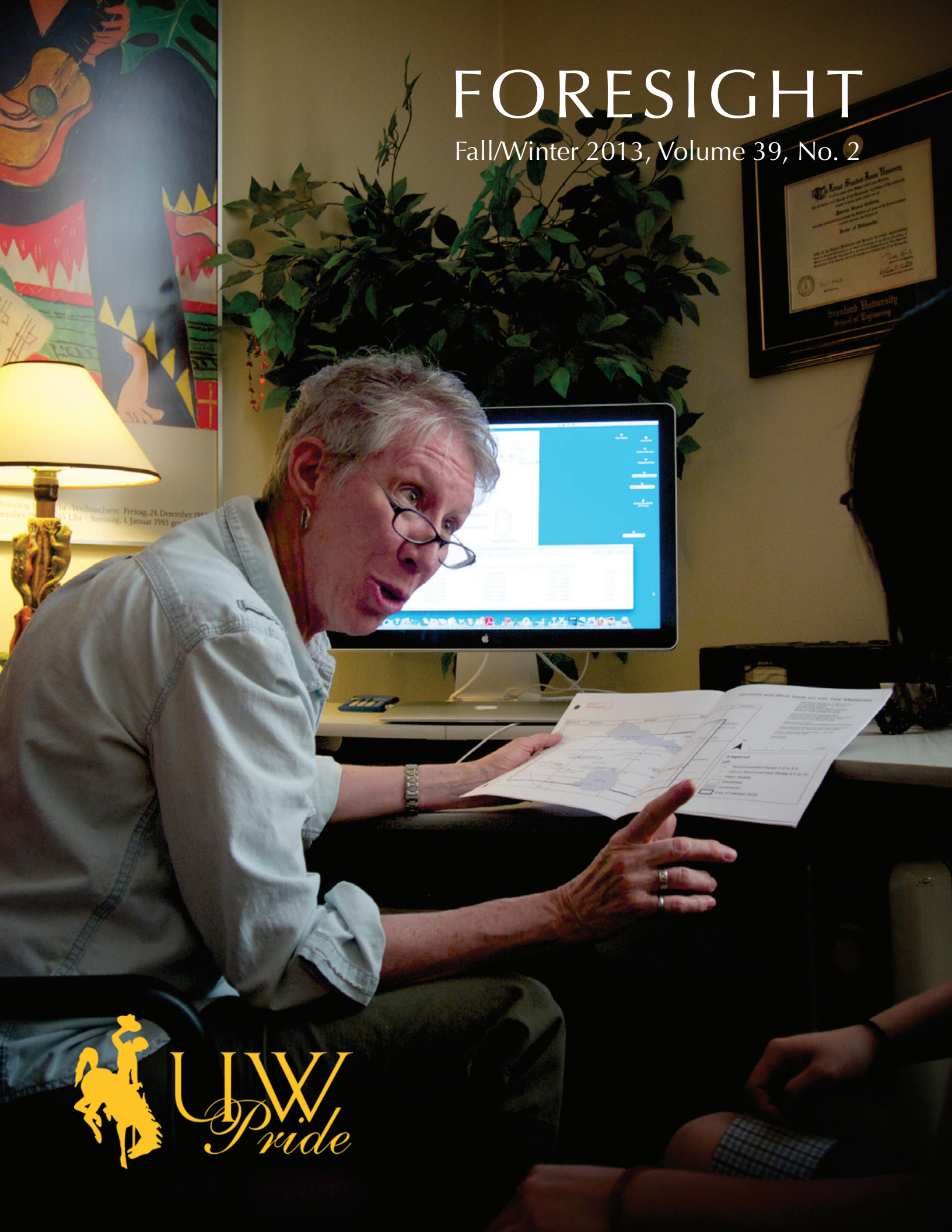

FORESIGHT

Fall/Winter 2013, Volume 39, No. 2

UW Pride

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On the web at:
www.uwyo.edu/ceas

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UW Pride

Working for Wyoming and the World...

In March 2010, Wyoming became the first state to adopt an official state code of ethics. The symbolic measure spells out ten ethics dervied from the "Code of the West" outlined in a book by author and retired Wall Street investor James Owens.

