

Elevations

The College of Arts and Sciences Magazine

Prepare for complete living. ~Spencer



UNIVERSITY OF WYOMING

Features

- Composer Anne Guzzo's music gives soul to the universe* 8
- Journey to the bottom of the sea leads to exciting geological discoveries* 12
- Of Mice and Birds: How sagebrush habitat loss contributes to predation of sagebrush songbirds* 18

Updates

- A&S Briefs 2
- A&S Internationalization 22
- A&S Bookcase 26
- A&S Alumni and Donors 28

Elevations

Volume 4: 2017

Managing Editor and Graphic Designer

Diana Marie Waggener

Cover Image

The "ABE" hydrothermal vent discovered on Feb. 10, 2017, at 2300m below sea-level. The mineral rich 370°C fluids exiting from the chimneys create "black smoke" of iron-sulphide particles as they mix with cold seawater.

Image courtesy of Mike Cheadle, University of Wyoming/ NSF/ROV Jason 2017 © Woods Hole Oceanographic Institution.

College of Arts and Sciences Administration

Paula M. Lutz, Dean
Greg Brown, Associate Dean
Teena Gabrielson, Associate Dean
Robert Schuhmann, Associate Dean

Elevations is the magazine for College of Arts and Sciences alumni, friends, and constituents. Address comments and questions to Diana Marie Waggener, Managing Editor, College of Arts and Sciences, Department 3254, 1000 East University Avenue, Laramie, WY 82071; or send email to dream@uwyo.edu.

Mailing addresses are provided by the University of Wyoming Foundation. To change your mailing address and/or contact information, please send email to foundation@uwyo.edu.



Dear Friends of the College of Arts and Sciences:

I began last year's letter with comments on the economic challenges facing Wyoming, resulting in budget reductions for UW. I described those challenges as great opportunities for our campus. I am pleased to report that we have met those challenges head on and taken advantage of the resulting opportunities! We committed to campus strategic planning so that our mission and vision were examined and re-affirmed as we set exciting new goals. We prioritized and re-calibrated, with an eye to streamlining and efficiency across the college and the university.

To create synergies across both research and teaching, A&S has restructured into twenty-one units, including two new schools and five consolidated departments. The School of Culture, Gender, and Social Justice is home to the programs in Gender and Women's Studies, African American Diaspora Studies, American Indian Studies, and Latina/o Studies. The School of Politics, Public Affairs, and International Studies comprises Political Science and Global and Area Studies. Our consolidated units are Philosophy and Religious Studies, Visual and Literary Arts (Art and Creative Writing), Mathematics and Statistics, Criminal Justice and Sociology, and American Studies and History.

We may look a bit different, but college programs and people remain committed to preparing A&S students for "complete living." *Elevations* will highlight our students and shine the spotlight on our talented faculty. The photos and stories will show you the cutting edge research and outstanding teaching to which we aspire. I've often said that A&S represents the heart and soul of this university. As you read these articles, I hope that you agree. Our breadth and depth are simply breathtaking! We are committed to the best in higher education here in Wyoming.

Our feature articles take you from music inspired by science and nature to sagebrush songbirds and life in total darkness...from the Green River Basin of Wyoming to the bottom of the sea. The "A&S Bookcase" features the latest from A&S alumni and faculty authors. Check out our short news items in "A&S Briefs" and our student experiences abroad in "A&S Internationalization" (London to Mongolia?!).

In closing, I encourage you to spread the word about the College of Arts and Sciences! Please brag about the things you learn in *Elevations*—exciting research, inspirational teaching, and meaningful service here at home and around the globe. As A&S alumni, supporters, and friends, you are members of the A&S family, and these are your accomplishments as well. Thank YOU for all you do for us.

Best regards,

A handwritten signature in dark ink, appearing to read "Paula M. Lutz".

Paula M. Lutz, Dean

Persons seeking admission, employment, or access to programs of the University of Wyoming shall be considered without regard to race, color, religion, sex, national origin, disability, age, veteran status, sexual orientation, or political belief.

Chemistry professor successfully applies active-learning pedagogy in the classroom

Throughout his career, Associate Professor John Hoberg, Department of Chemistry, has been recognized for effective teaching methods. To further strengthen his approach in the classroom, he participated in the Learning Actively Mentoring Program (LAMP), a UW Top-Tier Science Initiative course. Hoberg was among 22 UW faculty members and graduate students in the LAMP inaugural cohort, a yearlong program, which included monthly discussions and a visit to an active-learning conference in Minnesota during summer 2016.

LAMP inspired Hoberg to dramatically revise his sophomore-level organic chemistry class. “I have been teaching for almost 30 years,” he says, “and this was one of the most exciting semesters I have had. Even someone like me, who is pretty set in his ways and has strong feelings about the best ways for students to learn, can always find ways to do things better. Participating in LAMP brought about modifications in my teaching method for the better—no question.”

Because traditional theater-style classrooms are not the best forum for active learning, Hoberg secured one of the suitable rooms in the UW Classroom Building for his spring 2017 organic chemistry class. Rather than taking notes while Hoberg lectured, 47 students sat at tables in groups and worked together to find answers to questions they brought to class, based upon brief presentations Hoberg gave at the end of the previous class session. While students looked for solutions to their queries, Hoberg moved around the classroom to help the groups as needed.

Active learning allows students to synthesize and apply what they are learning, rather than just memorize concepts and theories. Active learning involves small-group and all-inclusive-class participation and can occur in any classroom setting, but Active Learning Classrooms (ALC) generally are flat, open rooms with round tables that facilitate large-scale, high-quality interaction. Such classrooms are in short supply on the UW campus. Currently, the Enzi STEM Facility houses a few appropriate classrooms, as does the Classroom Building and the Energy Innovation Center, but none of those rooms holds 100 students or more. With the completion of the new \$100 million Science Initiative building, that void will be filled. Construction could begin as early as 2018.



Associate Professor John Hoberg, Department of Chemistry, interacts with a student.

Supported by Governor Matt Mead and the Wyoming Legislature, the UW Top-Tier Science Programs and Facilities Initiative intends to transform science education and improve student success at UW and across the state. While creating state-of-the-art facilities to support innovation and research in advanced scientific imaging and integrative biology, along with UW’s first suite of large-scale active-learning classrooms (150-200 students each), the initiative also signals a dramatic change in the way the foundational sciences are taught at UW. Moving from traditional lectures and laboratories to an active-learning format will improve student engagement.

“There aren’t a lot of universities building buildings designed specifically for this,” Hoberg says. “We have a perfect chance to do something that will be critical for the state’s future. We have to start training our students to build other economic engines to help Wyoming’s economy evolve, and this building and the Science Initiative are key mechanisms to do that.”

In the meantime, Hoberg and his STEM colleagues can integrate teaching practices that employ active-learning strategies into their classes. Reported active learning outcomes include a decrease in failure rates, improved academic success, increased inclusion and diversity, improved interpersonal interaction, increased engagement, increased learning motivation, and improved habits of mind that drive science.

To learn more about the UW Science Initiative, go to: <http://www.uwyo.edu/science-initiative/>

Humanities project to highlight Wind River tribes’ connections with elk

A multiyear project, “Understanding and Communicating the Role of Elk on the Wind River Indian Reservation,” received a \$150,000 grant from the National Endowment for the Humanities (NEH). The grant request was a team effort coordinated by Judy Antell, founding director of UW’s High Plains American Indian Research Institute (HPAIRI), who completed her tenure on July 1, 2017. Scheduled to begin in 2018, the project will explore and highlight relationships of Wyoming’s Wind River Indian Reservation tribes with an iconic big-game species.

“This award is something we are very grateful for and excited about,” says James Trosper, the new director of HPAIRI. “This is a unique opportunity to capture and communicate the stories, legends, and beliefs of the people of Wind River in regard to elk, and it’s a great way to tie the humanities with science.”

While the NEH-supported project concentrates on tribal culture and lifestyle in relationship with elk, another research effort focused on the science of elk migrations on the reservation also will take place. The Wyoming Migration Initiative, housed in the Wyoming Cooperative Fish and Wildlife Research Unit, will collaborate with the tribal wildlife management agency to map the migratory corridors of elk and mule deer on the reservation.

Both the Eastern Shoshone and Northern Arapaho tribes have strong traditions celebrating the natural world, and those traditions are represented in songs, stories, and visual artistic expression. Among the objectives of the project is to obtain oral histories, tribal stories, songs, chants, prayers, tribal language vocabulary, and unpublished documents to create an “elk cultural collection.”

This effort will be led by Jason Baldes, an enrolled Eastern Shoshone who heads the Wind River Native Advocacy Center (WRNAC), a nonprofit organization that works to empower Native Americans in Wyoming for a stronger voice through community organizing, education, research, legal advocacy, and leadership development.

“By strengthening knowledge of tribal histories, cultures, contemporary hunting and resource management practices, and tribal languages for the Eastern Shoshone and Northern Arapaho people, this project will enhance tribal citizens’ capacity to steward and assert their tribal sovereignty,” Baldes says. “And it will help assure that the elk’s many roles in tribal life and culture will not be lost.”

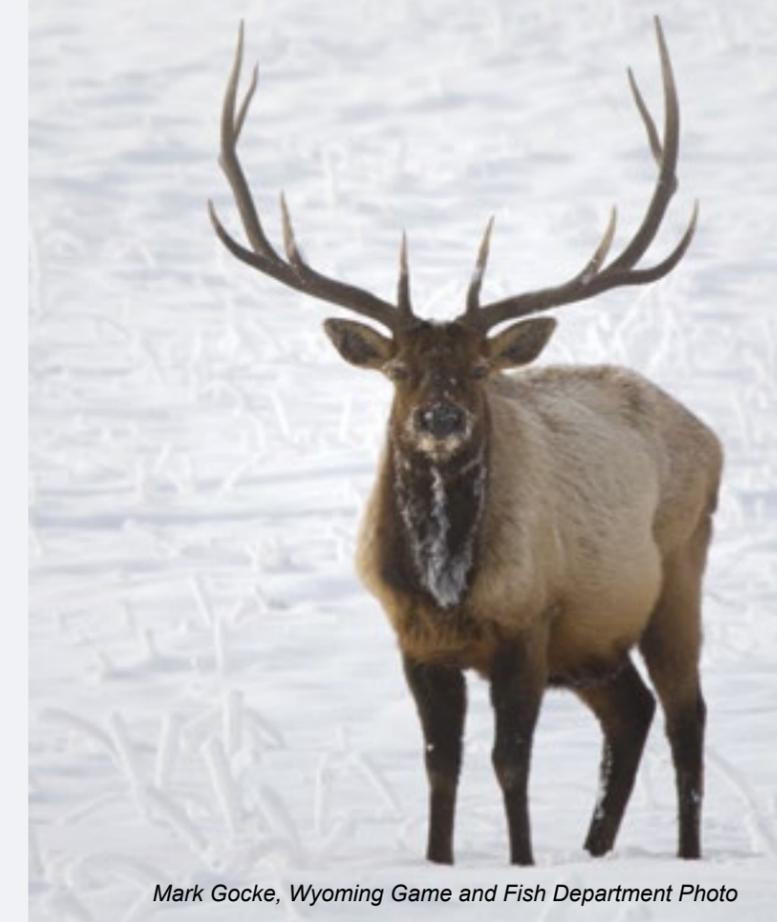
Under the advice and guidance of tribal members, including elders, the “elk cultural collection” will inform a K-12 curriculum, which will be implemented in the third year of the project, at the Wyoming Indian and Fort Washakie schools. The Wyoming Humanities Council (WHC) also will develop a statewide tour, featuring a video and printed materials. In addition, the project will include public gatherings on the reservation; a Website and social media campaign to communicate elk cultural information within tribal communities

and beyond; an internship program; and a professional development workshop for UW, community college, and Wind River Tribal College faculty and students.

