

SCIENTIA

A publication for College of Science and Health alumni



Students Benlina Aier and Jess Rehs, pictured with their mentor, Matt Heintz, monitored animal behavior at Lincoln Park Zoo over the summer as part of the Dean's Undergraduate Fellowship program.

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Fall 2014

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CSH progress notes

Reflecting on my first year at DePaul and the progress of the College of Science and Health (CSH) since its founding in 2011, I feel considerable excitement. Our enrollment has reached nearly 3,500 students, our faculty brought in \$2.3 million in new grants during the last academic year, construction of expanded laboratory space in McGowan South began and remains on schedule, and we have added a new nursing program and completed our pathways to graduate study in the health professions with Rosalind Franklin University of Medicine and Science. Yet these markers of success hardly tell the whole story.

Our students' achievements represent the most essential indicator of our accomplishments, and student involvement in research alongside our CSH faculty and in the community forms an important foundation to their education. Earlier this year, we converted DePaul Discoveries, our undergraduate research journal, to digital form. I encourage you to take a look at [bit.ly/DePaulDiscoveries](#) to see articles that illustrate how our students gain hands-on experience in what it means to be a researcher, how we teach research skills and how our professors bring students into their active research programs. In this issue of Scientia, you can learn more about this process. Read about our innovative summer research program on page 4, and find out about student contributions to a NASA-funded study on page 6.

Not every student arrives at DePaul with a plan, but our CSH advising team assures that all students find their way. "Laura," a current student, arrived on campus uncertain about her major or her future. A first-generation college student and athlete with an interest in psychology, she wasn't sure how to balance her course load with practice and study time. Starting with the Premiere DePaul orientation program, our advising team put on the full-court press. Now a junior majoring in psychology, Laura has studied abroad in Spain, maintained a very respectable GPA and routinely shares her experiences with newly admitted students. Our student-athletes graduate on schedule, and many break stereotypes by majoring in rigorous programs of study, thanks in part to our superb advising team and dedicated faculty advisors.

Another DePaul difference involves the intentional integration of the natural sciences and mathematics with health career options in a single academic unit. Most universities are structured in ways that segregate basic scientists, health researchers and health practitioners



Dean Gerry Koocher, PhD

in curriculum development, and few have direct alliances that enable students to accelerate into graduate school or professional degree programs effectively. Over the next year, we will launch a new strategic-planning effort aimed at enhancing this integration and adding new partnerships to improve career options for our students. I look forward to leading CSH in achieving our overarching goal of establishing DePaul as the premier choice for students seeking a well-guided pathway into science, mathematics and health careers.

Alumna entrepreneur finds success at the intersection of chemistry and law

When Katherine Kim (CSH MS '97, JD '04) enrolled in the Master of Science in chemistry program at DePaul, she never imagined that one day she would be the founder of a boutique law office—or that her foundation in chemistry would prove instrumental to her company's success. As principal of Spark IP Law, Kim assists start-ups in fields as diverse as the biotech, cosmetics and chemical industries with intellectual property strategy and development. "You cannot do this kind of work unless you have a scientific background," Kim asserts. "We have to understand their technology in order to write the patents."

Kim's path to entrepreneurship included stops at a biotech start-up, a large pharmaceutical company and a law firm focused on litigation. "After I graduated from DePaul, I never had a problem finding a job because not only did I have experience working with the various analytical instruments used in the pharmaceutical field, but also I had co-authored multiple publications," Kim explains. She recalls working closely with Professor Gregory Kharas in the polymer organic chemistry lab and publishing extensively in that area of study. This experience paid off when a California-based start-up hired Kim as a polymer chemist. When the company went under, Kim found work as an analytical chemist and was on track to become a research scientist in organic chemistry, but she decided to return to school for a second advanced degree.

Back at DePaul, Kim joined a cohort of students studying patent law. Even though she missed the labs and research projects that played such a central role in her first program at DePaul, Kim followed through on law school and soon found herself working grueling hours as a novice attorney. "I decided I didn't like law at all," she admits.

"But somebody gave me a small client, I helped them out, and I enjoyed it so much that I started trying to get other clients." This shift ultimately allowed Kim to find a career at the intersection of her dual degrees.