Live each day with courage

Take pride in your work

Always finish what you start

Do what has to be done

Be tough, but fair

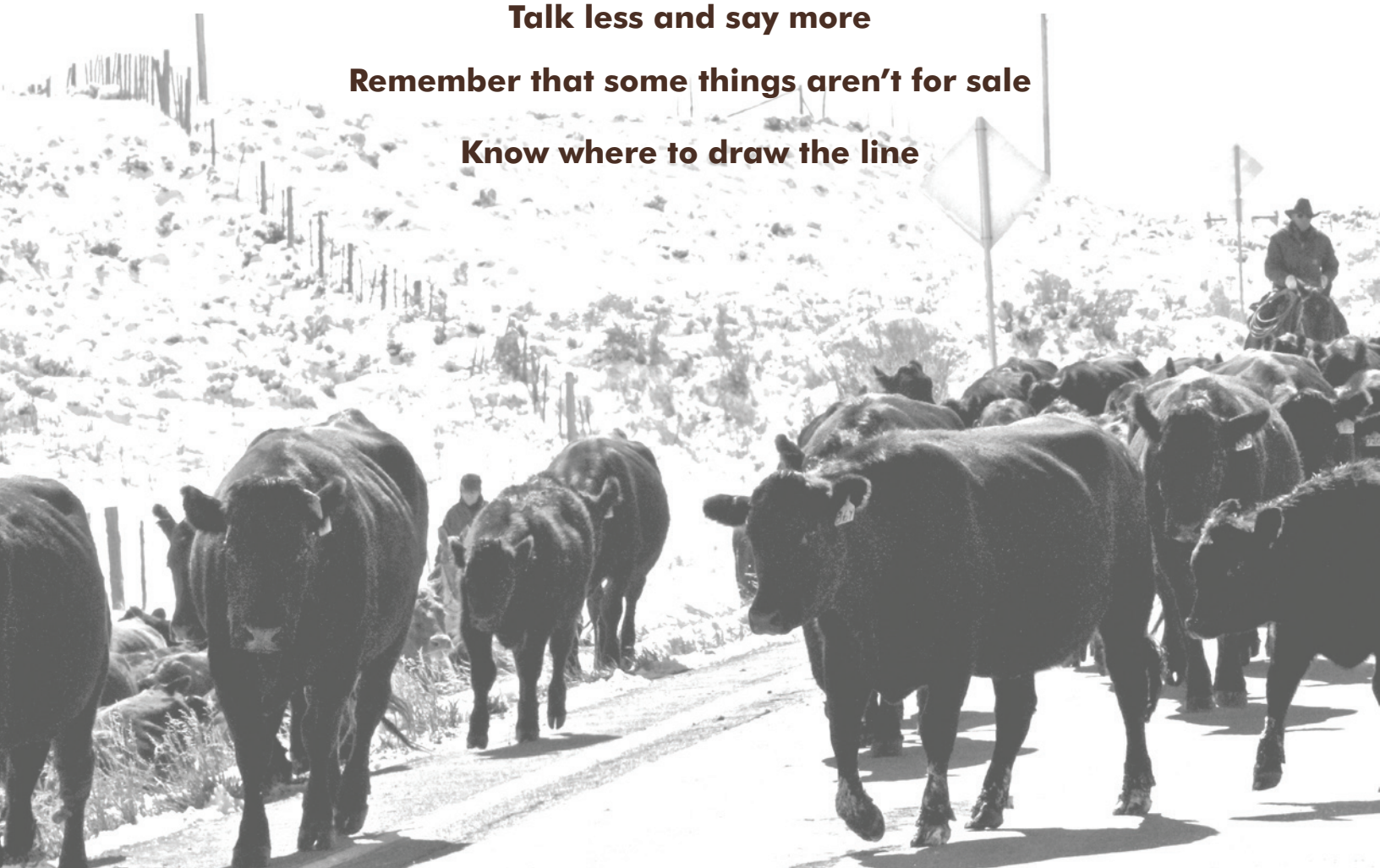
When you make a promise, keep it

Ride for the brand

Talk less and say more

Remember that some things aren't for sale

Know where to draw the line



Message from Dr. Jerry Calkins, CEAS National Advisory Board Chairman

It is my pleasure to provide the Introductory Message for the fall issue of Foresight Magazine and some information about the College's National Advisory Board.

The Board was organized in 1998 as a requirement of ABET accreditation to foster higher levels of educational and research excellence. The Board interacts with students, faculty, department heads and the larger engineering and applied sciences communities; provides input on academic issues; supports the promotion, development and expansion of the education programs and facilities; recognizes significant achievements of CEAS alumni and supporters; and assists in fund-raising.

Initially, the Board acted in an advisory role to the Dean and faculty. Over time the role and responsibilities have increased until today the Board has become an important stakeholder in the implementation of the Engineering Initiative (EI) in achieving Tier1 recognition and successful completion of the Engineering Complex Project (ECP)

The Board consists of 25 voting members including a representative from each of the Departmental Advisory Boards. Members are selected for a four year term by the Dean and current voting members representing all engineering and applied science disciplines of the College. Membership is not limited to CEAS graduates but also includes individuals who are active in their support of the College. Faculty and students are represented by non-voting ex officio members. A chairman and vice chairman are elected and serve two year terms. The Board is organized into standing committees [Executive, External Affairs, Finance, Pathway to Excellence, Engineering Complex] consisting of both voting and ex officio members.

Although engaged in numerous projects, the Board is currently involved in the successful implementation of

the EI and the ECP. Nearly six years ago, Dean Ettema, with the assistance of the Board, proposed the ECP which calls for major renovations and construction to the engineering building and the new Energy Engineering Research Facility.

As the ECP moved forward in the design and funding phases, momentum was gained when Governor Mead issued a directive as a top priority for his administration to create the vision to lead UW toward a "Tier 1 academic and research institution in areas of excellence appropriate for Wyoming." To implement this directive, he appointed the Wyoming Governor's Energy, Engineering, STEM Integration Task Force whose members include the Dean and Board Chairman. In May 2013, UW issued an Engineering Initiative Report to the Task Force that articulated a compelling vision for the future of the College. In the report, an outline of a strategy for CEAS attaining Tier 1 recognition is presented along with specific recommendations to move forward.

This is a critical year for the College with a change in leadership in Old Main and Dean Ettema stepping down. The Board is fully engaged with the new UW President, Dr. Richard McGinity, and the Interim Dean, Dr. Khaled Gasem, who are fully supportive of this endeavor.

Dr. Gasem joins UW as the Associate Provost for Graduate Education. However, because of his extraordinary background with degrees in Chemical Engineering and extensive experience in academia, academic administration, and the energy industry, his first assignment is serving as the College's Interim Dean until the permanent Dean has been recruited.

This is truly an exciting time for the College. In order to accomplish these lofty goals, it will take all us pulling together. I would like to encourage those of you who are currently engaged with the College to stay engaged. For those of you who have lost contact with us, I would like to encourage you to re-engage by contacting the College, the UW Alumni Association, and/or the UW Foundation to learn how you can help CEAS attain Tier 1 recognition as one of the top schools of engineering and applied science in the country. If you are interested in serving on the Board, feel free to contact me.

Jerry M Calkins, PhD, MD
NAB Chairman

photo: Dr. Jerry Calkins, NAB Chairman and Dr. Khaled Gasem, CEAS Interim Dean

SUBMIT OUTSTANDING ENGINEERS FOR AWARDS

Each year Tau Beta Pi recognizes two outstanding engineers with the **Wyoming Eminent Engineer Award** and the **Outstanding Engineer Alumnus Award**. The Wyoming Eminent Engineer Award recognizes an outstanding engineer who has made outstanding contributions to the Great State of Wyoming and the engineering profession. The Outstanding Engineering Alumnus Award recognizes a college alumnus who has distinguished themself through outstanding contributions to engineering. Nomination forms may be obtained online at **https://uwyo.collegiatelink.net/organization/tbp/documentlibrary** or requested from Steve Barrett at **SteveB@uwyo.edu**. Nomination packages are due by February 15, 2014 to Steve Barrett.

Outstanding engineers and scientists can additionally be submitted for the college's **Awards and Recognition**. These awards recognize and honor graduates who have distiguished themselves with outstanding professional and community leadership acievements throughout their careers. Nominations and additional information can be obtained by contacting Baillie Miller at **BMille42@uwyo.edu**, or on the web at:
www.uwyo.edu/ceas/development/awards

Dr. Jeff Clune: Harnessing natural selection.

by: Heather Ann Gibbs, CEAS Marketing and Communications Intern

TALK LESS BUT SAY MORE

Ever wonder what it would be like to see evolution happen right before our eyes? To watch the changes that take millions of years instead happen overnight? In computer worlds, generations can occur in microseconds, enabling researchers to study how evolution works without the wait.

Studying how intelligence evolved, and how to repeat the process to evolve artificially intelligent robots, is what happens in the University of Wyoming's Evolving Artificial Intelligence Lab, led by Jeff Clune, a new Assistant Professor in the Department of Computer Science. They investigate what made nature produce such exquisite designs in order to improve evolutionary algorithms and thus evolve smarter virtual creatures and robots.

Clune and his students are investigating how the complex process of evolution can be harnessed to create artificial intelligence, robots, and physical designs. "The ultimate goal of my lab is to learn how to produce robots that rival natural animals in grace and intelligence," Clune described. The group believes that one promising way to do that is to understand the power of evolution, so they study how evolution produces intelligence and complexity in order to develop artificially intelligent robots. These robots have the unique ability to learn and adapt to their ever-changing environments.