“Using the tribes’ relationships with elk as the focal point, important classroom and community discussions rooted in humanities-based inquiry will occur,” Antell says. “Tribal partners will play a lead role in acquiring existing knowledge about the cultural and historical dimensions of elk—and designing ways to incorporate that information into schools and communities on the reservation. These activities will build community and enhance the role of humanities in tribal life.”

Private fundraising is underway so UW can match the \$150,000 NEH “Creating Humanities Communities” grant. The project involves five partners, including HPAIRI, WRNAC, the WHC, and Fremont County School Districts 14 (Wyoming Indian) and 21 (Fort Washakie).

To learn how to contribute toward the grant match, please call Katrina McGee, director of UW Foundation development, at 307-766-4266 or send her an email at kmcgee1@uwyo.edu.



Mark Gocke, Wyoming Game and Fish Department Photo

A&S graduate receives National Science Foundation Graduate Research Fellowship

In spring 2017, Dalyn Grindle, of Pavillion, earned a National Science Foundation (NSF) Graduate Research Fellowship to study at Harvard University. She graduated in December 2016 with bachelor's degrees in anthropology and environment and natural resources and a minor in drawing.

When Grindle was considering career choices, she decided to become an archaeologist and see the world. "No one I knew of—family and friends—had done something like that," she says, "but, people from Wyoming are a special breed, and it reflects in the way that we approach our work."

Grindle's work ethic carried her from Pavillion (population ~230), to UW, and now to Harvard. A first-generation college student, Grindle received the NSF Graduate Research Fellowship, one of the nation's most competitive awards for graduate studies, to conduct a zooarchaeological study on reindeer domestication. Besides the NSF grant, Grindle, an honors student and McNair Scholar, received additional funding



UW Photo

from Harvard. Out of more than 250 applicants, Grindle was among 10 students accepted to Harvard's anthropology Ph.D. program.

While attending UW, Grindle took advantage of study-abroad programs in New Zealand, Australia, the Canary Islands (Spain), and Croatia. During summer 2016, she was selected to intern at the Smithsonian Institution's National Museum of Natural History and presented her research on "indigenous uses of sturgeon in the Pacific Northwest" at the 2016 Keith and Thyra Thomson Honors Convocation.

Grindle never believed, in her wildest dreams, that she would attend a prestigious Ivy League school. Grindle says, "It goes without saying that my parents are incredibly proud of me and that none of us expected something this big to happen, but I can't thank my family enough. The support they showed has made my achievements possible."

A&S student named UW's 2017 Top Graduating Man

Honor student Anthony Farmer, Cheyenne, received the 2017 Tobin Memorial Award, which is given annually to a male student who demonstrates academic excellence and achievement, service to the university, participation in leadership in the community and campus activities, and citizenship qualities. Farmer, the son of Rachel Martinez (B.A. Journalism 1997; MPA 2003) and Brian Farmer (B.A. Political Science and B.S. Psychology 1994; M.A. Political Science 1997; JD UW Law School 2001) received bachelor's degrees in both political science and in economics. He began a master's program in fall 2017.

While attending UW, Farmer was active with Multicultural Affairs, received the Outstanding Honors Freshman Award, and served as a senator on ASUW, and the College of Arts and Sciences Grade Appeals Committee. He is a member of Golden Key International Honors Society and Phi Kappa Phi. In fall 2016, he studied at the University of Glasgow at the Adam Smith Business School with an emphasis on macroeconomy, government debt, and contemporary issues in inequality.



UW Photo

Department of Theatre and Dance graduate lit up *Hairspray Live!* production

Helena, Montana, native Neal Petz, a graduate of the Department of Theatre and Dance, helped to light up the set of NBC's made-for-television musical *Hairspray Live!* The musical aired December 7, 2016, and was filmed at Universal Studios in Los Angeles. Petz began his internship with the show's lighting design team on November 9 and finished when the show aired.

The show's set consisted of two connected soundstages and a large portion of the Universal Studios backlot. Because the show used indoor and outdoor settings that presented different lighting challenges, this turned out to be a unique internship. The biggest challenge with the outdoor setting was the fact that the lights could only be seen well at night, and because a child actor had limited work hours, the cast worked during the day until the dress rehearsals.

Petz's duties included picking up lighting design materials and gear from off-site locations (and sometimes coffee and food); overseeing two reference cameras

so the team could see the lighting as the audience would; and assisting the lighting programmers and technicians. "A lot of my time toward the end was spent watching what was happening on the monitor and listening to Allen [the lighting designer] on headset discuss what needed to be changed," Petz says. "I learned from watching him what it means to be in charge on such a large project with a large team."

Besides learning some tricks of the trade from the show's crew, Petz says the best part of the internship was making contacts for work after college. He graduates in fall 2017 and plans to pursue a career as a lighting director on concert tours. Petz credits the Department of Theatre and Dance with helping him to take his first step into the industry. "This was an incredible opportunity that I was lucky to hear about," Petz says. "Department of Theatre and Dance faculty and staff were extremely supportive and helped me work out some of the finer details of my internship."



Courtesy Photo

A&S student named UW's 2017 Top Graduating Woman

Honor student Sarah Maze, Ranchester, received the Rosemarie Martha Spitaleri Award, established in 1964 to recognize women who exhibit excellent leadership, academic integrity, and active citizenship qualities. Maze graduated with dual degrees in physiology and Spanish, with a minor in neuroscience.

Maze is the daughter of Meg and Tim (M.S. Natural Science 1995) Maze. Since her freshman year, Maze remained involved with ASUW, and she held memberships with Alpha Epsilon Delta premedical honor society, Phi Beta Kappa, Iron Skull Honor Society, Catholics on Campus, Sigma Delta Pi national Spanish honorary; and Mortar Board. Sarah also received Experimental Program to Stimulate Competitive Research (EPSCoR) and IdeA Networks of Biomedical Research Excellence (INBRE) funding for her research in Associate Professor Johnathan Prather's neuroscience research lab in the Department of Zoology and Physiology.



UW Photo

A&S Briefs

A new genus of plants is named after Associate Dean Greg Brown

A new genus of plants has been named after Associate Dean Greg Brown, a professor in the Department of Botany. *Gregbrownia*, including four species *brownii*, *fulgens*, *hutchisonii*, and *lyman-smithii*, is a member of the Bromeliaceae family—commonly known as the pineapple family. Identifiable by their distinct circular arrangement of leaves (approximately 1 meter in diameter) and a large cluster of yellow-green to white flowers, members of the genus *Gregbrownia* grow both on trees and on land within the Andes Mountain Range, which borders northern Ecuador and Peru.

Brown specializes in plant systematics, a branch of botany that involves identifying, naming, classifying, and studying the evolution of plants. His research focuses on the Bromeliaceae family.

Two of Brown's colleagues, Professor Walter Till (University of Vienna) and Research Scientist Michael Barfuss (University of Vienna) established the new genus out of an existing genus, *Mezobromelia*. The new genus was discovered based on new molecular (DNA sequence) and morphological (form and structure) data.

"The goal of modern plant systematics is to only name groups of species that are monophyletic [having only one origin]," Brown explains. "When a researcher finds a new,



Photo courtesy of Greg Brown

well-supported monophyletic group [clade] within an already-recognized genus, the group has to receive a new name at the appropriate taxonomic rank. In the case of the species in *Mezobromelia*, those new species were at the generic rank."

Gregbrownia was named in honor of Brown's contributions to the taxonomy and morphology of Bromeliaceae. "This is a tremendous, totally unexpected honor," Brown says. "This recognition and honor become a permanent part of plant taxonomy and plant nomenclature."

Former A&S Dean E.G. Meyer shines at Wyoming Senior Olympics

Wyoming Senior Olympics volunteer Pennie Espeland (B. A. communication 2008) hugs former A&S Dean E.G. Meyer (1963-1975) as he stands on the podium after taking first place in the 95 and over division of the 100-meter dash. Meyer is 97 years old and still going strong.



University of Wyoming ♦ College of Arts and Sciences

Hell Gap archaeological site receives historic landmark designation

Hell Gap, located in the Hartville Uplift of east-central Wyoming, received national historic landmark (NHL) designation in July. A critical Paleoindian site, Hell Gap was first investigated by UW researcher George Agogino (1959-1961) and by Harvard University/Peabody Museum (1962-1966). Professors Marcel Kornfeld and Mary Lou Larson and Professor Emeritus George Frison, Department of Anthropology, continued Harvard's work beginning in 1993.

"The NHL nomination is based largely on our [Department of Anthropology] research and the data we amassed," says Kornfeld. "However, the nomination would not have been possible without our partners at the State Historic Preservation Office; in particular, Judy Wolf, chief of planning and historic context program."

Hell Gap, which is situated approximately 15 miles northeast of Guernsey, consists of four localities in a small valley containing at least 20 Paleoindian components. Originally, it provided the longest sequence of Paleoindian cultures dating between approximately 11,000 and 8,000 radiocarbon years ago (~13,000-9,000 calendar years ago). This nearly complete chronological sequence greatly aided prehistorians in their efforts to classify and link artifacts from the entire continent and continues to be a useful key to Paleoindian chronology. In addition to the site's significance for untangling the chronology of Paleoindian cultures, Hell Gap also is classified as a camp site and provides a rare venue to study questions regarding other aspects of First Americans behavior beyond the temporarily occupied kill or processing localities represented by bone beds.

Mysteries that have been uncovered at Hell Gap show evidence of repeated occupations by nine Paleoindian cultural complexes in well-stratified deposits. Over the decades, archaeologists have discovered several hundred projectile points, hundreds of scrapers and tens of thousands of



UW Photo

Anthropology student Nicholas Schmitz works at Hell Gap as part of the 2014 Advanced Archaeology Field School.

flakes or remains from fashioning stone tools, bone needles for sewing clothes, and post holes from structures that once stood in the area. Even a few beads were found.

Over the years, the Hell Gap project has successfully brought archaeology to the public through the Hell Gap Public Outreach Programs, while also offering UW Advanced Archaeological Field School students hands-on learning opportunities. In addition, Hell Gap collections have contributed to at least 15 master's theses or Ph.D. dissertations from UW and other institutions and dozens of papers have been presented at regional and national conferences.

"The site fundamentally changed how archaeologists viewed Paleoindian foragers," says Kornfeld, "because, as a residential campsite, it showed a diversity of human activities, including medium game hunting, tool stone acquisition, and personal ornamentation—none of which were evident at the big-game kill sites and surface scatters that had dominated the Paleoindian archaeological record up to that point."

The National Historic Landmarks Program recognizes historic properties of exceptional value to the nation and promotes the preservation efforts of federal, state, and local agencies, Native American tribes, and those of private organizations and individuals. Administered by the National Park Service, the program provides states and local communities with technical assistance, recognition and funding to help preserve the nation's shared history and create close-to-home recreation opportunities.



Photo courtesy of Marcel Kornfeld



Composer Anne Guzzo's music gives soul to the universe

Diana Marie Waggener

Have you ever wondered how to musically articulate a vibrating microbe or what tone quality would best convey the many nuances of the wind in Wyoming?

