency.

“I didn't think that I would ever fall in love with research,” Myers said. “There's just so much research to be done. We will never know everything.”

And this isn't Myers' first rodeo, either. The 22-year-old completed two previous projects with Chibisa, including a study on the effects of transport-related stress in young calves, and was able to present her findings at a scientific conference in Vancouver, Canada.

Having graduated, Myers plans on applying for veterinary school and continuing to work with livestock. First, though, she's continuing to pursue her research as a graduate student at U of I.

“This opportunity changed my life,” Myers said. “I honestly think that if more people knew about research, they would want to do it, too.”

Miyako (Mia) Nakayama lived near Tokyo, Japan, in 2011 when the Tohoku earthquake and resulting tsunami damaged three reactors at the Fukushima Daiichi nuclear plant. Radioactive materials were released into the environment, causing widespread evacuations and one nuclear-related death.

Although the United Nations has found health and environmental risks were temporary, news outlets have reported damage estimates calculated by the Japanese government will reach \$188 billion.

For Nakayama, the disaster made her question the future of her home country.

"I have been seeking renewable energy sources, which can partially replace the nuclear power plant in Japan, ever since I experienced the Fukushima Daiichi nuclear disaster," Nakayama said. "As I researched many types of renewable energy sources, I found that wind energy is the most promising technology due to the amount of power it can produce and cost-effectiveness."

Nakayama, a senior who graduated in December in mechanical engineering, grew up in the Chiba Prefecture in Japan, which is about a 10-minute train ride from Tokyo and about 150 miles from Fukushima.

The 27-year-old graduated with a degree in business with a marketing emphasis from Hosei University in Tokyo. But she wanted to take her education further and decided to pursue a second degree.

"My dream was to do interdisciplinary work that combines business and technology," Nakayama said.

Nakayama found herself poring over vast amounts of literature to better understand wind as a renewable energy source and to learn whether onshore or offshore wind turbines were more efficient.

She worked with Associate Professor Tao Xing in the College of Engineering as a mentor on her research.

Wanting to use a real-world simulation, Nakayama searched for a location that could support onshore and offshore wind turbines. She wanted to compare wind production between locations with approximately the same wind availability.

"To establish a fair comparison between onshore and offshore wind turbines, I had to choose the state that had the most available windy land," Nakayama said. "I chose the state of Texas."

For her comparisons, Nakayama analyzed data from the National Renewable Energy Laboratory and wind turbine manufacturers to get information such as wind speeds found across Texas and the capabilities of wind turbines.

She found offshore wind turbines produce more power but are not as cost-effective as onshore wind farms.

"This research can help in the preliminary decision-making process for businesses and governments installing wind turbines," Nakayama said.

Nakayama has a job offer with Yanmar, a company located in Osaka, Japan, that makes engines for industrial purposes such as boats and agriculture equipment.

After training with the company for six months, she will work in a material procurement position.

"When you find research you are interested in, just do it, just try," Nakayama said. "Be open-minded and just do it."



The Power of Wind

WRITER:

Jaime Ellis is a senior from Boise and is majoring in journalism with a minor in animal science.

PHOTOGRAPHER:

Cody Allred is a sophomore from Council studying public relations.



OUR Grant:
OUR Travel Grant
award recipient

"I have been seeking renewable energy sources, which can partially replace the nuclear power plant in Japan, ever since I experienced the Fukushima Daiichi nuclear disaster."

Miyako Nakayama



“What happens when the animal turns white, and it ends up not fully blending into its environment?”

Spencer Colvin

Unmasking an Animal's Camouflage

WRITER:

Hailey Stewart is a senior from Middleton and is majoring in journalism.

PHOTOGRAPHER:

Megan Murphy is a senior from Sun Valley and is studying advertising.



OUR Grant:
OUR Undergraduate
Research Grant
award recipient

Zebras have stripes. Leopards sport spots. Snowshoe hares disappear into a snowy landscape. But, despite their concealment, University of Idaho senior **Spencer Colvin** is working on a computer program to understand how successfully animals conceal themselves.