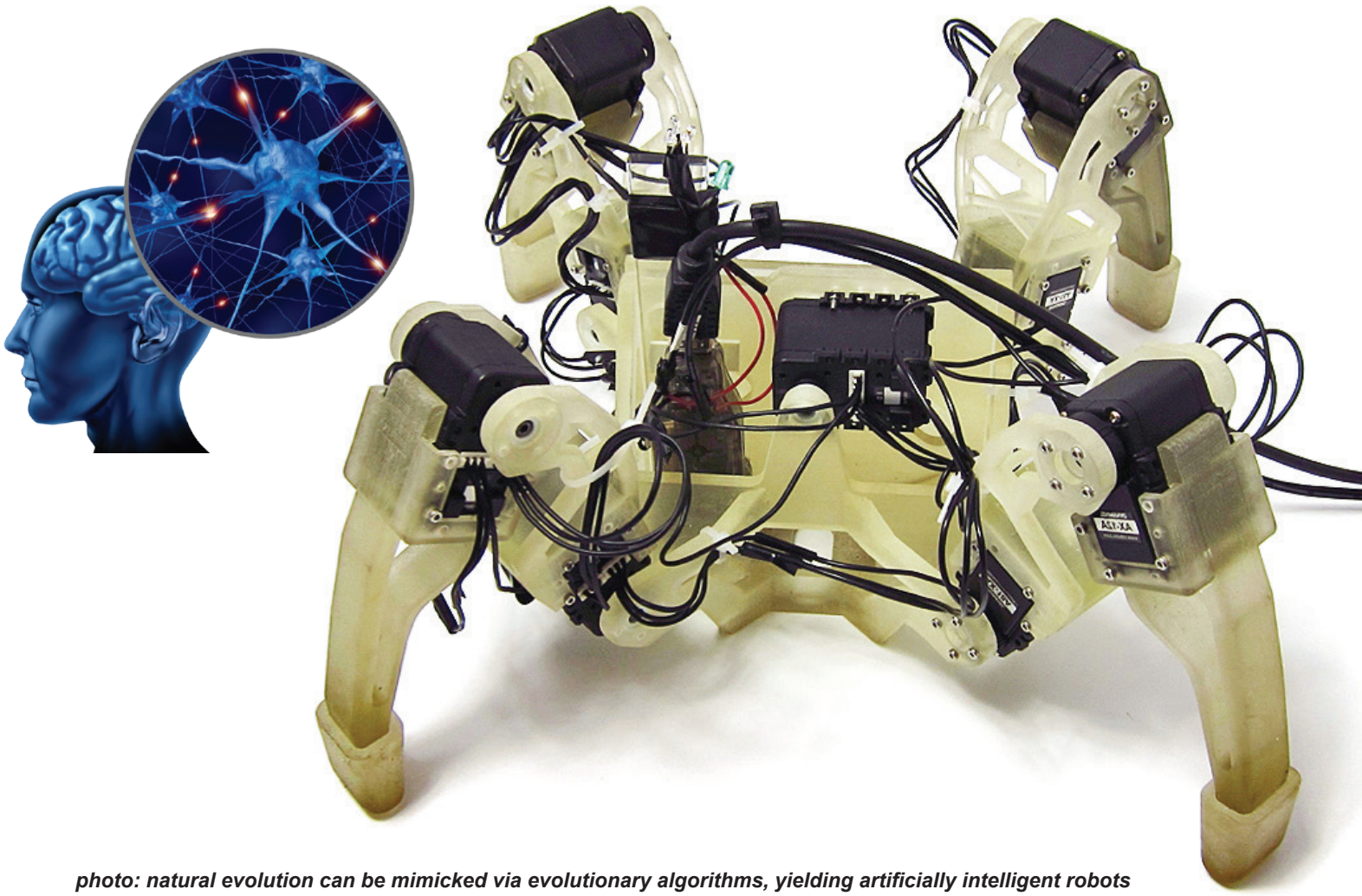


photo: natural evolution can be mimicked via evolutionary algorithms, yielding artificially intelligent robots

To do that, a 'survival of the fittest' approach is applied to software programs. More fit programs—those that make robots smarter, for example—survive to the next generation. Over time, the software gets smarter, faster, better at learning, more robust to damage, etc. These evolutionary algorithms often produce designs that outperform anything human engineers have come up with.

Consider an industry having the ability to develop robots that move like cheetahs, machines that can make silk, seed molecules that self-assemble into oak trees or blue whales, or nano-factories that can produce life-saving chemicals. Nature has mastered these practices, leaving engineers and scientists with the fascinating question of how we can match, and then surpass, nature's capabilities. Clune believes the best way to do that is by emulating the process that produced those designs: evolution. "What's great about computational evolution," Clune notes, "is that we get to decide what counts as fit. We can reward evolution for making medicine, creating robots that locate land mines, or whatever we wish. We can thus harness evolution to produce tremendous benefits to society."

Why risk human lives when we can instead have robots do a job? Clune provides examples: "Instead of risking the lives of firefighters to battle raging forest fires, we should be sending robots." The difference could be asking a mother's son or daughter to go into the Fukushima Daiichi nuclear power plant to shut it down, or instead programming an intelligent robot to do so.

To have evolution design such impressive robots, though, more research needs to be done. That means plenty of work for the members of the Evolving AI Lab. Although computational evolution frequently outperforms human engineers, its products still pale in comparison to the amazing organisms in the natural world. The daily work of the lab involves conducting experiments in simulations of evolution to discover how evolution produces increasingly sophisticated designs. With each passing year, their experiments reveal more of nature's secret ingredients. As Clune says "Our greatest challenge continues to be uncovering the not-yet-known aspects of natural evolution that make it so powerful."

Wyoming Recognizes Value of Ph.D.

reprinted from the August 2013 Licensure Exchange with permission of NCEES

David Whitman, Ph.D., P.E., F.ASEE
Wyoming Board of Registration for Professional Engineers
and Professional Land Surveyors Member

The state of Wyoming has, for many years, defined the teaching of advanced engineering topics and research investigations as the practice of engineering. Thus, faculty at the University of Wyoming who teach upper-division or graduate-level classes and do engineering-related research, by law, should be licensed. Obviously, this has been a difficult proposition. In lieu of having all faculty members being licensed, the Wyoming Board of Registration for Professional Engineers and Professional Land Surveyors took the unofficial approach that the dean of the university's college of engineering and applied science should hold the P.E. license as the responsible person in charge. This, in turn, has caused issues with regard to the hiring process.

A re-examination of this history has led to two new formal relationships between the board and the university—a memorandum of understanding and a new licensure path.