Clients come to Spark IP Law with various intellectual property needs. Kim's office provides solutions paired with personal attention that smaller start-ups often need and appreciate. "We'll see what kind of budget they have, what their goals are and we'll recommend next steps," Kim says. "We'll suggest where they should file the patents and then we'll actually do that work for them."

Kim notes that all of her clients come from referrals, but getting to this point of financial viability wasn't easy. "Generally, people will start their own firm with one big client after they've been at a large firm for 10 or 15 years," she says. "When I struck out on my own, I had nothing, and I had to learn everything the hard way." Kim remembers attending networking events three to four nights per week for more than a year in an effort to drum up business.

Luckily, Kim loves meeting new people and considers it a primary perk of her job. "It's one of the reasons I worked so hard at networking—I thought, okay, if this doesn't pan out and I have to go back to a large firm, I'll never have time to meet people," she explains. While other attorneys are holed up in offices for hours on end, Kim heads to the heart of the biotech scene on the West Coast to scout for business development opportunities. Recently, she served as a judge for the Intel International Science and Engineering Fair. "Those students are very impressive—the brightest of the brightest," she recalls. "But I was just as excited about networking with the other judges!"



Katherine Kim's top four tips for recent graduates:

Keep building your resume.

Even if you don't know what you want to do, keep adding value to your resume. Do something productive that will make you stand out, whether it's starting a blog, getting published, securing a business contact or pursuing a degree.

Network.

If you're going to start your own business, you have to network. A lot of people say they hate networking. If that's the case, pair up with someone who enjoys networking so you can work as a team.

Be realistic about your weaknesses.

I think the most successful people are the ones who understand their own weaknesses. Don't try to do it all yourself. People think they can do everything, but that's inefficient. You can do so much more if you partner with someone who complements you.

Don't take things personally.

You're never going to be liked by everyone, so don't worry about it. Just move on from that. Statistically, you're bound to meet someone who is cool, who is helpful, who will become a mentor or a mentee or a friend.



Benlina Aier, Matt Heintz and Jess Rehs collaborated on takin behavioral research.

Lions, lycopods and laboratories: CSH students thrive in summer internships

This past summer, junior Benlina Aier stood in front of the Sichuan takin exhibit at Lincoln Park Zoo. Armed with an iPad, the psychology major used the ZooMonitor app to record behavioral information about the five takins, a type of goat antelope, milling about their environs. "I never thought I'd learn how to distinguish and name them," Aier exclaims. "It was definitely overwhelming trying to collect data on all five of them at once!" Nonetheless, by midway through Aier's internship, she had mastered this crucial task. "We want to make sure we have a clear understanding of how the animals are spending their time so we can optimize their health and welfare, as well as replicate their wild conditions as much as possible," explains Matt Heintz, a welfare monitoring postdoctoral fellow and Aier's mentor.

As one of eight recipients of the inaugural Dean's Undergraduate Fellowship program, Aier worked 30 hours per week at Lincoln Park Zoo, conducting two rounds of observations daily, training volunteers on the process, compiling and managing data, and analyzing journal articles. "Though I have some previous research experience, I wanted to work over the summer to better develop my research skills," Aier says. While she enjoyed checking in on her assigned animals, including lions, snowy owls and polar bears, Aier also appreciated the larger scope of her work. "In the long term, all these projects will come together for the sake of animal welfare," she explains. "The collected data go to zookeepers and other zoos to better improve the lives of the animals we are so fortunate to study."

The fellowship program, operated by the college's Office of Advising and Student Services and financially supported by the Dean's Advisory Council and other donors to the Dean's Undergraduate Research and Internship Fund, provides students with a \$3,200 stipend for the summer. "Many DePaul students work to support their academic studies and often cannot afford to take advantage of low- or unpaid internship or research opportunities," says Sara Miller-Acosta, associate vice president of development. "At the same time, these opportunities are often critical for students seeking hands-on research experiences outside the classroom." During summer 2014, Lincoln Park Zoo and Argonne National Laboratory each accepted two interns through the program; another four students held positions at The Field Museum.