Have you ever asked yourself how the color of honey or a particular painting would sound?

Have you ever considered the musicality of love and hate and stars and water?

Wyoming native Anne Guzzo, an associate professor in the Department of Music, has asked herself all of those questions and many others.

She communicates the answers through her music.



Anh-Thuy Nguyen photo

Growing up in a home in which the classical music radio station played the soundtrack of daily life and both parents were artistically inclined, served as the perfect incubator for creative expression. Guzzo's father Anthony, a retired UW professor of chemistry, is a sculptor, and her mother, Sandra, is a writer and painter. When she was in junior high at UW Prep, Guzzo attended a band concert at Laramie High School during which a piece composed by a student was performed. "As I sat in the audience, listening to that student composition, I got so excited thinking that maybe I could compose," says Guzzo. "I had never met a living composer—and here he was, just a student like me. I immediately started reading about how all the band instruments worked, poring over an instrumentation book I found at the library. My junior high band director was encouraging enough to try out my first composition with the Prep band, and I was hooked."

Today, Guzzo is an internationally performed composer, and her work has been played in Brazil, British Columbia, Canada, Italy, and throughout the United States. In 2015, Guzzo's music was featured at the Beyond This World concert at the Choral Arts Institute in Los Angeles. Her compositions are performed and recorded by numerous orchestras and

ensembles, including Third Angle in Portland, Oregon; the Colorado Chamber Orchestra; the Divan Consort and Synchrony Collective in Los Angeles; the Cheyenne Symphony Orchestra; and the UW Symphony.

A clarinetist first, Guzzo cites several influences on her music, including Russian-born Igor Stravinsky, who composed *Three Pieces for Solo Clarinet* in 1919. "While studying for my master's in clarinet performance at UC Santa Cruz," notes Guzzo, "I auditioned to play in Stravinsky's *Soldier's Tale*, a Faustian folk-like story about a devil bargaining with a soldier for his violin. I found the work intellectually stimulating with such clever use and reuse of themes. It was challenging, but also a lot of fun to play, with its infectious rhythms and quirky tunes. I was also moved by the music and how well it represented the characters."

Other artists that help shape Guzzo's work include Israeli-American composer Shulamit Ran, the second woman to win the Pulitzer Prize in Music for her *Symphony* (1990), and Carl W. Stalling, best-known for his work with Looney Tunes and Merrie Melodies. Stalling made significant use of the "Musical Pun," which uses references to pop music or even classical pieces to create humor.

Continued on Page 10. . .

Guzzo has borrowed that technique for pieces like *Things Bright* (2011), which is about her backyard chickens, and her recent work, *The Bear and the Eclipse* for string quartet and bass. “I think that it is important to devour the work of composers, musicians, artists, and anyone who inspires or moves you,” says Guzzo. “One thing Stravinsky and Stalling had in common was their borrowing the work of others and interpreting that music in new ways as their own. Poet T. S. Eliot said that ‘the good poet welds his theft into a whole feeling, which is unique, utterly different from that from which it was torn.’”

Among Guzzo’s inspirations are science and nature, and she often draws upon scientific phenomena and nature’s marvels

to create her compositions. In recent years, she has worked with vertical dancers from the Department of Theatre and Dance, as well as UW science professors and researchers from such diverse areas as geology, rangeland ecology, and microbiology. These interdisciplinary collaborations have led to pieces that are both moving and humorous. “I think music and science, when done well, involve a lot of hard work,” she explains, “but also an openness to thinking differently or creatively—asking ‘what if’ and then trying it, seeking patterns, looking at proportions, seeking to understand translations and transformations, and assessing what has happened with the experiment.”

Guzzo continues: “In my chamber orchestra work, *The Carnival of the Microbes*, I learned how a variety of microbes functioned from Dr. Naomi Ward [Department of Molecular Biology, College of Agriculture and Natural Resources] and her poet collaborator, Dr. Harvey Hix [Departments of Philosophy and Religious Studies and Visual and Literary Arts]. I took those functions and translated them into music—if the *Corynebacterium*, found in soil, reproduce by snapping off of the main bacterium and appear to vibrate when doing so, then orchestral strings will tremolo (a very fast back and forth with the bow on the strings) and snap their strings on the finger board. I think there is a kind of awe and beauty in the natural world, and my aim in pieces like this is to help convey that science and wonder with music.”

As one of the featured artists in the 2015 documentary film, *The Ucross Experiment*, detailing a two-year collaborative residency between artists and scientists, Guzzo and Professor Ron Frost, Department of Geology and Geophysics, composed an opera titled *Clinker: Between an Opera and a Hard Place*. A musical description of the geology of the Powder River Basin, the opera’s libretto, written by Frost, contains technical geological terms, while Guzzo’s music conveys the sounds and rhythm that underscore the story. “One of the beautiful things about science-art collaborations is that you communicate these wonders and information in a new way and reach new audiences,” notes Guzzo. “For example, if we can present art at scientific conferences, then we have a whole new audience of invested listeners. They understand the story already, and here they are listening to opera about something they care about. If you anthropomorphize a geological process, the creation of clinker—a red, baked, pottery-like rock that forms when underground coal fires burn—and turn that process into a scheming baritone, always looking for ways to heat things up—you have a memorable, interesting, and hopefully engaging way to understand geology AND listen to new classical concert music.”

“The good poet welds his theft into a whole feeling, which is unique, utterly different from that from which it was torn.” ~T.S. Eliot

A musician’s musician, Guzzo finds herself composing music that pleases those who will ultimately play her work. At the same time, she is well aware of the interplay between music makers and their audiences. She taps into her own emotions about such abstract concepts as love and wind, and sometimes she hears the music in her head before she starts to work with a concept. She describes her musical voice as welcoming, witty, and occasionally elegant.

Her musical elegance often is best communicated when Guzzo writes for her first love—the clarinet. She writes compositions for AdZel Duo, who have an album coming out this year. “In working with the AdZel duo, or any commissioner, I listen carefully to their requests,” Guzzo says. “The ideal collaboration, for me, is one that leads to multiple performances and is appealing to all in the three parts in the world of concert music—the composer, the performers, and the audience. For example, these wonderful performers requested an easy

piece. They didn’t want to have everything in their repertoire be so hard that they had to prep it for months. So I wrote a piece that shows them off, makes them sound brilliant, but is not actually that technical on the instrument.”

While she has experienced her fair share of rejection (what artist hasn’t?), Guzzo’s work is played and recorded often. She believes that having the tenacity to keep trying is the key to her success as a modern composer. Developing a thick skin and the ability to trust herself also has been Guzzo’s saving grace. Once she has completed a piece and has a decent recording, Guzzo sends it out to ensembles, contests, calls for scores, old friends who perform professionally, conductor friends, and she even makes “cold calls” because she wants as much exposure and repeat performances for the piece as possible. “To be an artist of any kind,” Guzzo says, “you absolutely must develop a thick skin, because most of these attempts will be rebuffed. I often think of Madeleine L’Engle, author of *A Wrinkle in Time*, who sent that manuscript out 26 times before someone finally wanted to publish it. I aim to collect lots and lots of rejection letters because that means I’ll have some acceptance letters too.”

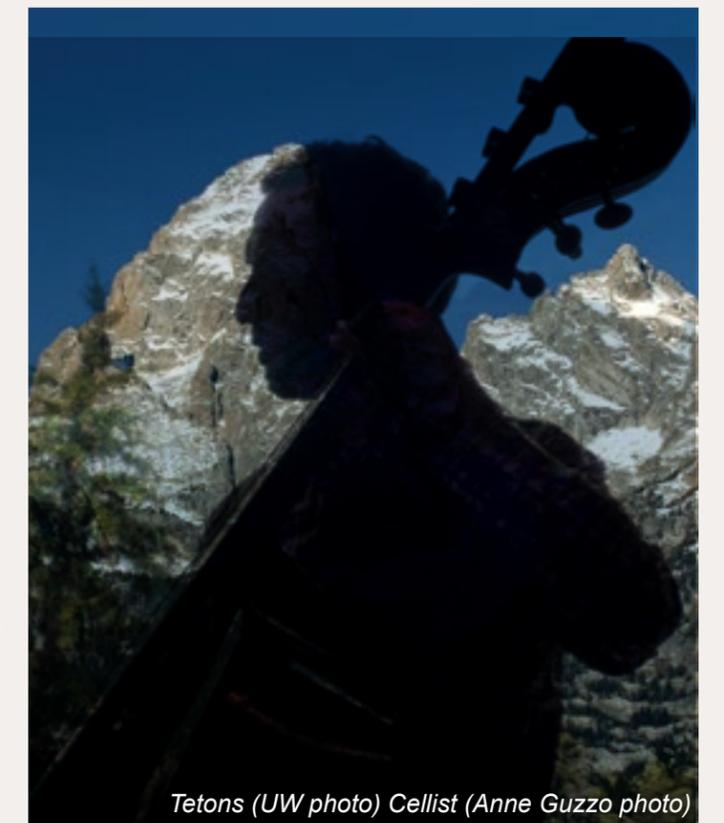
Besides writing musical compositions and collecting both rejection and acceptance letters, sharing her gifts with students is one of Guzzo’s great joys. “I genuinely love teaching,” she exclaims. “Being able to encourage curiosity and creativity is such a wonderful, wonderful opportunity. One of the important things about being in a position like mine, I believe, is to never, ever crush someone’s creativity and to help them support and find their own compositional voice. Honestly, most of what I do as a composition teacher is listen to what the student says they intend, ask a lot of questions, and then simply state the facts about what the student has brought to me. For example, if they wanted a climactic moment, but didn’t change the range or the dynamic or the tempo, I point that out. I suggest they experiment—ask ‘what if’—and then have them try out some ideas. Usually they find a more effective or moving way to achieve their goals. But one rule of my studio is that if a student likes it the way they originally wrote it, they get to keep it. It is their art, not mine. I find that there is definitely enough work out there for everyone, so I don’t need to compete with them. The way I see it, their successes are my successes.”

Wyoming Festival: Sparkling New Chamber Music

With the goal of creating and playing music in a beautiful natural environment, Guzzo founded the Wyoming Festival, a music event, held annually at the UW-NPS research station, AMK in the Berol Lodge at Grand Teton National Park.

This innovative 10-day festival is devoted to the creation of new concert music inspired by the wild and natural setting of Grand Teton National Park. Through a juried process, six music composition fellows, as well as a composer-in-residence, from across the nation are invited to participate. The festival culminates with a preview concert performed at the Craig Thomas Discovery and Visitor Center, Moose, and the final concert takes place at the AMK in the Berol Lodge.

The Wyoming Festival is supported by the UW-NPS and the Douglas B. Reeves Endowment for Composition. To learn more about the UW-NPS or to make a tax-deductible donation to the Wyoming Festival, send email to: uwnps@uwyo.edu.



Tetons (UW photo) Cellist (Anne Guzzo photo)

Journey to the bottom of the sea leads to exciting geological discoveries

Diana Marie Waggener

The seafloor: the final frontier of exploration on Planet Earth. These are the voyages of Professors Barbara John and Michael Cheadle, Department of Geology and Geophysics, and their graduate students. Their mission: to explore the bathymetry (topography) and rocks at the bottom of the sea, to seek out amazing organisms living under both extreme pressure and in total darkness, and to boldly go where few humans have gone before.