In fall 2018, Colvin wanted to gain undergraduate research experience at U of I in preparation for applying to graduate school. With a background in fish and wildlife sciences, the 22-year-old from Jerome paired with College of Natural Resources' Janet Rachlow, a professor of wildlife ecology, to create a research project in line with his interests in animal ecology.

They landed on studying the camouflage of snowshoe hares, a native to North America. The hares morph from white hair in the winter to brown hair in the summer.

The two teamed with College of Art and Architecture's Kyle Harrington, an assistant professor of virtual technology and design, so Colvin would have support with the computer science aspects of the project. The team's goal is to develop technology that can assess the quality of a subject's — in this case snowshoe hare's — camouflage.

Colvin started working with computer software called ImageJ, which was made to dissect images. The ImageJ software can be used for analyzing the blends of color in artwork or the effectiveness of camouflage clothing.

Colvin, Harrington and one of Harrington's graduate students are developing ways to analyze photographs

of animals in their natural settings with the ImageJ software. When complete, their computer program will be able to distinguish between the subject and its background and calculate how well the animal blends in with its surroundings.

Colvin combs through each photo of snowshoe hares and actively selects the pixels belonging to the animal, telling the program all the selected pixels are the subject while all other pixels are the background.

“Basically, we are asking, ‘How well do snowshoe hares camouflage themselves?’” Colvin said. “With this research, you could take that simple question and grow it so many ways.”

Once complete, Colvin said Rachlow will use the program to answer questions about snowshoe hares' responses to climate change.

“When temperatures rise, there is less of a need for the snowshoe hare to change to a snow-white color in the winter,” Colvin said. “What happens when the animal turns white, and it ends up not fully blending into its environment?”

Now, with a background in fish and wildlife sciences and applicable knowledge in computer science, Colvin said he feels ready for the obstacles graduate school might bring.

“The computer aspect of this project was very new to me,” Colvin said. “That piece of the project has really helped me hone a number of skills and rounded out my education.”

The University of Idaho hadn't pinged **Samuel Myers'** radar when he was applying to colleges until the National Merit Scholar from Mukilteo, Washington, received a piece of mail from the university.

"It was like, 'Hey, we know you're a National Merit Scholar, and we offer a full-ride scholarship, so come check us out,'" Myers said. "The most important thing I was looking for in an undergraduate institution was the ability to participate in undergraduate research. When I saw that this university had plenty of opportunities for that and professors who were willing to start working with people right away, it really sealed the deal for me."

Now, the 20-year-old junior is studying mathematics and physics and working on a project with Jason Barnes, an associate professor in the Department of Physics. The study investigates the formation and evolution of planets by studying exoplanets, planets in other planetary systems — not our solar system.

Myers uses data from NASA's space telescope Kepler, which for several years recorded stars' light curves — stars' brightness over time. A star's brightness appears to change when an exoplanet passes in front of the star, blocking part of the star's light from reaching Kepler.

By studying this brightness pattern, Myers can measure an exoplanet's spin-orbit misalignment — if an exoplanet revolves around its star on a different plane than the star rotates. An exoplanet's spin-orbit misalignment tells Myers something about that exoplanet's orbit.

In addition, using technology developed by Barnes and a former U of I graduate student, Myers and his colleagues are able to analyze gravity-darkened stars. These stars rotate so rapidly, they start to flatten, resulting in varying brightness across latitudes that make it more difficult to examine them. But Myers said their equipment processes the data in a way that makes it usable, creating an independent measurement.

So far, Myers said they have completely measured the spin-orbit misalignment of one planetary system. After looking at several more planetary systems, they hope to gain insight into how planets form and clarify theories about planetary formation.

"We may be able to say, 'OK, well, Theory A isn't happening, but Theory B is happening all the time. And we are watching that play out in the universe,' which is really cool," Myers said. "Understanding how planets form tells us a lot about where we might expect to find planets that are habitable and what goes into making a habitable planet. We've been making actual scientific process, and it's just amazing."