Staff mentors at each institution encouraged their interns to ask questions, maximize their efforts and produce high-quality work, which the students showcased in digital portfolios. They will also be sharing their research at the Annual Natural Sciences, Mathematics and Technology Showcase in November. As senior biological sciences major Vishal Patel notes, "What good is research if someone does not have the skill set to present it in a manner that the majority of people understand?" During his internship in the botany department at The Field Museum, Patel found that developing his communication skills happened naturally on the job. "The diversity among interns and staff members is nothing short of extraordinary, so it brings great conversations and different perspectives to the table," he says.



Clockwise from left: Vishal Patel, Edward Gluzman and Emily Franz at The Field Museum; Gluzman displays a fern sample; a map shows the origins of the fern specimens.

Among other responsibilities, Patel assisted with several digitization and visualization projects funded by the National Science Foundation, including expanding a database of fern and lycopod herbarium specimens. "This project will greatly increase the accessibility of the collections, making them available online to the scientific and broader community, with far-reaching applications," he says. Patel's mentor, Matt Von Konrat, a collections manager and adjunct curator at the museum, says the students' contributions made a real difference, and he valued their dedication to the project. "They are all very conscientious, diligent and promising students with a strong passion for learning and science," he asserts. "We benefit enormously ... partnerships like these are the way of the future."

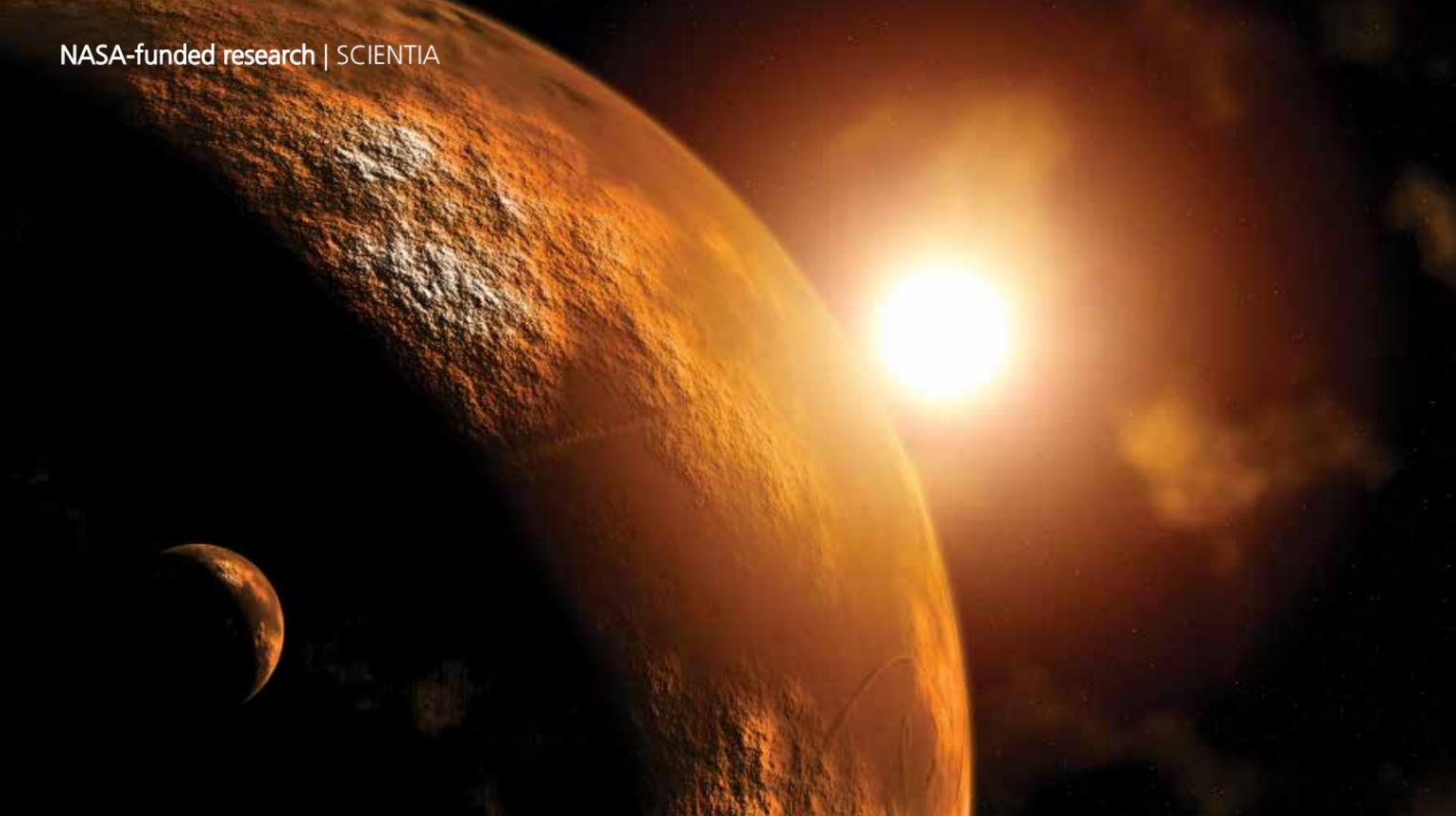
For senior Matthew Kwiecien, a double major in physics and computational math, the fellowship presented an opportunity to learn more about possible career paths. "The university is a great place to learn, but there's an entire other half of physics that I had never seen," he explains. "My personal goal is to find out as much as I can about how science is done outside of the classroom." His internship at Argonne National Laboratory more than fit the bill. "Since the first day, I have been in charge of my own project and how far I want to take it," Kwiecien says. "I get treated as if I am just another scientist at Argonne, which makes me want to dedicate even more time to my research project."