Memorandum of understanding

In January 2011, the board signed an MOU with the University of Wyoming that called for the following:

- The college shall continue to promote the importance of professional licensure to eligible faculty, staff and students as follows:
    - Eligible engineering faculty and staff members shall be encouraged to become licensed professional engineers. The board will provide alternate paths to licensure for faculty members holding an earned doctorate in an engineering discipline.
    - The college's Orientation to Engineering course, and other courses within each engineering program, shall instruct students on ethical behavior and the importance of professional licensure.
    - All graduating seniors within an engineering discipline shall be required to take the Funda mentals of Engineering examination with a good-faith effort.
- Each engineering capstone design course (e.g., senior design) shall be taught under the supervision of a faculty member who is a licensed professional engineer. If a licensed professional engineer is not available to teach the course, a licensed professional engineer from the faculty and staff committee mentioned in the item below shall be appointed to provide design and course oversight. The appointed engineer shall actively participate in course design reviews and other related course activities.
- The dean shall appoint a faculty and staff committee of professional engineers, licensed to practice in Wyoming, to oversee all engineering capstone design courses. A senior, licensed faculty member shall chair the committee. If the dean is licensed, he or she shall serve as committee chair.
- The committee shall provide the board an annual report (due June 1 of each year) documenting the college's activities pertaining to licensure, including a list of instructors for the capstone design courses and a list of program-specific courses that address ethical behavior and professional licensure.

After two full years in effect, the MOU is working very well.

The new path to licensure

Effective July 1, 2013, Wyoming law recognizes the value of the earned doctoral degree in engineering with regard to licensure. The NCEES Model Rules has, for a long time, allowed the waiver of the FE exam for those with an earned engineering doctoral degree. The Wyoming law now also waives the Principles and Practice of Engineering exam.

The new path to licensure is stated as follows:

- An applicant for a license as a professional engineer who has graduated from a doctoral curriculum in engineering approved by the board shall submit evidence satisfactory to the board showing that the applicant;
    - Is of good moral character and repute;
    - Has passed any examinations required by rule of the board to establish competence at a professional level in Wyoming licensing laws and professional ethics; and
    - Has four years of engineering experience in increasing responsibility and scope of a grade and character that evidence the applicant is competent to practice as a professional engineer.

While the rules that will correspond to the new legislation are not yet approved, the current draft is as follows:

- A “doctoral curriculum approved by the board” is defined as an earned doctoral degree (Ph.D., etc.) from an institution that grants EAC/ABET-accredited undergraduate or graduate degrees.
- “Examinations required by rule of the board” are defined as
    - A written examination on professional ethics and Wyoming licensing laws; and
    - An oral interview with the board.
- The four years of engineering experience must be obtained after the applicant completes his/her first degree (undergraduate or graduate) in engineering. No credit toward this experience requirement will be given for the applicant’s graduate education.

Ramifications

The Wyoming board recognizes that this is the first engineering licensure law in the United States that effectively waives both the FE and PE exams for those with qualified earned doctoral degrees. Because of that, the board realizes that those who are licensed via this pathway will, at least in the near future, have difficulty getting comity licensure from other jurisdictions. However, the board encourages other jurisdictions to include this new pathway in future modifications of their licensure laws.

Finally, this is NOT a limited license for teaching or faculty only. This license will have all of the rights and responsibilities that accompany any license in the state of Wyoming.

ALWAYS FINISH WHAT YOU START

Dr. John Oakey to Use NSF CAREER Award to Research Regeneration of Structural Tissues

John Oakey wants to make tissue engineering and regenerative medicine more effective and widespread for applications such as rebuilding damaged knee cartilage. The University of Wyoming researcher will soon receive a large funding source that will assist him.

Oakey, a UW assistant professor of chemical and petroleum engineering, was the recent recipient of the National Science Foundation's Faculty Early Career Development (CAREER) Program Award. The Division of Chemical, Bioengineering, Environmental and Transport Systems (CBET) within the NSF recommended Oakey for the award, which totals $400,071.

He received the funding Sept. 1. Budgeted over five years, the award will pay for equipment, supplies and salaries for a graduate student and two undergraduate students, Oakey says.

The CAREER Program offers the NSF's most prestigious awards in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research. Only assistant professors without tenure are eligible. The CAREER Program is intended for faculty members who are at or near the beginning of their careers.

Cracking the Cartilage Conundrum

Because cartilage doesn't regenerate well, it doesn't heal. Rather, damaged and lost cartilage can create the genesis for osteoarthritis, Oakey says. Osteoarthritis, which affects an estimated 27 million Americans over age 25 (National Institute of Arthritis and Musculoskeletal and Skin Diseases statistics), results in joint pain and cartilage inflammation and limits joint mobility.

"This project focuses upon biomaterials and cell types that are appropriate for the regeneration of structural tissues, such as cartilage and bone, but will ultimately be applicable to a variety of therapeutic scenarios," Oakey says.

Oakey will develop miniaturization techniques and devices designed to rapidly assess cell encapsulation (immobilization of living cells) within tissue-like biomaterials. This information will be employed to strategically build implantable hydro-gel tissue scaffolds to assist in native tissue regeneration.

Synthetic tissue scaffolds serve two functions. First, once the scaffold is implemented, it immediately restores the function of the tissue that was injured. Second, the scaffold serves as a support for the cells (encapsulated within the tissue-like biomaterials) to grow.

"Cells need an environment in which they can survive, proliferate and produce native tissue," Oakey says. "The scaffold eventually degrades and is resorbed by the body."

However, it is this transition period of healing that Oakey describes as a "tricky period of time."

"What can go wrong?" he says. "Cells die. Cells can differentiate into very different types of cells. The scaffold can fall apart before the native tissue is fully assembled."

As a result, Oakey plans to closely study a dilemma that can arise between a synthetic material's diffusive conductivity and its mechanical strength. A material's diffusive conductivity describes how well it transports oxygen and other dissolved gases, nutrients and waste products.

His interest in the subject brings together his background in materials and his interest in the life sciences. Oakey says he likes to work "at the interfaces between different disciplines."

"My research, while diverse, tends to all be very interdisciplinary," Oakey says.

Oakey received his doctoral and master's degrees in chemical engineering, both from the Colorado School of Mines. He received his bachelor's degree in chemical engineering from Penn State University. He also was a postdoctoral fellow at the Center for Engineering in Medicine at Massachusetts General Hospital and Harvard Medical School and a postdoctoral fellow at Shriners Burns Hospital in Boston.

"I think it's a fascinating field because it's inherently complex, but it's the future of medicine," Oakey says of tissue regeneration. "There's a lot of room for new creations, innovations and solutions."

Spreading the Knowledge

NSF CAREER Award stipulations require the award recipient to include an educational outreach component as part of receiving the grant money. Oakey says the educational goals of this proposal are to develop and introduce microfluidic devices for laboratory and demonstration use at the university, high school, and elementary school levels. Microfluidics deals with the behavior, precise control and manipulation of fluids that are geometrically constrained to a sub-millimeter scale.

Initially, the focus will be to develop a capstone chemical engineering unit operations laboratory centered on microfluidic experiments. Subsequently, the microfluidic devices will be modified for demonstration use with existing outreach programs in Wyoming K-12 schools.