Geologists John and Cheadle have been exploring submarine geology and, consequently, life on the seafloor for the past 20 years. Their expeditions have resulted in fascinating opportunities, including the 2016 Indian Ocean Expedition to drill the upper part of a 5-kilometer-deep hole in ocean crust that will initiate a journey to the earth's mantle. This endeavor eventually will lead to the realization of a more-than-50-year-old dream for the geologic community, which began with Project Mohole between 1958 and 1966. An attempt to retrieve sample material from below the *Mohorovičić* discontinuity (the boundary between the earth's crust and the mantle), Project Mohole aspired to find conclusive evidence to support the theory of plate tectonics and continental drift.

Initially, Project Mohole received a great deal of attention, so much so that, in April 1961, *Life Magazine* sent author John Steinbeck to the drill ship to write dispatches. Due to lack of funding, however, the project was discontinued, but earth scientists held to the dream of one day drilling a hole through the ocean's crust to glean a sample of the mantle to, in the words of Steinbeck, "crack a great geophysical mystery."

Stemming from their quest to crack geophysical mysteries or, at least, to gain a better understanding of how the earth's crust grows and evolves, John and Cheadle have been involved with important discoveries, including the Lost City Vent System in the Atlantic Ocean, found in 2000, during a National Science Foundation (NSF) expedition. A collection of up to 180-foot-tall limestone towers, the "Lost City" hosts a submarine hot-spring system with hydrothermal vents that scientists believe is similar to those that accommodated the earth's first living organisms.

Continued on Page 14. . .



Research Vessel RV Atlantis, one of four ocean-class research vessels in the U.S. fleet (Mike Cheadle photo).

More recently, Cheadle and John served as co-chief scientists on a 42-day-NSF-funded expedition to the middle of the Southern Pacific Ocean. Along with UW undergraduate and graduate students and a team of international scientists, they boarded the U.S. vessel, *R/V Atlantis*, at Easter Island (Rapa Nui) on January 13, 2017. Their mission was to investigate Pito Deep, a chasm in the seafloor two-and-a-half times as deep as the Grand Canyon. “Pito Deep rests on the edge of the Easter Microplate,” explains John, “which is a small tectonic plate that rotates like a ball bearing trapped between two overlapping arms of the East Pacific Rise. This is an area in the Pacific Ocean that exposes a cross section of lower ocean crust, which we know would help us to understand how oceanic crust is formed.”

The scientists used the remotely operated submarine, *Jason II*, and an autonomous undersea vehicle, *Sentry*, to locate and document five previously undiscovered hydrothermal vents, as well as to relocate two others that were found in 1994. These vents are called “black smokers” because they emit clouds of iron, copper, zinc sulfide particles, and even a small amount of gold. Measuring as high as 70 feet, with nearly 40-foot-high “chimneys,” these “black smokers” are among the most spectacular features found on the seafloor and host an alien chemosynthetic ecosystem within which organisms thrive in the darkness at the bottom of the sea.

They observed that the water emanating from the mouth of the vents measured at temperatures of up to 370 degrees Celsius, indicating that seawater must descend down cracks to

a nearby magma chamber where the water is heated and then rises back to the seafloor. “This process is important because the very hot water can dissolve elements, like copper, from the rocks and precipitate them as potentially economic deposits at the site of the vents,” explains Cheadle. “Perhaps the most important aspect of these vents is the chemical and thermal dynamics taking place within them, making such environments highly suitable for chemical evolution processes to take place.”

Because this year is the 40th anniversary of the first sighting of undersea hydrothermal vents, the timing of Cheadle and John’s discovery is serendipitous. “The big surprise is the fauna that live down there. There’s no light. It’s totally dark,” says Cheadle. “The whole vent community depends on chemo-synthetic bacteria for food. These bacteria can use hydrogen sulfide to produce organic material. It’s simply a completely alien ecosystem.”

As if finding an alien ecosystem wasn’t exciting enough, the team also accomplished the first detailed geologic mapping of the lower oceanic crust. The lower crust comprises a coarse-grained rock, gabbro, which crystallizes in the magma chambers below the volcanoes, supplying the basalt lava that covers most of the seafloor. Mapping the seafloor was accomplished by first sending the autonomous vehicle *Sentry* to depths of 14,800 feet (6,000 meters) below sea level to map the seafloor bathymetry at a resolution of 2 to 5 meters using sound waves, creating maps so detailed that individual rock outcrops are imaged.



Autonomous undersea vehicle *Sentry* mapped the seafloor at 1m resolution (Mike Cheadle photo).

Once these maps were finished, John and Cheadle sent the second robotic submersible, *Jason II*, straight to rocks on the seafloor. *Jason II* is tethered to the ship via fiber optic cable and operated by a pilot, allowing scientists to take high-resolution images and direct the pilot to use two robotic arms to pick up samples from the seafloor, as well as to measure temperatures in the vent chimneys. The vehicle can stay on the seafloor for up to seven days and recover up to 400 pounds of rocks per dive. The final geologic map is among the most comprehensive ever made that shows *in-situ* ocean crust, with a resolution and detail comparable to geologic maps of the continents. As such, it reveals complexities never before seen, leading to a much better understanding of how ocean crust, which forms 60 percent of the earth’s surface, is created.

Sentry’s other task was to map the earth’s paleomagnetic field orientation as recorded by the rocks on the seafloor. As the gabbro cools, it freezes in the orientation of the earth’s magnetic field, effectively providing a tape recording of how the earth’s magnetic field has changed through time. Magnetic mapping of the seafloor over the past 50 years shows that reversals in the direction of the earth’s magnetic field generate magnetic stripes parallel to the mid-ocean ridges and provides conclusive evidence in support of the plate tectonic theory—the “great geophysical mystery” that Project Mohole hoped to solve in the 1960s. The magnetic mapping at Pito Deep went one step further because the 4-kilometer-high cliffs allowed imaging of the third dimension of the magnetic stripes for the first time.

Boundaries between the magnetic stripes are effectively isotherms, or lines of constant temperature, so the shape and orientation of these boundaries defines the thermal structure of the crust. This information helped solve one of the fundamental questions about how oceanic crust forms and cools. “Some scientists had argued water can penetrate several kilometers deep into the lower crust leading to rapid cooling of the crust,” explains Cheadle, “whilst others argued the water can’t go that deep and, therefore, the crust cools much more slowly. The team found that the magnetic stripes dip very gently in the third dimension, which supports the slow cooling model.”

A revelation by themselves, the rock samples mostly consist of a rock type called troctolite, very rich in a mineral called olivine, which itself is abundant in magnesium. These rocks represent the residue left behind in the magma chamber after the undersea volcanoes erupt their lavas. The presence of these olivine-rich rocks at high levels within the lower crust (less than 2 kilometers below the sea floor) had not been seen before and indicates that the magma chambers must have existed at very shallow levels within the crust.

Continued on Page 16. . .

Plate Tectonics Review

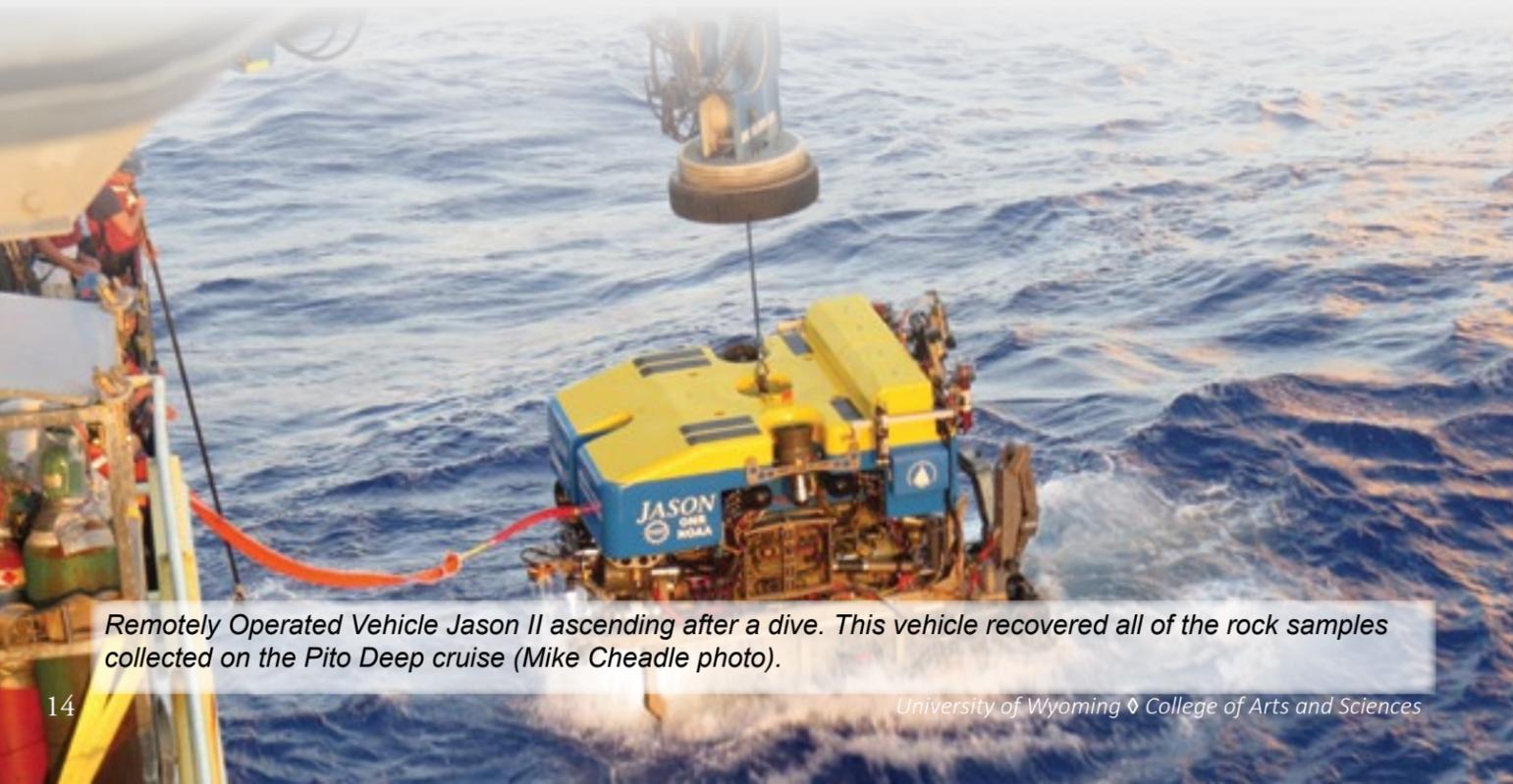
Plate tectonics (from the Latin *tectonicus*, from the Greek: *τεκτονικός*, “pertaining to building”) provides geology with a comprehensive theory that explains “how the Earth works.”

Developed from the 1950s through the 1970s, plate tectonics is the modern version of continental drift, a theory first proposed by Alfred Wegener in 1912. It grew from the explosion of new knowledge that emerged post World War II about the ocean floor, the earth’s magnetism, the distribution of earthquakes and volcanoes, the flow of heat from the earth’s interior, and the worldwide distribution of plant and animal fossils.