As a member of the Advanced Photon Source team, Kwiecien wrote code to generate images from X-rays. The project entailed correcting a set of 500,000 raw, recorded data files and then adjusting the image parameters to produce high-quality images of the sample. While the

scope of this work was daunting, Kwiecien was ready for the challenge. "I don't think I could have been more prepared for this fellowship, and for that, I have to thank DePaul's physics department," he affirms. "Having a solid foundation in physics, both theoretical and experimental, has made it much easier for me to jump into my project and adapt to a new setting." While some students view summer as a time to relax, Kwiecien couldn't wait to head to his internship each day, calling it the professional experience of a lifetime.

"It's an investment in our future," Patel says. "We have been given the opportunity to create connections, develop time management and communication skills, and build a resume that's suitable for our career." While Aier says she still has a long way to go, she's certain that these experiences will serve all of the fellows well in the next chapter of their journeys. "With the skills and knowledge we have gained in our positions, I know that we will be more prepared for the real world, graduate study and research," she says. "Personally, I can't wait!"

For more information or to support the Dean's Undergraduate Research and Internship Fund, contact Paula Starkey, director of development for the College of Science and Health, at (312) 362-6341 or pstarkey@depaul.edu.



Fielding a team for a mission to Mars

Imagine being confined to a small room with a handful of co-workers for years on end. This situation may sound extreme, but for astronauts deployed on space missions to destinations such as Mars, it will be their daily reality. “It will probably be difficult or impossible to swap out crew members once they are on their way, and the crew will likely encounter challenges that we have no way of predicting,” says Associate Professor Suzanne Bell, who has been studying the composition of effective teams for more than 10 years. “So it seems particularly important to make sure we’ve got the right astronauts and the right mix of astronauts in the vehicle at launch.”

With plans underway to land the first people on Mars in the not-so-distant future, NASA is funding research projects related to that ambitious endeavor. Last year, Bell won a competitive contract from NASA to research and identify team composition issues for long-distance and long-duration space expeditions. Bell’s findings will help NASA understand the potential implications of different team compositions and inform the trajectory of future studies.

The lack of any prior trips of similar length on which to base the study did not deter Bell. On the contrary, she embraced the challenge. “Our first step was to do a literature review on team composition research that has been conducted in

environments analogous to long-duration space flight,” she says. “For example, we looked at scientist teams wintering at stations in the Antarctic.” Bell notes that it was critical to compile data from situations that mimicked the isolation, confinement, duration and small-group dynamics of the proposed Mars exploration. Junior Christina Teach, one of Bell’s three undergraduate research assistants, helped with this aspect of the project. “We sought out specific composition variables, such as demographics, personality variables, values, and general mental ability and intelligence,” she explains.