In October 2019, Myers, who received the College of Science's Hill Undergraduate Research Fellowship for his project, plans to present his findings at the annual meeting of the Division of Planetary Sciences in Geneva, Switzerland. After graduating in spring 2020, Myers hopes to continue his educational endeavors with planetary science and eventually become a professor.

“Understanding how planets form tells us a lot about where we might expect to find planets that are habitable and what goes into making a habitable planet.”

Samuel Myers

WRITER/PHOTOGRAPHER:

Olivia Heersink is a senior from Fruitland and is majoring in journalism with a minor in justice studies.

Forging into the Final Frontier



Alexandra Malfant and Lucas Rovic used class time to help Micron Technology find ways for the Boise-based computer chip maker to be more efficient.

The two University of Idaho students worked as part of a team to assess Micron's operational systems through their Business Process Center class for their operations management degrees. College of Business and Economics Instructor Todd Martin led the class in spring 2018.

Micron develops and manufactures memory and semiconductor devices — the electronic components of computers. The company asked the team to assess the company's operations.

Malfant, a 23-year-old senior from Leon, France, said working with such a well-known company provided both exciting experiences and difficult challenges.

"We obviously can't learn everything there is to learn about such a large company," Malfant said. "But it really did give us a taste of what an operations manager would do out in the real world."

The team used the computer software ProModel to organize their research and analyze the company's operations, said Rovic, a 27-year-old senior from Boise. The software allowed the team to dig into Micron's current production schedule.

"We look to figure out the most efficient way of running various scenarios to find the best strategy for the company," Rovic said.

Micron provided the team a set of data from the company's production systems, and the team compared the current

mode of production and a number of potential changes to the production process. Using computer simulations, they calculated differences in efficiency and output.

"With Micron, as a whole, there is just so much to the company. There are thousands of steps the company must go through just to build a single memory chip," Rovic said. "It takes a while to wrap your head around all that."

In general, companies don't ask the teams in the Business Process Center class to solve specific problems, but rather to look holistically for areas of improvement and make recommendations.

"I found it surprising how broad and how complex this kind of work can be," Malfant said. "They always say business is business, but there is so much more to business than we often think — that's where this work comes in."

The team met with Micron employees to begin the project and again at the end of the semester to present their research. In addition to the real-world business experience the students received, Rovic said the class helped them gain confidence in presenting their research.

Rovic and Malfant graduated in fall 2018. Because of Rovic's relationship with the company, Micron offered him a job after graduation. And Malfant said she is keeping her career options open after graduation.

"This class gave me the confidence to be able to work with professionals," Malfant said. "It taught me how crucial teamwork can be to business."

WRITER:

Hailey Stewart is a senior from Middleton and is majoring in journalism.

PHOTOGRAPHER:

Nicole Etchemendy is a junior from Teton Valley and is studying creative writing with minors in philosophy and journalism.

“It really did give us a taste of what an operations manager would do out in the real world.”

Alexandra Malfant

Shaping Business One Project at a Time





OUR Grant:
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Many people like to collect things. **Vincent Aron Oliveras** liked collecting frogs during an internship in Ecuador. He even caught one frog species that was previously unidentified.

“Being able to collect so many frogs was amazing, especially when we ended up catching two new species,” said Oliveras, who came to the University of Idaho from The Bronx, New York, to get his degree in wildlife resources with a minor in entomology and geospatial information systems.

Oliveras applied for an internship to do research in the Zamora-Chinchipe watershed that surrounds Loja, Ecuador, for eight weeks to study the impact land use has on diversity, abundance and physical condition of the amphibians living there. Land use in the area includes forest, pasture and urban settings.

“I saw the opportunity to do research in Ecuador,” the 30-year-old senior said. “I wanted to see where my skills could take me and see how much I could learn.”

Oliveras worked with Diego Armijos Ojeda from the University of Loja in Ecuador and College of Natural Resources Assistant Professor David Roon. Once he arrived in Ecuador, he collected frogs from within the Zamora-Chinchipe watershed.