The theory describes the motion of seven large plates and the move-
Elevations ♦ Volume 4 ♦ 2017

ments of many smaller plates of the earth’s lithosphere, over the earth’s mantle. Where the plates meet, their relative motion determines the type of boundary. At mid-ocean ridges, new lithosphere is formed and the plates move apart; at subduction zones, like that found off of the coast of Oregon and Washington, the plates converge and one plate gets pushed down into the mantle beneath mountain ranges and volcanoes, like those of the Cascade Range; and at transform faults, like the San Andreas Fault, the plates slide past each other, but in doing so can generate very large and dangerous earthquakes. The relative movement of the plates typically ranges from zero to 15 centimeters per year, not very different from the rate at which a finger nail grows—3.6 centimeters a year.

Michael Cheadle



Remotely Operated Vehicle *Jason II* ascending after a dive. This vehicle recovered all of the rock samples collected on the Pito Deep cruise (Mike Cheadle photo).

In addition to discovering, imaging, and measuring temperatures from the seven hydrothermal vents, collecting over 400 rock samples, and achieving the first completely detailed geologic map of the lower ocean crust, the voyage included several outreach activities before and throughout the cruise, including live ship-to-shore Webcasts. Audiences included K-12 and post-secondary classrooms (with emphasis on interacting with Wyoming classrooms), as well as specialist groups in the United States, Canada, and the United Kingdom.

Broadcasts reached more than 1,050 students and the general public, allowing direct engagement with the shipboard science party as operations and discoveries were made. “Some might argue that bringing live science to school children in their classrooms was one of the of the most important aspects of the expedition,” remarks Cheadle, “to both make them aware of the opportunities that could await them when they get older and to get them interested in science and in the mysteries of planet earth, itself.”

The *Atlantis* voyage is not the final mission for John and Cheadle. During summer 2017, Cheadle went to Japan to de-

scribe rock core from Oman on-board the 55,000 ton *Chikyu*, the largest academic research vessel in the world. Oman likely has the best example in the world of an ophiolite—a piece of ocean crust that formed underwater at a mid-ocean ridge, but subsequently has been pushed up by tectonic forces onto the continents and, therefore, now is above sea-level and much more accessible than normal oceanic crust. Some argue, however, that there is something strange and different about the crust to cause it to behave this way. So Cheadle and 30 other geologists boarded the *Chikyu* to carefully examine the core from Oman to determine if it, indeed, looks like those rocks recovered from the sea-floor at places like Pito Deep. “I also got some unexpected excitement during the trip,” says Cheadle. “Whilst there, the ship had to outrun a typhoon that was headed toward Japan!”

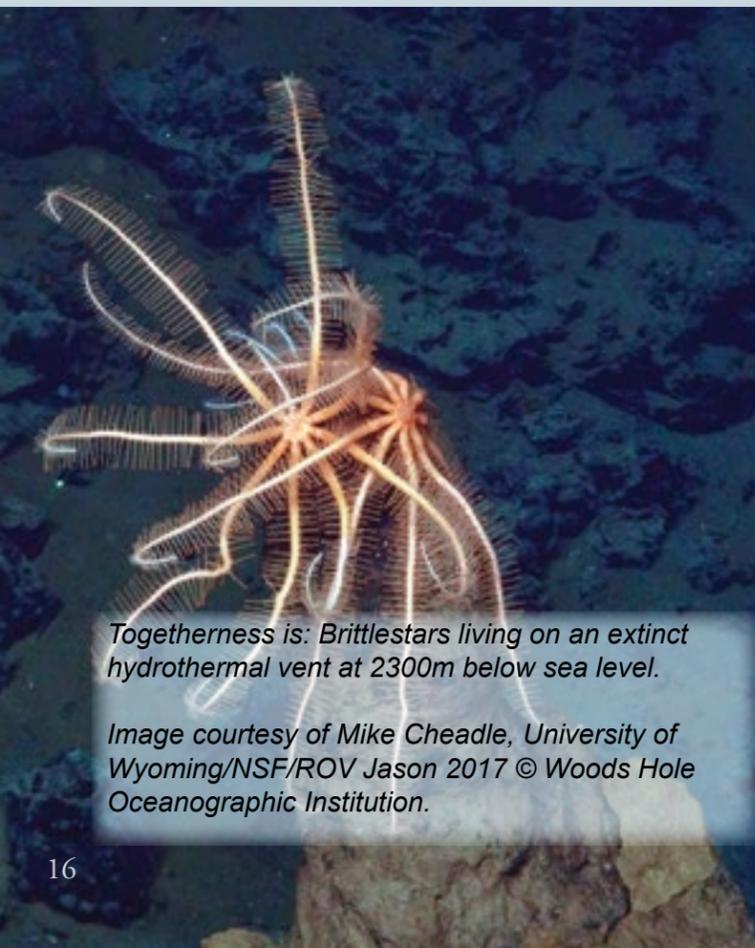
Meanwhile, the husband and wife team are waiting to receive word of when their next adventure will happen—this time to the Indian Ocean to research the bottom of the sea where even more undiscovered geology and life await.

To learn more go to: www.pitodeep.org.



Mike Cheadle and Barbara John aboard RV Atlantis (courtesy photo)

Life Under the Sea



Togetherness is: Brittlestars living on an extinct hydrothermal vent at 2300m below sea level.

Image courtesy of Mike Cheadle, University of Wyoming/NSF/ROV Jason 2017 © Woods Hole Oceanographic Institution.



Crabs and polychaete worms living on a hydrothermal vent 2300m below the sea surface.

Image courtesy of Mike Cheadle, University of Wyoming/NSF/ROV Jason 2017 © Woods Hole Oceanographic Institution.

University of Wyoming ♦ College of Arts and Sciences

Voyage of the Jackalope

The Jackalope is a 5-foot-long mini-boat that was part of the outreach program Cheadle and John organized for their Pito Deep expedition. She was purchased in kit form from Educational Passages in Maine and given to Theresa Williams’ middle school class at the UW Lab School. Williams’ students built, painted, and named the mini-boat as part of their studies. They placed objects and information about Laramie and Wyoming in her waterproof “time capsule” including an explanation of the name Jackalope in 20 different languages.

Equipped with an Iridium GPS system, the mini-boat was set to report her position once every 24 hours, with the National Oceanographic and Atmospheric Administration (NOAA) picking up the signal and publishing her position on the Web. She was launched from the RV Atlantis at the end of the Pito Deep Expedition in February and began what was to be a 190-day-long journey across the Pacific Ocean.

She travelled 12,310 kilometers along a great circle. In late August, she made landfall on Ontong-Java Atoll in the western Pacific Ocean—one of the largest atolls in the world. Williams’ students followed the journey and learned much about ocean wind patterns and currents and the geography of myriad ocean islands as she crossed the Pacific.

The Jackalope was the first mini-boat from a Rocky Mountain School, the first to be launched in the southern Pacific Ocean, and she travelled the farthest great circle distance of any mini-boat ever launched. The satellite imagery of Google Earth suggests she was found by one of the 2,000 inhabitants of Ontong-Java Atoll and now sits in the backyard of an islander. Hopefully, the islander will follow the requests printed on the Jackalope and contact the students at the Lab School or maybe re-launch her so she can continue her journey to the west and maybe even to China, but Ontong Java Atoll is a very remote part of the world with the only contact with the outside world being a supply ship which goes there about once a month; perhaps the Jackalope has already reached the end of her adventure.



Elevations ♦ Volume 4 ♦ 2017

Of Mice and Birds

How sagebrush habitat loss contributes to predation of sagebrush songbirds

Diana Marie Waggener

Photo by Lindsey Sanders, graduate student, Department of Zoology and Physiology

Stretching across 11 states and dipping into both Mexico and Canada, the sagebrush sea, splattered in greys and browns and muted greens, often is referred to as “The Big Empty.” This arid miniature forest, however, is far from empty. Sagebrush steppe frequently contains 150-year-old shrubs and hosts a diverse understory of grasses and forbs that give shelter and forage to more than 87 mammal species and approximately 297 avian species. The greater sage-grouse makes its home among the sagebrush and is considered an “umbrella species” for the conservation and management of other co-occurring wildlife species.

Over the past few years, decreasing numbers of the greater sage-grouse became a hot topic of conversation in Wyoming, which has more sagebrush than any other state. In 2010, the U.S. Fish and Wildlife Service (USFWS) announced that the chicken-sized bird was being considered for a federal listing under the Endangered Species Act. In 2015, however, the USFWS determined that the greater sage-grouse would not be listed thanks, in large part, to cooperative land-use plans among various federal and state agencies, private landowners, industry, and environmental groups. These plans potentially could conserve 35 million acres of federal sagebrush habitats across 10 states, but the debate continues.

The greater sage-grouse, like many of the species that exist within the 129 million acres of sagebrush habitat in the Intermountain West, live nowhere else in the world. Among those are a collection of songbirds—the sagebrush sparrow, Brewer’s sparrow, and sage thrasher.

These three perching birds have complex songs and can learn songs by listening to other birds of their species. Each spring, they migrate hundreds of miles from their over-wintering habitats in northern Mexico and the United States Southwest region to build their nests within patches of dense sagebrush shrubs in Wyoming. Interestingly, they often return to the exact same territories, and both males and females incubate eggs and feed nestlings.

For two decades, oil and gas extraction in the northern Green River Basin swelled, creating new challenges for sagebrush habitat management in southwestern Wyoming. Beginning in 1992, with the use of fracking techniques in the Jonah Field and later expanding to include the Pinedale Anticline, considerable changes to the sagebrush ecosystem in that area occurred. According to one estimate, more than half of the original extent of sagebrush steppe range-wide has been altered. Once sagebrush shrubs are removed, it takes decades to centuries for sagebrush to truly regenerate.

Sagebrush habitat loss, degradation, and fragmentation led to a fairly recent 3 percent decline among the sagebrush songbirds, and the USFWS has identified all three sagebrush songbirds as “species of conservation concern,” a term that generally refers to species that are in decline or appear to be in need of conservation.

So, in 2008, Associate Professor Anna Chalfoun, Department of Zoology and Physiology, and her graduate students started to examine the influence of natural gas development in southwestern Wyoming on the nesting success (numbers of nests that produce at least one fledgling) of sagebrush songbirds. “Because these birds have evolved to nest almost exclusively within sagebrush habitats,” explains Chalfoun, “they are vulnerable to the vast changes to sagebrush habitats range-wide.”

The first phase of Chalfoun’s research indicated that the nesting success of all three birds—the sagebrush sparrow, Brewer’s sparrow, and sage thrasher—decreased with surrounding sagebrush habitat loss and alteration. Diminishing numbers of the Brewer’s sparrow and the sagebrush sparrow have an estimated decline of six birds for every 10 gas wells per square mile. Even though nesting success has decreased in these areas, the songbirds continue to settle wherever they find patches of sagebrush.

For the songbirds, these altered nesting sites became an ecological trap in which more nests are discovered by predators, occasionally including other bird species like the loggerhead shrike, northern magpie, short-eared owl, northern harrier, and American kestrel. “A first step,” Chalfoun says, “was to learn who the *primary* nest predators were. We placed 24-hour-infrared video cameras at a subset of nests and discovered, to our surprise, that rodents, including deer mice, which often are the same size as the nestlings they depredate, were the main culprits.”

Between 2011 and 2017, Chalfoun and her students found that 89 percent of predation to Brewer’s sparrows was caused by rodents. Of 47 predation events filmed on infrared video camera, 25 were by deer mice, 12 by chipmunks, and five by ground squirrels. During that same time period, 68 percent of the predation of 37 sage thrasher nests was done by 10 deer mice, 10 chipmunks, and five ground squirrels.