"We'll take some tools we've de-

photo: graduate student Amy Reece and Dr. John Oakey

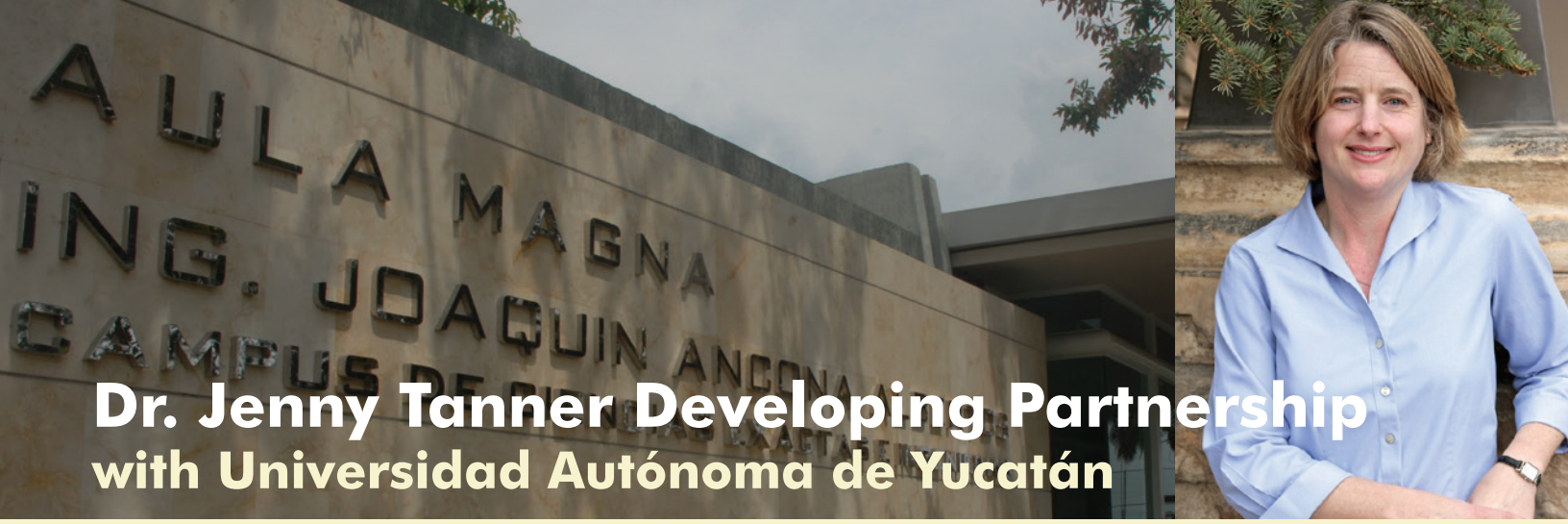
veloped, devices that allow the student to look through a small, inexpensive microscope to see what's happening." Oakey says, displaying a small piece of glass with a layer of silicone mounted on top of it.

Oakey is partnering with members of UW's Science Posse to create experiments in which the necessary materials can be mailed to any school in Wyoming. He also has obtained a small clamp that can securely hook an iPhone or iPad camera to a microscope, and make the lessons interactive, even over long distances.

"You can turn on the camera. The teacher can project onto the wall for the whole the class to see what's going on under the microscope," Oakey says. "At the same time, I can be sitting in Laramie and see what's going on, using my iPad or computer."

While Oakey hopes his research eventually can be used to alleviate real pain in others, he doesn't rule out he may end up helping himself one day.

"I do like to ski, so the writing's on the wall," he says with a laugh.



Dr. Jenny Tanner Developing Partnership with Universidad Autónoma de Yucatán

Dr. Jenny Tanner is currently a UW Associate Professor of Civil and Architectural Engineering. While finishing her Ph.D. at the University of Texas at Austin in 2003, she worked closely with fellow graduate student Jorge Varela. Ten years after their graduation, Dr. Jorge Varela is now a Professor of Structural Engineering at the Universidad Autónoma de Yucatán (Autonomous University of Yucatán, UADY). Their collaborative efforts have continued and have led to the formation of a partnership between the engineering programs at their respective universities. As part of the collaboration, UADY has hosted Jenny Tanner for a technical presentation on masonry laboratory activities at UW.

UADY is located in the town of Merida. The university's key mission is to contribute to social development, science, and technology, while also providing innovative and sustainable solutions regionally, nationally, and globally. It is a forward thinking university that currently offers undergraduate programs in:

- Civil Engineering
- Engineering Physics
- Mechatronics Engineering
- Renewable Energy Engineering

The university additionally offers M.S. and Ph.D. options in environmental, construction, and structural engineering. Students are provided access to several laboratories to help them solidify fundamental engineering concepts.

The faculty of engineering at UADY has set their 2020 vision as:

"In 2020 the Faculty of Engineering wants UADY to serve as a space open for undergraduate and postgraduate training, recognized nationally and internationally as a leader in various fields of engineering, as well as their committed sense of transcendence in the scientific, economic, and social development of Yucatán and southwest Mexico, and respect for the environment."

*Spanish to English translation, modifications have been utilized for clarification purposes

A partnership between UADY and UW is underway and each program looks forward to the long-term implications for the development of the exchange program. Strong ambassadors will help encourage students from UADY to attend UW and vice versa. This outreach additionally displays the continued internationalization efforts of the faculty of the CEAS.

UW and UADY both yield high productivity, high quality performance, and an integration of academic collaboration and exchange networks. By increasing each of their individual competitive levels to the international standards of performance at all stages of student development; they simultaneously cover knowledge and training in specific skills required for engineering education while also contributing to the personality development of each student.

Students mutually benefit by being exposed to cultural diversity and variances of the presentation of material found within the engineering discipline inherent with cross-border management. In the ever-increasing multicultural and fast-paced working environment, this provides long-term implications for the demand of the student in the workforce throughout varying stages of their career development.

Dr. Jenny Tanner encourages students to study abroad and says the following: "One of the best things someone can do for themselves is to become a global citizen. Studying structural engineering at the University of Costa Rica afforded me an opportunity to learn Spanish and have an understanding of how other universities work. It was an experience that has opened many doors for me. As a result of my knowledge about earthquake damage in structures and Spanish language skills, I was selected to study the performance of masonry buildings after the 2010 Chilean earthquake. It has been a pleasure to share lessons learned with engineering schools in the Rocky Mountain Region."

Women in Engineering: Paige Fischer

Paige Fischer is beginning her MS in Chemical Engineering. She grew up in Arvada, CO and attended Ralston Valley High School. She chose the University of Wyoming for the combination of a quality engineering education and competitive swimming program. She quickly advanced through her undergraduate studies and on to graduate work by participating in the "Quick Start" program.

The BS/MS Quick Start program in Chemical and Petroleum Engineering (CPE) is designed to present highly qualified UW students with the opportunity to begin graduate study while they complete their Bachelor of Science (BS) degree in Chemical and Petroleum engineering. This program allows for early planning of the graduate portion of a student's education and provides more flexibility in the number of required courses and the order in which they are taken. Quick Start students must maintain a cumulative GPA of at least 3.4 in their undergraduate courses, 3.4 in their departmental courses and at least 3.0 in 5000-level courses to remain in good standing in the program.