Next, Bell interviewed astronauts, mission directors, capsule communicators who talk to the astronauts during their flights and other individuals involved in astronaut and mission control selection and training. This operational assessment provided insight into NASA’s current methods for creating mission crews and revealed certain potential problem areas. “Generally speaking, the most memorable responses were when interviewees agreed that it is important to consider the individual differences of crew members when selecting teams for long-duration missions,” says graduate research assistant Shanique Brown. “This response, coming directly from those who have experienced living in isolation, really speaks to the value of the work done by industrial/organizational psychologists.”



Suzanne Bell at the historic Apollo Mission Control Center in the Johnson Space Center in Houston.

While Bell cannot discuss the comprehensive results of her research until NASA approves the final tech report, the team presented select preliminary findings at the Annual Convention for the Association for Psychological Science in May. Specifically, Bell shared intriguing results regarding extraversion. “In more traditional work teams, the qualities of extraverted individuals—sociable, fun-loving, friendly and talkative—can be an asset,” she explains. “However, [these qualities] may not be desirable to staff crews who live and work in isolated and confined environments.” Furthermore, while research on traditional teams suggests that blended teams of introverts and extraverts appreciate each other’s differences, this may not be the case for long-duration space travel.

Bell stresses that more research is necessary to fully understand these initial results. “My guess is that you wouldn’t want to send a crew that is too extreme toward either end of the pole,” she says. “Introverted astronauts might do better in terms of being able to cope with the social monotony and living in an isolated and confined space, but all-introvert crews may have their own challenges with leadership and engaging in effective team processes.” Personality type is only one factor of many that NASA will need to consider in forming expedition teams. By way of example, Bell adds, “There may be circumstances in which NASA will have to choose certain rare expertise over a specific personality mix.”

The project’s unique context was never far from the research team’s minds. In February, Bell and Brown attended the NASA Investigators Workshop in Galveston, Texas, where fellow academics presented their own behavioral health research. The itinerary also featured a behind-the-scenes tour of Houston’s Johnson Space Center, which Brown calls surreal. “We observed mission control crew members monitoring the International Space Station,” she says. “The highlight for me was looking at and touching the technology used during



Research assistants Dulce Vega and Shanique Brown at the Annual Convention for the Association for Psychological Science.

the Apollo missions.” Teach, the undergraduate research assistant, felt a similar connection to the history behind the project. “I read interview after interview of famous astronauts such as Sally Ride and Owen Garriott,” she says. “It was very interesting and sometimes comical learning about their experiences!”

With the initial contracted project completed, Bell is already submitting follow-up grant proposals to NASA. In fact, NASA used some of her recommendations from the interim tech report to shape a recent research call. “NASA has their work cut out for them over the next few years,” Bell asserts. “But it’s definitely been exciting to apply team composition theory to such an extreme context.”



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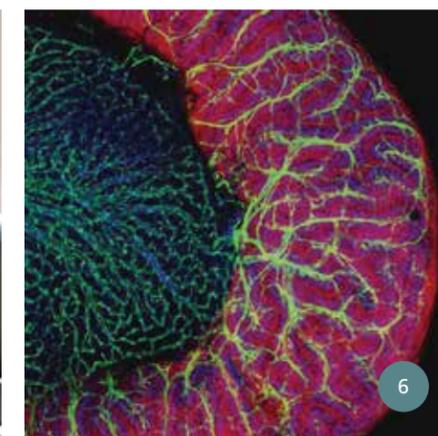
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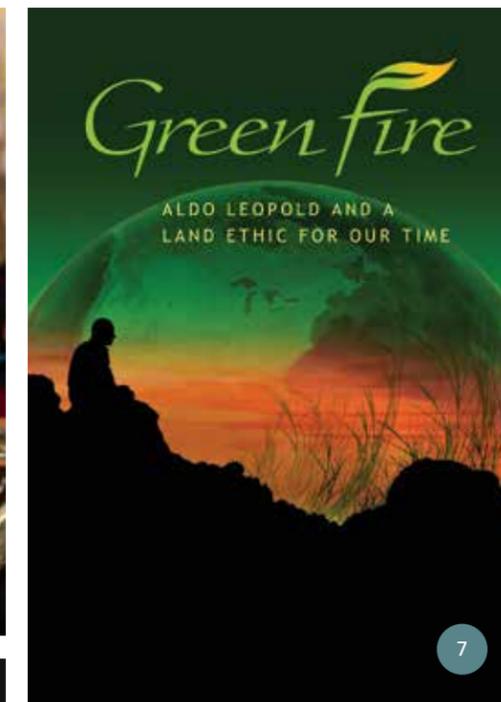
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6 Biology major Erica Binelli (CSH '14) won third place in the Aquaneering Art of Science Photomicrography Calendar Contest for her image of gut tissue in adult zebrafish, which she photographed using the Department of Biological Sciences' confocal microscope. An outside panel of science and art professionals judged entries on both technical execution and artistic rendition. Aquaneering, a manufacturer of fluidized bed bioinfiltration systems, featured Binelli's image in a 2014 calendar included with the January issue of Zebrafish Magazine.