“We collected frogs by hand, and then we weighed them, measured and identified them,” Oliveras said. “There were 15 species of frogs that were supposed to be within the watershed. We found six or seven species of frogs.”

Oliveras spent the remainder of the research trip in Ecuador analyzing the data collected.

He thought the greatest differences in diversity would be found between forest and urban settings due to a change in environmental factors such as food availability, water pollution and predation on frogs.

“We weren’t able to definitively say that a decline in habitat resulted in a decline in health,” Oliveras said. “Ultimately, we found the more disturbance there was or the higher rate of habitat degradation, the fewer species and diversity there was.”

Scientists consider the decline of amphibian populations an early warning sign for problems in the ecosystem that result from decreased water quality.

“Ideally, the research should inform management decisions,” Oliveras said. “This was a solid set of data that indicates ‘Hey, you guys may need to change the way you manage your watershed and some of your policies.’”

He was able to present his research nationally at the Ecological Society of America conference in New Orleans, Louisiana.

Oliveras said working across cultures had its challenges but was also rewarding. He has continued his partnership with his international colleagues and will be a co-author on their professional publications.

He plans to attend graduate school after he gets his bachelor’s degree in spring 2019, and, because of his international experience, he’s exploring schools outside the United States.



Frog Diversity in Ecuador

WRITER:

Jaime Ellis is a senior from Boise and is majoring in journalism with a minor in animal science.

PHOTOGRAPHER:

Nicole Etchemendy is a junior from Teton Valley and is studying creative writing with minors in philosophy and journalism.

“I saw the opportunity to do research in Ecuador. I wanted to see where my skills could take me and see how much I could learn.”

Vincent Aron Oliveras



The Image of an Athlete

WRITER/ PHOTOGRAPHER:

Olivia Heersink is a senior from Fruitland and is majoring in journalism with a minor in justice studies.

Joelle Stephens has always been fascinated by the human body. So much so, the 21-year-old Moscow native decided to dedicate her life to studying it and hopes to become a registered nurse after graduating from the University of Idaho this spring.

Stephens, a senior majoring in exercise, sport and health sciences, said her chosen career path was further validated through her current research, which focuses on body composition, energy intake and body image in adolescent aesthetic athletes, such as dancers and gymnasts whose performances involve an artistic aspect.

In spring 2016, Ann Brown, an assistant professor in the College of Education, Health and Human Sciences' Department of Movement Sciences, began working with Stephens and encouraged her to apply for a summer 2017 research grant.

Brown suggested Stephens focus her study on young dancers and gymnasts because most research on these types of athletes centers on pre-existing problems, such as inadequate energy intake, low bone density and low self-esteem. Those problems can lead to osteoporosis and eating disorders, respectively. By looking at a group ranging from ages 5 to 15, they hoped to observe points

at which these problems may begin to develop and offer pre-emptive solutions involving changes in diet and exercise.