Aside from excelling in her academic studies, Paige has established herself as one of the Cowgirls' best

distance-freestyle swimmers. As an undergraduate, she competed in the 1650 freestyle, 1000 freestyle, 500 freestyle, and 400 freestyle relay. Her strongest meet of her Junior season came at the Citrus Classic when she took first in the 1650 freestyle with a time of 17:33.13. She finished second in the 500 freestyle with a time of 3:37.88 in this same meet. This combination of academics and athletics led her to being named to the Academic All-Mountain West and a Mountain West Scholar-Athlete.

Paige began working with Dr. John Oakey the summer after her sophomore year. Her research is focused on using photodegradeable polymers to isolate circulating tumor cells from blood samples. By functionalizing the surface polymers, they are able to run blood across these surfaces and capture only the tumor cells. Increasing the capture rate and efficiency of these cells will potentially allow for the early detection of cancer and the tracking of a patient's prognosis during treatment of the disease.

Paige has recognized the significance of direct industry experience for early professionals to understand what is taking place in the frontlines of an individual field. After completion of her M.S., she intends to spend a period of time working in private industry. Looking down the road, Paige intends to pursue a PhD and eventually land back in the classroom, but instead as a university faculty member.

Paige exudes a commitment and resolve in her academics and athletics that is inspiring and is the very definition of a student scholar and athlete. The College of Engineering and Applied Science is proud to recognize Paige as one of the many outstanding students within the college.

ACEC

American Council of Engineering Companies
of Wyoming

An association of engineering and surveying companies providing service to Wyoming citizens.
ACEC of Wyoming is dedicated to the continuing advocacy and education of Wyoming companies.

The members of ACEC of Wyoming are proud to support
the University of Wyoming College of Engineering and Applied Science
with scholarships funded through the ACEC of Wyoming Scholarship Trust Fund.

For information on ACEC of Wyoming contact Joe Lord, Executive Director, (307) 745-8100
Or visit our website: www.acecwy.org

photo: graduate student Hua Wang and Dr. Patricia Colberg

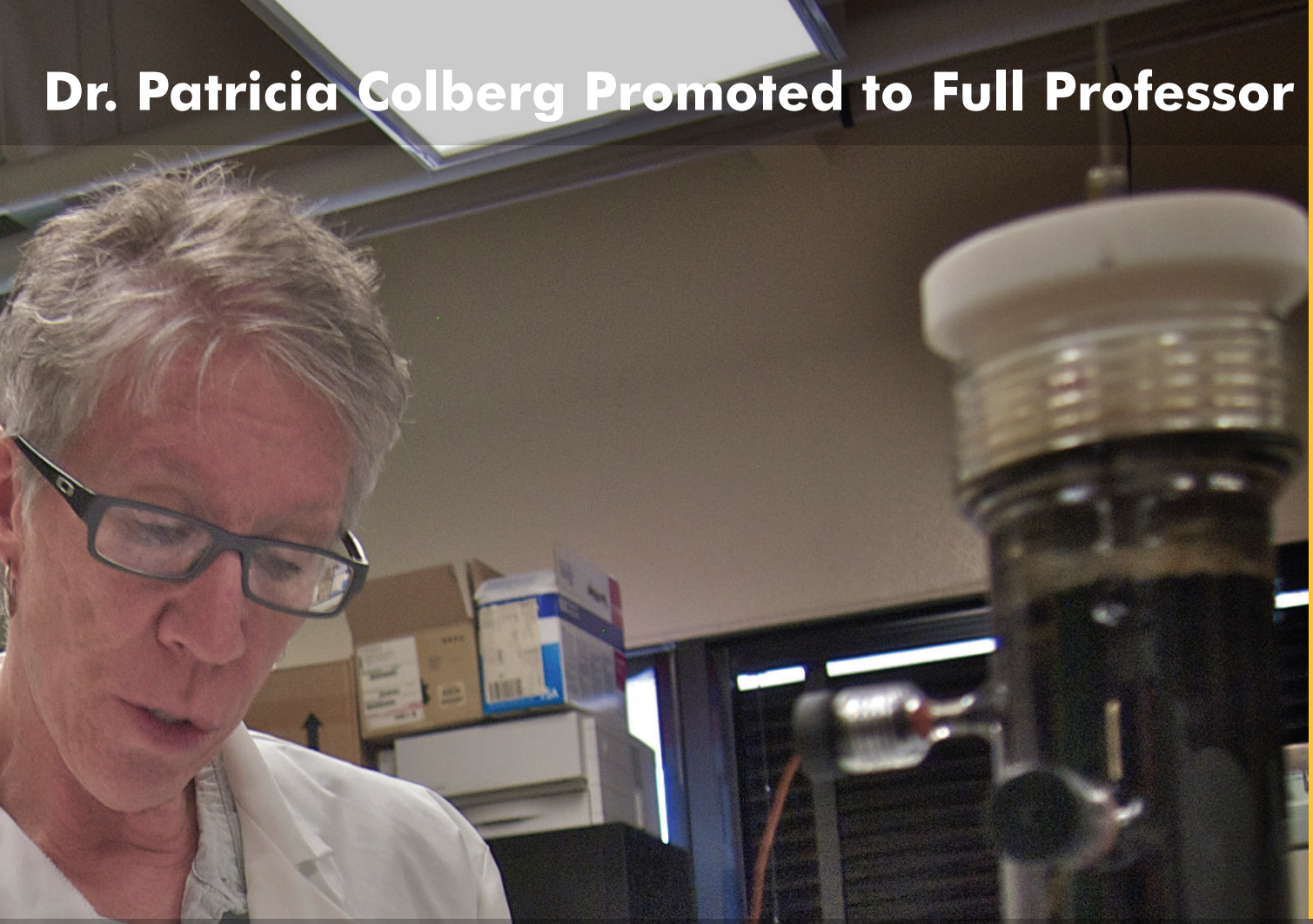
Dr. Patricia Colberg from the Department of Civil and Architectural Engineering was promoted to full professor on July 1, 2013. She is the first female faculty member to achieve this rank in the history of the College of Engineering and Applied Science.

Professor Colberg received a B.S. degree with Honors in Bacteriology from North Dakota State University, an M.S. degree in Bacteriology from the University of Idaho, and a Ph.D. in Civil Engineering from Stanford University. After five years of postdoctoral research in Switzerland and The Netherlands, she moved to Laramie to become Manager of the Microbiology Division at Western Research Institute with an adjunct faculty appointment in the Department of Molecular Biology. Her tenure-track appointment was made in the Department of Zoology and Physiology where she achieved tenure and the rank of Associate Professor. In January 2009, she joined the Department of Civil and Architectural Engineering. She serves as the College's Mentoring Champion and established the Mentoring Resource in 2010, which sponsors a year-round series of faculty development seminars.

Colberg serves as the ABET Assessment and Accreditation Coordinator for the Department of Civil and Architectural Engineering. Recently, she received training as an ABET IDEAL Scholar from ABET's Institute for the Development of Excellence in Assessment Leadership (IDEAL) in Baltimore, MD. In January 2013, she was invited to become a Senior ABET IDEAL Scholar. In this capacity, she periodically travels to various universities in the U.S. and abroad to train others on how to assess their academic programs.