Lab notes

1 Starting this winter quarter, students will enjoy an upgrade to the fourth floor facilities in the Monsignor Andrew J. McGowan Environmental Science and Chemistry Building (McGowan South), which will include new teaching labs for anatomy, physiology and physical chemistry, as well as an open lab. Further renovations took place on the third floor, where a second organic chemistry lab welcomed students this fall, and modifications were also made to the Department of Environmental Science and Studies. Meanwhile, at Byrne Hall, the Department of Physics' two teaching labs were overhauled to provide enhanced, state-of-the-art studio physics spaces.

2 On June 15, the college awarded its first Doctor of Nursing Practice (DNP) degree to Marcia Stout (CSH DNP '14), visiting assistant professor and interprofessional lab coordinator. Stout, who is also a family nurse practitioner in a community clinic, entered the program in 2012. "The program is exciting because it educates advanced practice nurses to become transformers of the health care system on multiple levels," she says. "This degree has advanced my career perspectives as a clinical educator, scholar and leader in health care." Pictured: Clinical Associate Professor Ronald Graf, Stout and Assistant Professor Joseph Tariman.

3 Professor Liam Heneghan (LAS MA '13) of the Department of Environmental Science and Studies won the 2014 CSH Excellence in Research Award. This annual award recognizes faculty who have made significant scientific contributions in their area of research and who promote outstanding research at the college. In a nomination letter, Professor David H. Wise, associate director of the Institute for Environmental Science and Policy at the University of Illinois at Chicago, called Heneghan an "exceptional, multi-faceted researcher" and a "selfless and invigorating collaborator." Heneghan's areas of research include urban ecology and restoration management. Follow him on Twitter @DublinSoil. Pictured: Dean Koocher and Heneghan.

4 Dorothy Kozlowski, professor of neuroscience, was elected as the next president of the Society for Neuroscience Chicago Chapter. Her term will begin in 2015 and last two years. In addition to organizing a yearly scientific meeting, the society works on outreach and education programs in the community, connects neuroscientists in the Chicago region and mentors young scientists. Kozlowski was also appointed as a St. Vincent de Paul Professor for the 2014-15 academic year. St. Vincent de Paul Professors are a cohort of faculty who promote the university's educational mission in ways consistent with Vincentian personalism, social justice and service. Photo credit: DePaul University/Jeff Carrion.

5 On May 5, Leonard Jason, professor of psychology and director of the Center for Community Research, gave an invited talk entitled "Diagnostic Criteria for Myalgic Encephalomyelitis/Chronic Fatigue Syndrome" to a panel of scientists at the Institute of Medicine in Washington, D.C. The panelists are part of a commission that is considering new names for chronic fatigue syndrome, as well as new criteria for a case definition. Watch a recording of Jason's talk at bit.ly/JasonIOM.

7 In honor of Earth Week 2014, the college hosted a screening and discussion of "Green Fire: Aldo Leopold and a Land Ethic for Our Time." Approximately 75 students, faculty and staff gathered to watch the documentary, which offers insight into the writings and philosophy of the early-20th century environmentalist Aldo Leopold. Curt Meine (LAS '80), a conservation biologist and the film's narrator, headed a panel discussion following the screening. The event also gave students an opportunity to network with panelists, who included The Field Museum's Urban Conservation Director Laurel Ross and the Center for Humans & Nature's Director of Cultures of Conservation Gavin Van Horn.

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We welcome your story ideas,
questions and comments.

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