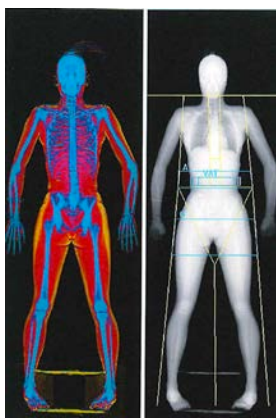
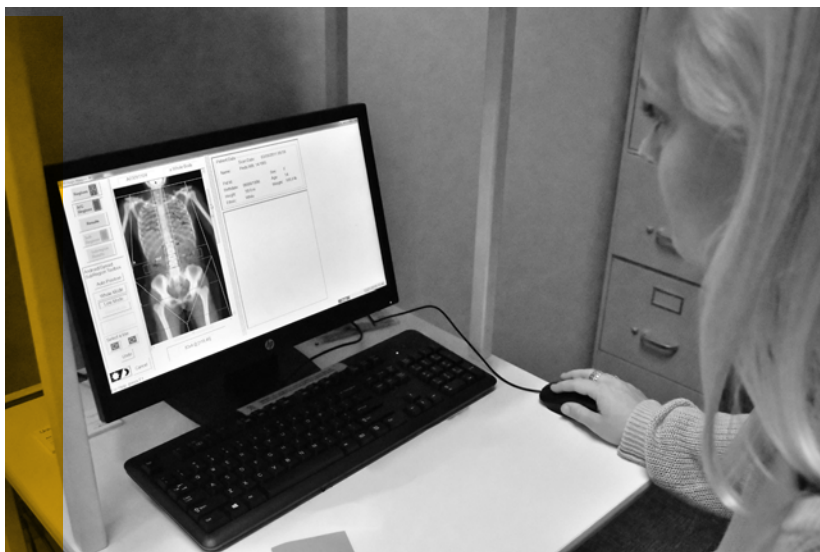
"We know quite a lot about aesthetic or weight-sensitive athletes once they've already developed problems, but I think identifying when those issues surface is more important," Brown said. "All of these variables are interrelated."

During the fall 2018 semester, Stephens and Brown had a cohort of 31 participants — 18 gymnasts and 13 dancers — whose average age was 10 years old.

During a 30-minute session in the Human Performance Lab, the young athletes were asked to answer 11 questions in relation to body image and self-esteem, providing an overview of what they thought about themselves and what they believed others thought.

Participants also provided their past medical history and their food intake for the past 24 hours. They even completed a dual-energy X-ray absorptiometry scan, which looked at bone density and lean muscle mass — a person's total weight minus any fat.

"Our main goal is to find ways to help young athletes maintain a good, overall healthy lifestyle while being super active," Stephens said. "Their bodies are still



“ Our main goal is to find ways to help young athletes maintain a good overall healthy lifestyle while being super active.”

Joelle Stephens

growing and their bones are still developing — what they eat now is important for when they get older. This is also the time where they can feel pressure to look a certain way for their activity or sport.”

So far, Stephens said the data shows most of the group suffers from low calcium intake, but has high self-esteem and body image perception, with 90 percent saying they are happy with how they look. A few of the athletes are at risk for low bone density for their developmental stage.

“It’s interesting because every parent is protective of their child and it’s a different dynamic than just having a college student come into the lab versus a 7-year-old and their parent,” Brown said. “The way you explain things is much different and Joelle was great at working with them.”

Eventually, they’d like to investigate whether the dancers differ in any way from the gymnasts. Stephens is set to report her findings in April 2019.

“It’s important to just be happy with the way your body looks and to try to maintain as happy and healthy of a lifestyle as you can,” Stephens said. “Even though our study was directed toward aesthetic athletes, many other people can be influenced by a variety of factors, so just trying to help identify areas where we can improve people’s overall lifestyle is beneficial.”



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ROOM FOR IN-CLASS RESEARCH

A former dancer, **Ann Brown**, an assistant professor in the University of Idaho Department of Movement Sciences, has transformed her love of athletics into a career of scientific research.

Throughout spring 2019, Brown has taught an elective course, Metabolism in Exercise and Sport, centered on how metabolic processes change based on what people eat and how those nutrients are broken down while exercising. The class research project was funded by an Office of Undergraduate Research Curriculum Development Grant.

In the course, students developed their own hypotheses, recruited participants and collected data to better understand resting metabolism in a fasted-versus-fed state. They also looked at the relationship between a person’s metabolism and amount of lean muscle mass.

“I really wanted to increase the exposure students had to research within the classroom,” said Brown, who is in the College of Education, Health and Human Sciences. “This was a way to continue research important to my own scholarship, but that also gets undergraduates interested in research. It seemed like the perfect fit.”

Although Brown also taught the course in spring 2018, the 2019 version was the first time she was able to integrate the research component so heavily.

Because of the grant funding, Brown will conduct the research project for three consecutive spring semesters, allowing her to collect a more robust data set. After three semesters of the course, she hopes to have at least 120 participants who have taken part.