Colberg has received a number of teaching awards at UW. In 2004, she was named an Education Fellow in the Life Sciences by the National Academy of Sciences. As a teacher, she tries to broaden her students' abilities beyond traditional coursework by incorporating research and design projects as well as in-class discussion of papers and case studies. Colberg also places importance on development of her students' 'soft skills' which they will use every day in their careers. She is a proponent of peer-to-peer teaching, life-long learning, and what she calls 'self-teaching'. Colberg holds dual citizenship in the United States and Switzerland and travels extensively.

Dr. Patricia Colberg Promoted to Full Professor



She urges her students to take advantage of opportunities to study, live, and work abroad.

Colberg serves on the Senior Design Faculty for Environmental Engineering along with Dr. Jonathan Brant, Dr. Michael Urynowicz and Dr. William Bellamy. Students receive a 'real world' engineering problem from the Rocky Mountain Regional Chapter of the American Waterworks Association and Water Environment Federation. They spend the semester designing a solution to the given problem for an actual client and participate in a regional competition in the spring. The project requires teamwork, independent research, and the production of a professional report; it trains students to be competent technical writers and able to present and defend their work.

Colberg and her many UW collaborators have been awarded almost $9 million in extramural funding. She regards her research as largely cross-disciplinary with primary areas of expertise in environmental microbiology and geomicrobiology. Her research interests include both basic and applied topics, but is largely focused on anaerobic microbial transformations of organic and metal contaminants in soils, sediments and ground water; electron transport in metal-reducing bacteria; iron cycling in alpine lakes; the impact of carbon sequestration on subsurface microbial processes; and depassivation of permeable reactive barriers.

In her free time, Colberg likes to kayak, hike, ski, snowshoe, cycle, hunt without a gun (i.e., mushrooms), garden (yes, at 7200 feet!), cook (especially French and East Indian), and read murder mysteries and biographies. Over the past 25 years in Laramie, she and her husband have completely renovated their 100+ year old home across from Undine Park. She is married to Dr. Norbert Swoboda-Colberg, a Swiss-born geochemist who works in the Department of Geology and Geophysics at UW. Their son Skye is a junior at UW majoring in Spanish and Geography; their daughter Siena is a freshman at Western Washington University in Bellingham, WA and is majoring in Art.

Facutly Highlights

Dr. Thom Edgar Receives the ASCE Region 7 2013 Lifetime Achievement Award

Congratulations on behalf of the College of Engineering and Applied Science to Dr. Thom Edgar for receiving the ASCE Region 7 2013 Lifetime Achievement Award. He continues a distinguished career at the University of Wyoming that began in 1981.

Dr. Edgar's career is and continues to be characterized by three commitments: a commitment to student welfare, a commitment to education, and a commitment to engineering in the state of Wyoming. Each of these commitments have been constant over nearly three decades and recognized over the years. His ASCE Outstanding Faculty Advisor award reflects his commitment to student welfare, his Ellbogen Teaching Award reflects his commitment to education, and his WES Outstanding Engineer award reflects his commitment to Wyoming Engineers. This focus on students, education, and the engineering community is a legacy that will continue to have impact in the decades to come.

Dr. Kam Ng Awarded First Runner-Up for the Deep Foundation Institute (DFI) Educational Trust 2013 Young Professor Paper Competition

Dr. Kam Ng, assistant profesor of the Department of Civil and Architectural Engineering, was awarded First Runner-Up for the DFI Educational Trust 2013 Young Professor Paper Competition, for his paper entitled "Towards a Performance-Based Design of Drilled Shafts."

Awards were presented at the DFI 38th Annual Conference on Deep Foundations in Phoenix, AZ. Competition papers were published in the DFI Journal.

The Deep Foundations Institute (DFI) Educational Trust is an independent, 501(c)(3) nonprofit organization established in 2006 by the DFI as its charitable arm. The mission of the Trust is to support and encourage individuals in the fields of study related to the deep foundation industry by providing scholarships and opportunities to meet and work with deep foundation industry leaders. For additional information please visit: www.trust.dfi.org.

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Professor of Practice William D. Bellamy

Dr. William D. Bellamy has been appointed to serve as Professor of Practice for the Department of Civil and Architectural Engineering. This non-tenured faculty position is held by eminently qualified academic, business, or government leaders who have made major impacts on fields and disciplines important to the college's programs. In this capacity, Dr. Bellamy will additionally serve as a liaison between industry and the college, identifying teaching and research opportunities that support the public interest and societal needs.

The Bellamy family carries with it a legacy in Wyoming that is intertwined with achievements in engineering and five generations of University of Wyoming graduates. It can be stated that Bill comes from Wyoming's "First Family of Engineering". His great-grandfather Charles Bellamy, of Wyoming, became the first licensed professional engineer in the U.S. in 1907. In 1913, Charles founded Bellamy & Sons, Engineers, and his sons, Benjamin and Fulton, also became PEs. Benjamin (Bill's grandfather) worked as a city engineer in Laramie, WY. After Charles passed in 1934, the Wyoming Bellamy Chapter of the National Society of Professional Engineers was named in his honor.

Bill's father John was also a P.E. and a professor in the Department of Civil and Architectural Engineering at the University of Wyoming. He earned a UW civil engineering degree, later earning doctoral degrees in nuclear physics and meteorology. He went on to become a partner in Bellamy & Sons. John was named a University of Wyoming Distinguished Alumnus in 1968, and after his retirement was selected in 1991 as the Wyoming Eminent Engineer by the Wyoming Alpha chapter of Tau Beta Pi. John was inducted into the College of Engineering and Applied Science Hall of Fame in 2000 followed by his sons John and Bill in 2005.

Dr. Bill D. Bellamy is currently a Fellow and Senior Vice President of Water Technologies at CH2M HILL, one of the largest water and wastewater engineering companies in the United States. He provides leadership and direction for the water business and application of technologies worldwide. As a technology leader for CH2M HILL, he has assisted in delivering over $4 billion in engineering services including studies, designs, construction, and operations. Approximately $15 million of this work has been in studies and research for associations and agencies such as the American Water Works Association (AWWA), Water Research Foundation (WRF), U.S. EPA, and public and private utilities. He has worked on many international water supply problems and assisted the Environmental Protection Agency on numerous projects. In 2001, Tau Beta Pi named him Alumnus Eminent Engineer.

Dr. Bellamy's commitment to the profession of engineering, the college, and the State will very much be embraced as he begins his service as Professor of Practice for the Department of Civil and Architectural Engineering. Dr. Bellamy will be introducing new courses related to sustainability in the built environment and case studies of major water and wastewater treatment projects. He also plans to participate as a mentor to graduate students as they pursue their research in environmental engineering.