Continued on Page 20. . .



A sage thrasher finds a caterpillar to feed its nestlings. (Tayler Scherr photo).

Subsequent comparisons of rodent abundance revealed that deer mice and ground squirrels were more plentiful around natural gas infrastructures. Chalfoun says, “We tested the hypothesis that the main predators of rodents—coyotes, badgers, eagles, hawks, and ravens—are less prevalent near natural gas fields, thereby increasing rodent survival and abundance.” This ecological phenomenon is called Mesopredator Release, but Chalfoun and her graduate student Lindsey Sanders found that, in fact, the mesopredators also were more abundant in the gas fields. “Potentially, the ‘apex predators’ were all taking advantage of the increased rodent prey there,” adds Chalfoun. “So something else may be benefitting the mice and ground squirrels in the gas fields.”

Tracking florescent-powder-dipped mice at night recently gave Sanders and Chalfoun evidence confirming that mice will forage in the reclaimed areas surrounding the well pads and pipelines. In addition, diet analyses of their scat reveals that these mice consume both native and non-native plants (the former of which often establish in the reclaimed areas). Their preferred forage plants, including clover and some other fairly sparsely-distributed forbs, however, do not appear to be more commonly found in the reclaimed areas when compared with the original sagebrush habitats. “Reclamation grasses and forbs often have much plumper, juicier seeds than sagebrush



Male Brewer's sparrows typically perch and sing from the tallest sagebrush shrub in defense of its nearby territory where its nestlings rest. (Tayler Scherr photo).

does,” explains Chalfoun, “so we expected rodents to be potentially drawn to those areas.” Interestingly, the primary insect prey consumed by deer mice were lepidopteran (butterfly and moth) larvae—also a main diet source for songbirds and their young during the nesting period. “We cannot rule out the possibility, at this time, that the conversion of native sagebrush has altered other key components of rodent diets, such as lepidopteran insects, and altered their distribution,” explains Chalfoun.

While tasty seeds or insects may attract the rodents, denser patches of vegetation, including some of the non-native plants, like Russian thistle, commonly found in the reclaimed areas, make excellent hiding places from rodent predators. Another possible refugia (an area in which a population can survive in unfavorable conditions) for rodents might include the small sheds and buildings that are left over from the energy fields. “We have not tried to trap inside or near those buildings,” notes Chalfoun, “though, an employee in the gas fields told me that their building out there was heavily infested with mice! So, the mice could then emanate out and forage in the surrounding sagebrush.”

Another explanation for this phenomenon is that mice and other rodent nest predators simply have become concentrated



During research at the Pinedale Anticline, this deer mouse was coated with fluorescent powder so that researchers could follow their tracks with a UV light to learn where it traveled into reclaimed areas. (Kristina Harkins photo).

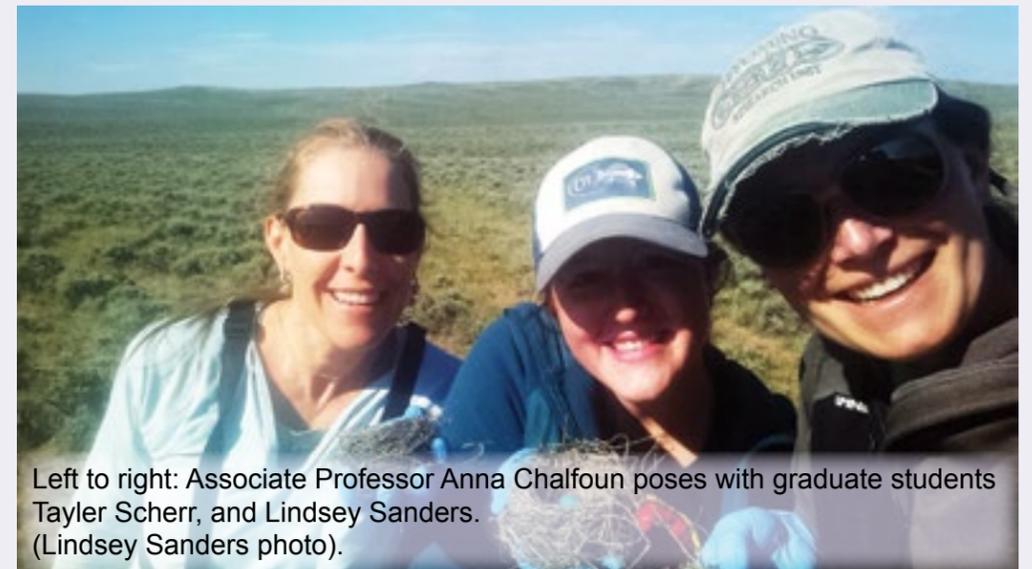
in remaining habitats within energy fields due to the edges created by roads and well pads that may not be crossed. If rodents are hesitant to cross particular edges, such as major dirt roads, they could “stack up” in adjacent areas and increase in density even if those areas are not particularly beneficial to them.

Regardless of the specific mechanism(s), the deviations to sagebrush habitats within natural gas fields are clearly affecting nesting outcomes of breeding birds. “If rodent densities are increasing as a result of landscape changes and/or altered herbaceous plant composition and structure,” says Chalfoun, “we should re-emphasize the need to restore disturbed sagebrush steppe areas within energy-extraction fields back to their more ‘natural state’ as quickly as possible, so that trophic dynamics and balance can be restored.”



Above, nearly two-day-old Brewer's sparrow nestlings beg for food. Their primary predators, deer mice, chipmunks, and ground squirrels, are not much larger than the nestlings. (Lindsey Sanders photo).

According to the Wyoming State Wildlife Action Plan (2017), several efforts are focused on lessening the negative effects of energy development on sagebrush habitats. In particular, the Jonah Interagency Office (JIO) supports projects to maintain important sagebrush habitats in the vicinity of energy development near Pinedale. Potentially, Chalfoun's research will help land managers develop mitigation plans that benefit Wyoming's sagebrush songbirds and even the more-famous greater sage-grouse.



Left to right: Associate Professor Anna Chalfoun poses with graduate students Tayler Scherr, and Lindsey Sanders. (Lindsey Sanders photo).

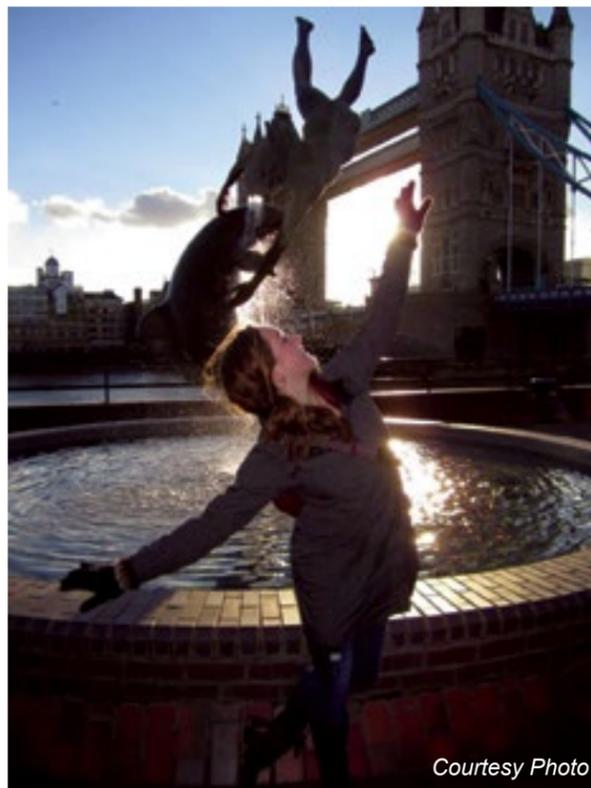
A&S Internationalization

First-hand encounters of the international kind

The College of Arts and Sciences has a long-standing tradition of encouraging its students to take advantage of study abroad. These life-changing experiences help students to see the world from a new perspective, develop language skills, step outside of their comfort zones, and increase their self-confidence.

UW currently has International agreements with Afghanistan, Argentina, Australia, Austria, Belgium, Brazil, Chile, China, Croatia, Cyprus, Denmark, Ecuador, England, Ethiopia, France, Germany, Ghana, Guatemala, Iceland, India, Indonesia, Israel, Italy, Japan, Kazakhstan, Korea, Malaysia, Mexico, Morocco, Nepal, the Netherlands, Peru, Philippines, Russia, Singapore, Slovak Republic, Scotland, Sweden, Syria, Taiwan, Tanzania, Tunisia, Turkey, United Arab Emirates, and Wales. Students in the College of Arts and Sciences regularly take advantage of the many offerings to take classes, conduct fieldwork and research, and immerse themselves in a place far away from home.

During Spring London Semester 2016, Killian Ramey, a dance major, attended the American Institute for Foreign Study (AIFS). Her academic courses were hosted by the University of London, while she also studied independently at four of London's finest studios—The Place, DanceWorks, Pineapple, and Studio 68. Working with dancers, choreographers, and teachers from across the globe was an opportunity that Ramey always will cherish. "Taking professional-level classes from new people every day encouraged me to grow in my artistry, confidence, and technique," she says. "I kept a detailed journal of every dance class I took while abroad that I will be sure to treasure forever."



In addition to academic and dance studies, Ramey immersed herself into London culture, attending 13 productions—including the Royal Opera's Giselle, learning to English Country Dance at the Cecil Sharp House, and exploring the city's architecture, markets, and parks. Ramey was struck by London's global environment, allowing her to interact with people from diverse cultures at various eateries and festivities. "I will always treasure being a part of the largest Chinese New Year celebration outside of Asia," she reflects. "I also do not think I could ever taste

another curry dish as delicious as the one I found on Brick Lane. Furthermore, I will never forget my first ride down to the Tube where I heard more than five different languages being spoken in a single elevator."

Besides exploring London, Ramey also participated in day trips and cultural events sponsored by AIFS. These events included visiting Bath, Stonehenge, and Oxford, as well as organized trips to Scotland and Munich. On her own, Ramey and two friends also traveled to Paris, and on the way back to the United States, she stayed in Iceland and took in its magnificent scenery and discovered yet another new culture.

"Having the chance to experience firsthand the world's vastness

and diversity led me to realize the importance of connection, collaboration, and sharing ideas," Ramey says. "My semester greatly humbled me as I realized how much I did not know; yet, it simultaneously inspired me to ever be learning from, growing alongside, and sharing with the people around me."

Victoria Hoeninghausen is a senior majoring in both criminal justice and international studies. During Fall Semester 2016, she spent five months in a small mountainous village in Northern Morocco where she attended Al Akhawayn University. While there, she took courses in Intermediate Arabic, Middle Eastern Politics, Africa and the United Nations, and International Law.

In addition to her coursework, Hoeninghausen deepened her international awareness by traveling throughout Morocco and Europe nearly every weekend. "This was an incredible experience for me because I made friends from all over the world, including Italy, Algeria, Germany, the Netherlands, and, of course Morocco," she says. "Having such a diverse group of friends came in handy because everywhere I traveled, I was with someone who could speak the native language."

By seizing the moment and taking spontaneous adventures, Hoeninghausen learned how beautiful the world can be when one has an open mind and is able to accept new cultures and encounters. Living in a Muslim country, Hoeninghausen was moved by the Call to Prayer from the town mosques five times a day—an occurrence not at all common in the United States. "While traveling to English-speaking countries also is an amazing and bold move, traveling to a developing country or a country that you know very little about will open your eyes to an entirely new perspective on life," she notes. "You never know, experiencing a country for yourself could go as far as ending a stereotype that you've had in your head about an entire population of people, and that is amazing!"