“I hope we find some interesting relationships between metabolism and body composition,” Brown said.



Humans have contaminated our fresh water with antibiotics. This pollution contributes to antibiotic-resistant bacteria, which are hard to treat when they infect humans and animals. Senior McKenzie Walquist is testing whether plasma effectively breaks down antibiotics in fresh water.

uidaho.edu/engr



Zebra fish have similar retinas to humans, except the fish can regrow damaged portions of their retinas — humans cannot. To learn about human retinal degenerative diseases, senior Zach Blume is investigating how kick-starting the fish's immune system influences the degeneration of the retina.

uidaho.edu/sci

Senior Hannah Jaeger is studying how human cytomegalovirus (HCMV), the leading cause of neurological birth defects, affects nidogen 1, a protein integral to the supportive layer surrounding blood vessels. Jaeger's studies indicate HCMV's interactions with nidogen 1 may damage the supportive layer's integrity and facilitate the dissemination of the virus throughout the body.

uidaho.edu/sci



The Office of Undergraduate Research has awarded 265 student grants since 2016.



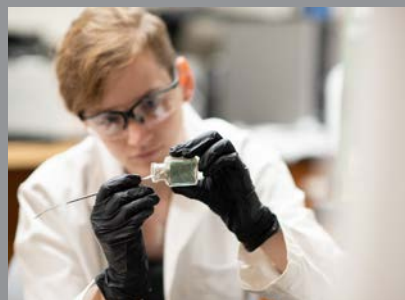
Emily Wesseling interviewed women and youth working at a tree nursery in Notsé, Togo, a developing nation with heavy deforestation. The junior documented their perceptions on the causes and mitigation of climate change.

uidaho.edu/cnr

More than 135 students present at the U of I Undergraduate Research Symposium each year.

Students described the J.A. Albertson Building's student level as dungeon-like. But, after business students raised the money, interior design students redesigned the space, now an inviting and vibrant student lounge.

uidaho.edu/caa



Junior chemistry major Lilian Bodley runs chemical tests on archaeological artifacts to uncover their mysterious history, good practice for her chosen career as a crime scene investigator.

uidaho.edu/class

Agriculture and business seniors Dustin Winston and Cole Lickely interned with a Fortune 500 financial services company in Chicago to learn about commodity trading.

uidaho.edu/cals



Lab Notes

With two-thirds of undergraduates engaged in research activities during their time at U of I, there are plenty of stories to tell.

Find out more at uidaho.edu/vandalsinfocus.

VANDALS IN FOCUS PRODUCTION TEAM

Editor – Leigh Cooper, Science and Content Writer

Designer – Beth Case, Art Director

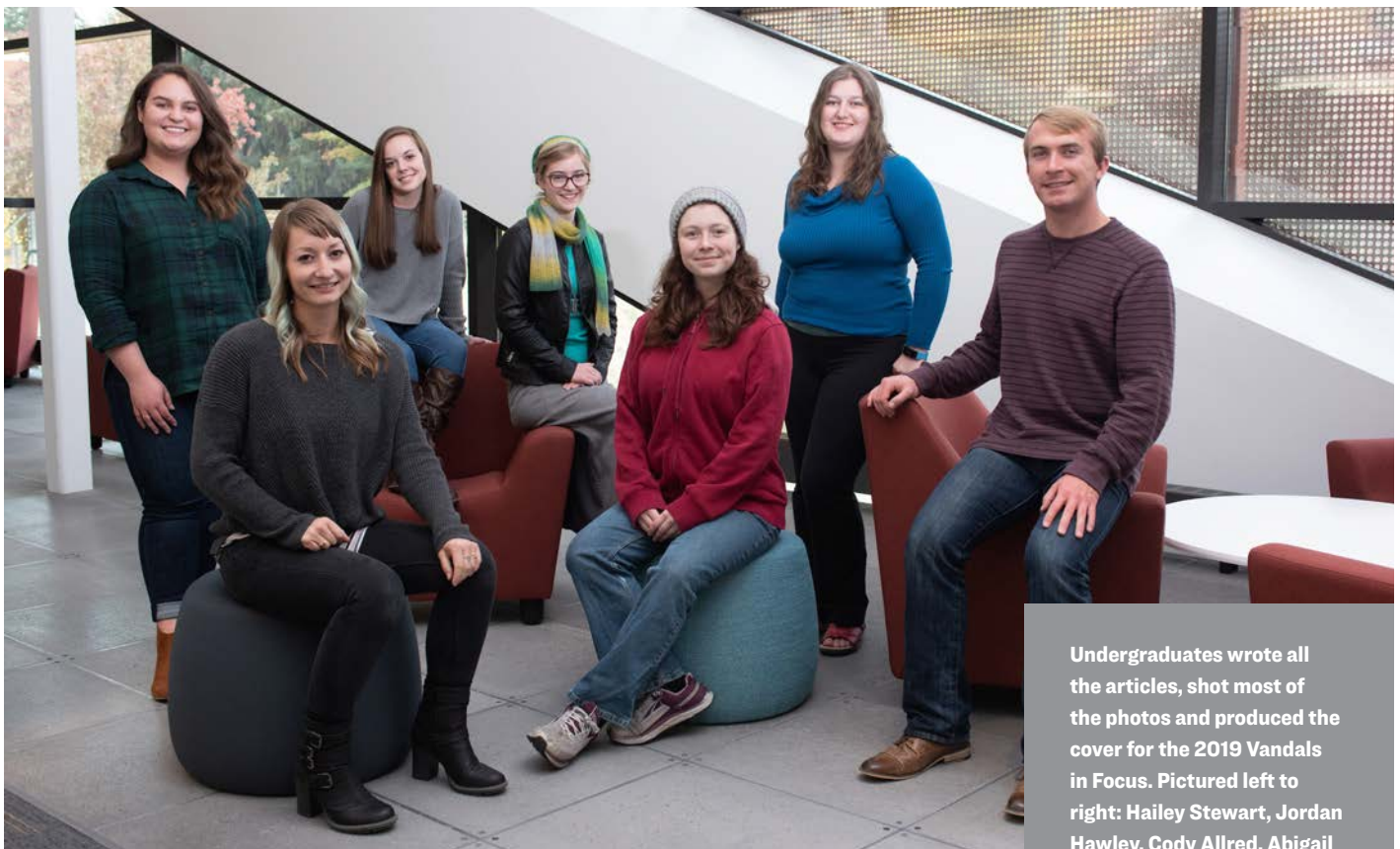
ABOUT THE OFFICE OF UNDERGRADUATE RESEARCH

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.

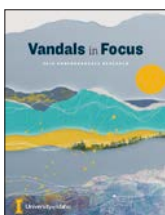
Contact OUR at our@uidaho.edu or 208-885-4109.

Learn more at uidaho.edu/undergradresearch.



Undergraduates wrote all the articles, shot most of the photos and produced the cover for the 2019 Vandals in Focus. Pictured left to right: Hailey Stewart, Jordan Hawley, Cody Allred, Abigail Spence, Alexis Van Horn, Jaime Ellis, Seth King. Not pictured: Megan Murphy, Nicole Etchemendy, Olivia Heersink.

COVER ARTIST'S NOTE



The 2019 Vandals in Focus cover was inspired by the University of Idaho's identity and explorative research as it relates to landscape. So much of this university is invested in the land — we are a land-grant university, we distinguish this institution by its primary location in Moscow, and our student research is tied to this specific place and other landscapes around the world.

Who we are as individuals stems from where we grew up or where we consider home. In the same vein, U of I's student research can also be identified by where it took place. In service to that idea, the artwork features a collaged landscape that represents the land as an index of this community's knowledge and identity.

Abigail Spence, who designed the cover, is from Deary and is a senior in the College of Art and Architecture's Art and Design Program.



University of Idaho

Office of Undergraduate Research

uidaho.edu/undergradresearch