Benefits of studying abroad

The Institute for International Education of Students (IES) conducted a 50-year alumni survey to explore the long-term impact of study abroad on the personal, professional, and academic lives of students.

95% said that studying abroad was a catalyst for increased maturity.

96% reported increased self-confidence.

95% said that studying abroad had a lasting impact on their world view.

94% said that studying abroad continues to influence interactions with people from different cultures.

Source: <https://www.iesabroad.org/study-abroad/why/alumni-survey-results>

A&S Internationalization

Sarah Beth Wurzel, a senior majoring in biology and Spanish, spent two semesters in a full immersion program in Chile in 2015. She lived with a Chilean family, volunteered at a bilingual preschool, and joined a church community. In her second semester, Wurzel joined the university choir.

She took several courses most of which focused on oceanography and Spanish. “All of my oceanography classes were with Chilean students, so I became friends with Chilean students and professors,” she says. “I also saw some Chilean naval research ships and collected samples from the Valparaiso Bay for one of my classes. Hearing about all of the current research Chilean scientists are doing and being able to ask them questions about it was very special.”

When asked what the most important skill or lesson she learned while abroad, Wurzel comments, “I learned how to truly listen to people and seek to understand a different culture and language from the nationals’ perspective instead of my own. Along with that, I realized that different countries’ approaches to a problem can be equally effective if not better than the solutions we have in the United States.”

Wurzel participated in several cultural festivals and learned to dance *la cueca*, declared the national dance of Chile in 1979, which mimics the courtship of a chicken and a rooster using handkerchiefs that symbolize feathers. She also got “hooked” on salsa dancing. “The people in Chile really welcomed me into their lives and showed me amazing hospitality,” says Wurzel. “I am so thankful to have been able to live a year of my life with them, see the beautiful country, and learn the language. I also am thankful to UW for the scholarships I received to help me to go to Chile.”

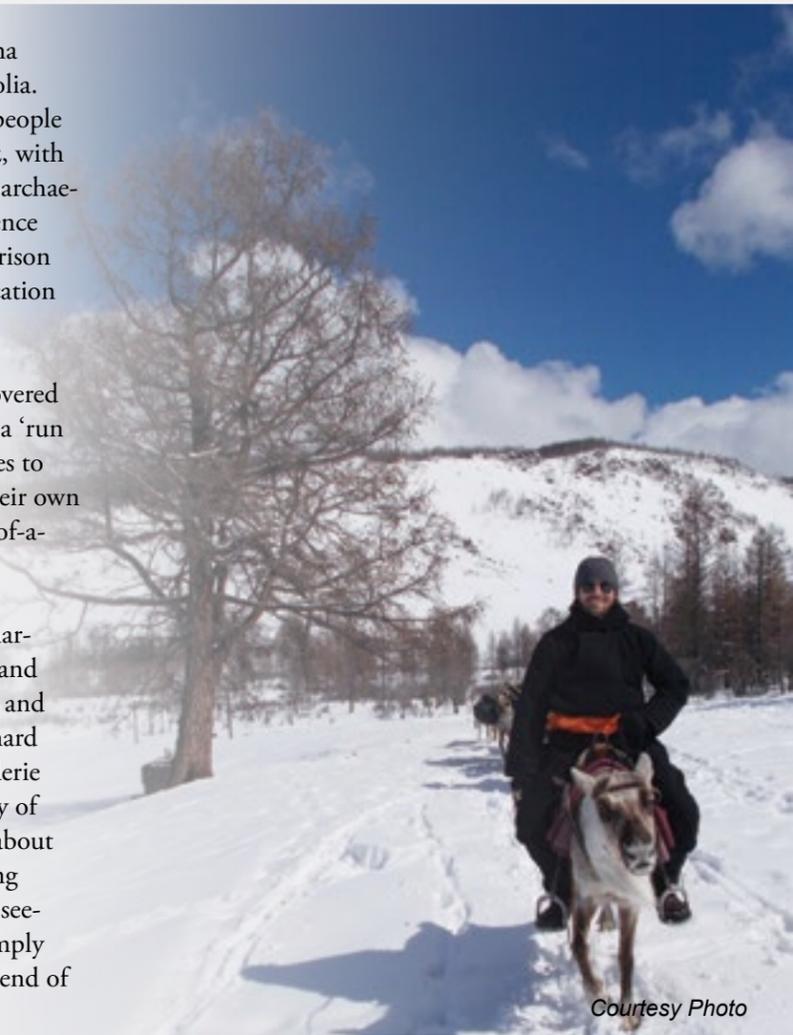


Courtesy Photo

In spring 2016, Spencer Ramsey Pelton, a Ph.D. candidate in the Department of Anthropology, lived in a remote camp with Dukha (pronounced do-ha) reindeer herders in the boreal forest in Mongolia. As a research assistant to Professor Todd Surovell, Pelton mapped people around their camps and inside their rounded homes, called an *ortz*, with iron stoves in the middle, to use as an analog for the Dukha Ethnoarchaeology Project. The goal of the project (funded by the National Science Foundation, the Fulbright Scholars Program, and the George C. Frison Institute) is to develop spatial theory of human behavior for application to archaeological problems.

While living and working with these nomadic people, Pelton discovered the true meaning of self-reliance. “The concept of a ‘repairman’ or a ‘run to the grocery store’ is foreign to those who must rely on themselves to maintain their few possessions and obtain most of their food by their own devices,” he says. “The nearest village was a-few-days-on-the-back-of-a-reindeer away, so if anything went wrong, we had to deal with it.”

Pelton’s interactions with the reindeer were intriguing. “I would characterize their disposition as somewhere between a golden retriever and a cow,” he says. “They make really funny noises, are food obsessed, and kind of dopey—they are inherently hilarious. They also are really hard working.” Besides enjoying the reindeer, Pelton found the camaraderie among the herders, complete with good-natured teasing and plenty of laughter, charming. He remembers receiving no shortage of jokes about him “crawling” up a snowy mountain pass on a particularly grueling day of travel. “My favorite part of living with nomadic people was seeing how purely happy they are,” he comments. “The Dukha are simply good people, and I felt like I had earned lasting friendships by the end of the experience.”



Courtesy Photo

Laramie native Gabriel Selting received the Undergraduate Student International Excellence Award in Spring 2017. Each year, the UW International Board of Advisors and the International Programs Office recognize individuals who have significantly contributed to internationalization and the promotion of global awareness at the university.

Selting, an honors student majoring in international studies with a minor in human and animal physiology, is president of the International Studies Student Club. He also received the Outstanding Freshman Award in the Global and Area Studies Program.

Selting’s main interest is the Middle East, which motivated his language study in both Arabic and French. He has been to Israel, Haiti, and France and has interned with the Education for Peace in Iraq Center in Washington, D.C. This past summer, he worked with the State Department at the U.S. embassy in Ouagadougou, Burkina Faso.



Adam Herrera Photo



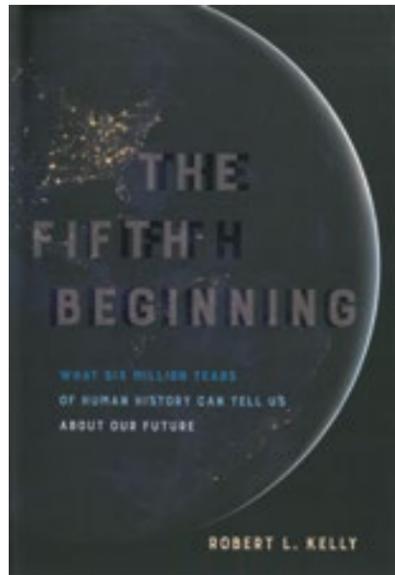
Celia Egghart (left), a junior majoring in English education, and Shelby Burroughs, also a junior majoring in English education, pose with their newly issued identity cards for their semester in London this past spring.

Courtesy Photo

“Nobody can discover the world for somebody else. Only when we discover it for ourselves does it become common ground and a common bond and we cease to be alone.”

American Author Wendell Berry

A&S Bookcase



The Fifth Beginning: What Six Million Years of Human History Can Tell Us about Our Future

Professor Robert Kelly
Department of Anthropology
University of California Press, 2016

Looking at the six-million-year history of human development, Robert Kelly identifies what he calls four “beginnings” all of which led to an ultimate, “no-turning back” change for the way societies organize themselves. He defines the first four enduring beginnings as the rise of technology, culture, and agriculture, and, finally, the state. Kelly argues that we are in the fifth beginning during which the concept of the “survival of the fittest” will give way to altruism and philanthropy.

These “beginnings” occur over a long period of time, Kelly argues, and this fifth beginning actually started in about 1500 A.D. (C.E.). Placing what many people today call globalization into its longer context, Kelly describes the fifth beginning as a five-thousand-year arms race, capitalism’s global reach, and the cultural effects of a worldwide communication network. He posits that the emergent phenomena of this fifth beginning will put an end to war, and capitalism, as we know it, will also cease to exist. The widespread shift toward world citizenship will evolve. Cooperation in new forms will end the “near-sacred” status of nation-states. His optimism makes Kelly’s book well worth the read, as he dwells not on coming chaos, but rather on humanity’s great potential—in the long run.



Miss Jane

Professor Brad Watson
Department of Visual and Literary Arts
W.W. Norton & Company, Inc., 2017

Longlisted for the National Book Award for Fiction and winner of the 2017 Harper Lee Award for Alabama’s Distinguished Writer of the Year, *Miss Jane* partly is inspired by the life of Brad Watson’s great-aunt. The story of Miss Jane Chisolm, a fearless rural woman of early-twentieth-century Mississippi who lives with an inoperable (at that time) genital birth defect, reminds readers of the exquisiteness of even an imperfect life.

The potency and implacable cruelty of nature, as well as its beauty, is a trademark of Watson’s fiction. In *Miss Jane*, he brings to life a hard, unromantic past that is tinged with the sadness of unattainable loves, yet marked with a transcendent beauty. Jane Chisolm’s irrepressible vitality and generous spirit give her the strength to live her life as she pleases despite the limitations that others, and her own body, would place on her. Free to satisfy only herself, *Miss Jane* mesmerizes those around her, exerting an unearthly fascination that lives beyond her still.

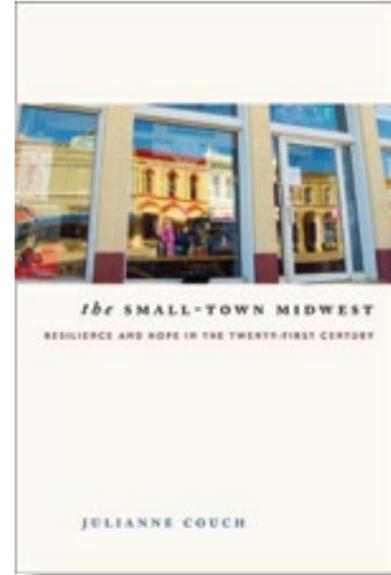


Rain Inscription

Professor Harvey Hix
Department of Philosophy and Religious Studies and the Department of Visual and Literary Arts
Etruscan Press, 2017

Rain Inscription gives vivid testimony to the paradox that human making is both lasting and fleeting. Its three sections (a sonnet-sequence Q&A with contemporary cultural studies, a renewal of the sayings of Herakleitos and Jesus, and a group of dialogues with contemporary artists) extend an already vast dialogue beyond its prior limits.

In addition to having been a finalist for the National Book Award for Chromatic, Hix’s awards include the T. S. Eliot Prize, the Peregrine Smith Award, and fellowships from the NEA, the Kansas Arts Commission, and the Missouri Arts Council. He has been a visiting professor at the University of Texas at Austin and at Shanghai University, and a Fulbright Distinguished Professor at Yonsei University.

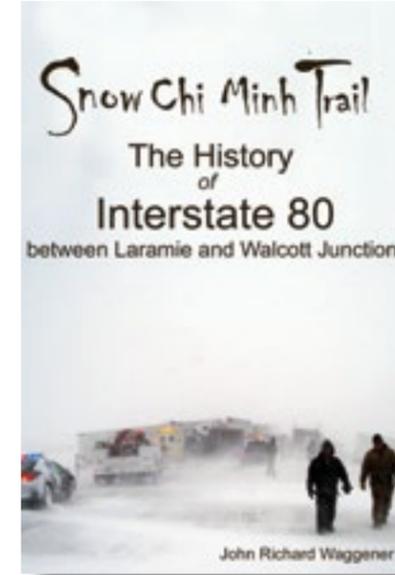


The Small-Town Midwest: Resilience and Hope in the Twenty-first Century

Online Instructor Julianne Couch
Department of English
University of Iowa Press, 2016

Most people in the United States live in urban areas; still, there are nearly fifty million people living in small towns of just a few thousand people or less. Some towns are within a short drive of a metropolitan area where people can work, shop, or go to school; some are an hour or more from any sort of urban hub. In this book, named a Kansas Notable Book by the Kansas library Association, Couch illuminates the lives and hopes of these small-town residents.

The people featured live—by choice or circumstances—in one of nine small communities in five states in the Midwest and Great Plains: Iowa, Kansas, Missouri, Nebraska, and Wyoming. Every day they witness people leaving for more urban areas, small businesses closing down, and more people thinking about leaving. But there is more to the story. Many people long to return to these towns, where they may have deep family roots or where they can enjoy short commutes, familiar neighbors, and proximity to rural and wild places. They are betting that the tide of rural population loss won’t continue forever, and they’re backing those bets with creatively repurposed schools, entrepreneurial innovation, and community commitment.

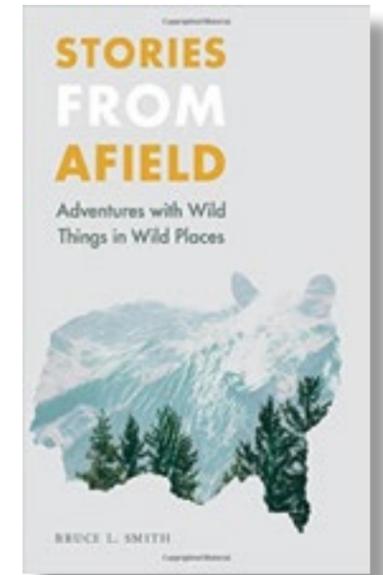


Snow Chi Minh Trail: The History of Interstate 80 between Laramie and Walcott Junction

John Richard Waggener
(B.A. geography and education 1995; M.A. geography 2001)
Wyoming State Historical Society Press, 2017

Fifth-generation Wyomingite John Waggener, associate archivist at the UW American Heritage Center, explores the politics, geography, and history of the stretch of road between Laramie and Walcott Junction, just outside of Rawlins. Named the “Snow Chi Minh Trail” by long-haul truckers in the 1970s, many of whom were Vietnam veterans, the mountainous road—7,000 feet above sea level—is where some of the worst highway crashes in the state of Wyoming have occurred. Television reporter Charles Kuralt brought that section of highway into the nation’s consciousness when he filmed there during a February 1972 blizzard for his CBS “On the Road” series.

Anyone who ever has driven or will drive those 77 miles during a snow storm will appreciate learning about how and why the highway was constructed in that location despite the warnings of well-versed locals. Waggener also details the development of snow fences by Ronald Tabler and others, as well as additional efforts to mitigate dangerous travel.



Stories from Afield: Adventures with Wild Things in Wild Places

Bruce Smith
(Ph.D. zoology and physiology 1994)
University of Nebraska Press, 2016

Bruce L. Smith (College of Arts and Sciences Outstanding Alumnus 2017) knew what he wanted to do for the rest of his life at the age of seven when his parents moved to the country. As a wildlife biologist, Smith has worked with most big-game species in some of the American West’s most beautiful and challenging landscapes. In *Stories from Afield*, Smith takes his readers with him on his adventures as a naturalist, sportsman, and wildlife biologist. He pulls his readers into the field of learning and discovery across wilderness areas of western Montana, the National Elk Refuge in Jackson Hole, Wyoming, and a South African temperate forest.

Ranging from humorous to harrowing, Smith’s essays recount capturing newborn elk calves, stalking mountain goats on icy cliffs, being stranded on a mountain after riding out a helicopter crash, and confrontations with bears. Throughout his adventures, the magnetism and danger of wild nature are constantly present, reminding us that our fascination with wildness often stems from its unpredictability.

A&S Alumni and Donors

A&S alumna receives National Endowment for the Humanities fellowship

Laramie native Danielle Olden, 2006 College of Arts and Sciences Outstanding Graduate, credits her UW undergraduate education with preparing her for graduate school and consequent position as an assistant professor at the University of Utah.

Like many high school seniors, Olden was ready to leave her home town after graduation, but financial realities determined that she would attend UW. “As it turned out, I couldn’t be happier that I chose UW,” she notes. “I had a number of life-altering experiences there for which I am grateful. I genuinely enjoyed my coursework, which helped me fine tune my writing and speaking skills, and I also learned how to research, how to develop an argument, and how to present evidence.”

Because of her fascination with religious history and Egyptology, Olden decided to major in history. Once she started to take classes, though, Olden was drawn to U.S. History because it helped her to make sense of contemporary debates and problems that she saw in everyday American life. She also took advantage of the wide range of courses available in a liberal arts and sciences college. “I felt empowered with the new knowledge I was gaining and the new insights I was developing,” she notes. “I loved my courses in English, Women’s Studies, Chicana/o Studies, and African American Studies. Combined, these courses helped me develop my scholarly interests and my research agenda, which I still am pursuing.”

Opportunities seemed to wait around every corner for Olden. As a freshman, she took Introduction to Public History, which met at the American Heritage Center (AHC). Growing up in Laramie, Olden had driven past the cone-shaped building countless times, but until she took that class she had no idea that the AHC was a leading manuscript and rare books repository where she would be able to explore history through primary resources. “I loved seeing, touching, and smelling the collections,” she says. “They smelled like old books—a scent that for me brought the past rushing into the present.” Eventually, Olden landed a student assistant job at the archive.

Olden also took two internships; one was with the President’s Advisory Council on Minority and Women’s Affairs (PACMWA),



Arthur L. Carter photo

during which she learned certain aspects of university administration, particularly concerning diversity and inclusion issues—a primary interest of and concern to Olden. The second internship was with Professor Marianne Kamp, formerly of the Department of History, who was the editor of the scholarly publication *Central Eurasian Studies Review*.

During the summer between her junior and senior years, Olden was a McNair Scholar, which provided funding for her undergraduate independent research. “The fact that it was paid was critical because it enabled me to focus on the research without having to work another job to pay the bills” she explains. “It gave me a taste of what it is like to pursue a career in academia.”

“It was through McNair that I learned what graduate school is,” she says, “and that there are graduate programs that not only pay your tuition but provide stipends as well.” Before becoming a McNair Scholar, Olden had not considered graduate school. The McNair staff offered workshops on research, writing, and presentation in addition to GRE preparation and graduate school application process. “They helped me apply to top programs, and then they helped me decide which one was the best fit for me,” adds Olden. “I don’t think I would be where I am today without the UW McNair Scholars program.”

Armed with a B.A. in history, including a concentration in public history, and a minor in interdisciplinary professional writing, Olden went on to earn both a master’s and Ph.D. in history at the Ohio State University. The rest, as they say, is history.

Today, Olden, a first-generation college graduate, teaches undergraduate and graduate courses in U.S. History, U.S. West History, Chicana/o history, borderlands history, and historical methodology and writing. As she finishes her fourth year at the University of Utah, Olden is preparing for a year-long National Endowment for the Humanities fellowship, which she will take during calendar year 2018.

Olden will use that year to work on her book, *Racial Uncertainties: Mexican Americans, School Desegregation, and the Making of Race in Post-Civil Rights America*, in which she looks at desegregation of Colorado public schools during the 1970s. Her work focuses on how Mexican Americans participated in litigation and community disputes concerning how desegregation would be implemented in the city of Denver. In 1972, *Keyes v. School District No. 1*, made

its way to the United States Supreme Court. The case resulted from law suits and disagreements about where Mexican Americans (the largest minority group in Denver) fit into the black-white paradigm of the court system. “I was drawn to the case,” explains Olden, “because of the questions and debates it presented about race—a major research interest of mine. Denver citizens could not agree on their racial identity or how they fit into the court’s desegregation plan. Mexican American racial ambiguity was, therefore, a critical part of the case. I argue that these racial uncertainties are more important to the history of modern America than previous scholars have recognized.”

As an educator, Olden hopes to inspire other first-generation college students and challenge the assumptions that students often bring into the classroom. Olden shares her accomplishments with her family, whose love and support have served as a guiding light. “My mom raised me and my two sisters as a single mother—a feat that I still can’t quite figure out,” notes Olden. “Yet, she did it, and she did it with grace, strength, and humor. My accomplishments are not mine alone; they belong to her as well.”

Katie Kern is the new A&S Major Gift Officer



UW Photo

Katie Kern recently joined the UW Foundation as the College of Arts and Sciences major gift officer. Born and raised in Albuquerque, New Mexico, Kern holds a B.A. in communications and an M.S. in physical education and sports administration from the University of New Mexico.

Kern was an assistant coach for the UW Women’s Basketball team for several years and has a strong passion for the University of Wyoming.

“I am extremely excited to work with the College of Arts and Sciences,” says Kern, “and I love living in Wyoming for the outside adventure opportunities. I enjoy hiking, camping, cross-country skiing, and basically anything outdoors. I have one dog, Decker.”

The College of Arts and Sciences is appreciative of all gifts!

WAYS TO GIVE

Online: www.uwyo.edu/giveonline

Email: foundation@uwyo.edu

Phone: 888-831-7795 or 307-766-6300

A&S MAJOR GIFT OFFICER

Katie Kern

Email: kkern4@uwyo.edu

Phone: 307-766-4364

DIRECTOR OF ANNUAL GIVING

Candace Paradis

Email: candace@uwyo.edu

Phone: 307-766-3933

 UNIVERSITY
OF WYOMING

College of Arts and Sciences
Department 3254
1000 East University Avenue
Laramie, WY 82071

Non-Profit Organization
U.S. POSTAGE
PAID
University of Wyoming



Part of the 22m tall “Medea” hydrothermal vent discovered on February 10, 2017, at 2300m below sea-level. Crabs and polychaete worms are visible on the surface of the vent.

Image courtesy of Mike Cheadle, University of Wyoming/NSF/ROV Jason 2017 © Woods Hole Oceanographic Institution.