Welcome New Faculty and Staff

Mohamed Ahmed • Assistant Professor
Department of Civil and Architectural Engineering
Ph.D. University of Central Florida

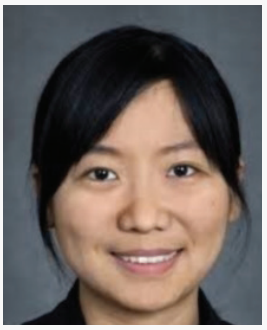
Research Emphasis
Traffic Safety, Intelligent Transportation Systems
Pro-Active Traffic Management Systems
Statistical and Data Mining Applications in Transportation
Highway Geometric Design

Saman Aryana • Assistant Professor
Department of Chemical and Petroleum Engineering
Ph.D. Stanford University

Research Emphasis
Fundamental Physics of Flow Instabilities
Dynamics of Subsurface Displacement Processes

Xiahong Liu • Professor
Wyoming Excellence Chair in Climate Science
Department of Atmospheric Science
Ph.D. Nanjing University, P.R. China

Research Emphasis
Physics and Dynamics of Climate
Aerosols, Clouds, and Precipitation



Liping Wang • Assistant Professor
Department of Civil and Architectural Engineering
Ph.D. National University of Singapore

Research Emphasis
Simulation Modeling for Building Performance
HVAC Control System Evaluation and Optimization
Low / Zero Energy Building Design
Total Building Performance and System Integration

Ann Jones
CEAS Career Services Liason,
UW Assistant Director of Career Services

Ann Jones will serve as the Career Services Liasion with the CEAS Center for Student Services. Ann is also the Assistant Director for Career Services at the University of Wyoming. In this capacity, Ann engages students in all aspects of job and/or career development including placement. She has extensive knowledge of both private industry and federal government employment.

Len Lutz
Academic Professional Lecturer,
Career Coordinator

Len is working in the Dean's office as an Academic Professional Lecturer. Len will carry the principal responsibility of leading the College's job placement, internship, and professional skills development programs while also instructing engineering course work. He will continue to implement a series of programs for the develoment of student's professional skills and career opportunities.

Kenya Johnson
Office Associate, Sr.
Department of Electrical and Computer Engineering

Korey Kreitman
Engineering Shop Master Technician
CEAS Shop

College of Engineering and Applied Science National Advisory Board

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Retired Vice-President
Medical Affairs Defense Research Technologies

Prof. Henry Bauer
Professor Emeritus
Computer Science, UW

Brigadier General Pat Burns (Ret.)
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Western Arch Coal, Inc.

Mr. Robert Serafin
Retired Director
National Center for Atmospheric Research

Dr. Sally Steadman
Faculty
University of South Alabama

Mr. Kent Westedt
Retired Senior Engineer
Lockheed-Martin Corp.

Mr. Kent Winchell
Chief Technical Office
Cray Computers

Ex Officio Members

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Dr. Paul Dellenback	**Dr. Khaled A.M. Gasem**	**Dr. John McInroy**
Dr. Jay Puckett	**Dr. Al Rodi**	**Dr. Richard Schmidt**

The National Advisory Board (NAB) was created in 1998 by Dean Pell and organized to assist the College of Engineering and Applied Science (CEAS) in accomplishing its goals. From its inception, the role that the NAB has played in the development of the CEAS has changed as the situation dictated. Initially, the NAB played an advisory role to the Dean and faculty. Over time the role and responsibilites of the NAB have increased until today under the leadership of the current Dean, the NAB has become an important stakeholder in the future of the CEAS. The NAB has reorganized not only in an advisory role but also new responsibilities to assist in the attainment of Tier 1 recognition and successful completion of the Engineering Complex Project.

The NAB consists of twenty five voting members including a representative from each Departmental Advisory Board. Each member serves a four year staggered term with the potential of serving a second term for a maximum of eight years. Members are selected by the Dean and current voting members of the Board. Members of the NAB represent all engineering and applied science disciplines of the College. Membership is not limited to CEAS graduates, but also includes individuals who are active in their support of the College. Faculty and students are represented by non-voting ex officio members.

The Board elects a chairman and vice-chairman, each serving a two year term. The NAB is organized into standing committees whose membership consists of both voting and ex officio members. The committees are Executive, External Affairs, Finance, Pathway to Excellence, and Engineering Complex.

photo: (above) Bonnie Jane Kester, Harold Kester, daughter Pat Edwards, Done Edwards, daughter Becky Kester, and Marti Groh, (background) Grand Coulee Dam, WA

Harold O. Kester
A Cowboy Who Gave Back

by: Susan McCormack

Harold O. Kester was a homesteader's son who grew up in a one room, 12'x20' shack near Buffalo, Wyoming. He lived by the Code of the West with hard work as the only ethic he ever knew. Once he herded cattle, sitting on a horse, his broken legs in makeshift splints, because you did what had to be done.

When he came to the University of Wyoming at the age of twenty-three, after struggling through the Great Depression, he didn't always have money for room and board, so he'd sleep on his bedroll in the loft of the UW Stock Farm at the abandoned Wyoming territorial prison. He put himself through school by working for a local butcher and breaking wild horses for local ranchers. Sometimes it was a forty-hour week, but that's what it took to get the jobs done.

Kester really had no idea what was involved in getting an engineering degree, but he knew he "liked to build things." He attributed his success to the encouragement and support of his friend and mentor, the legendary H. T. Person. Kester rose from the ranks of struggling students to become an honor student and member of Sigma Tau, the organization that is now Tau Beta Pi.

The University of Wyoming not only gave him the engineering tools to become a leader in his field, it's where he met Bonnie Jane Reymore. Bonnie Jane was a music education major whose parents owned a large, successful dairy north of Cheyenne. A farmer's daughter, she was no stranger to the Code of the West.

When they graduated in 1941, Kester had been commissioned as a second lieutenant in the U.S. Army Reserve. In December, the world was at war and Bonnie Jane became his wife. In 1944, leaving his infant daughter, Patricia, Kester began a two-year tour of duty in Europe. He was active in battle and involved in restoring utilities, bridges, and railroads in war-ravaged Europe.

After the war, a second daughter, Rebecca, was born and his career in hydroelectric work began. He and three other UW graduates formed what was eventually to become the Eagle Construction Corporation. From

1951 until its liquidation in 1987, Eagle completed 249 contracts in 17 states and Canada. Kester's company worked on most of the dams on the Missouri, Colorado, and Columbia Rivers. Their Grand Coulee Dam affiliation lasted 12 years with five of those years spent on installing North America's two largest hydroelectric units.

In "retirement", Kester became president of Loveland Ready Mix in Colorado, and was still sought after as a hydroelectric consultant nationwide.

An enviable career: from bunkhouse to boardroom. Is that the end of the story? Not even close.

Harold Kester attributed everything he had, as well as the many honors that came his way, to the education he received at the University of Wyoming. He was quoted as saying, "it seems like when you owe a debt, you ought to pay it back."

The extremely generous payback came in many forms:
- the Harold O. and Bonnie Jane Kester scholarship for undergraduate students is the single biggest scholarship endowment in the College of Engineering and Applied Science
- his personal gift to the H.T. Person Endowment
- the Eagle Construction Corporation Scholarship
- the Loveland Ready Mix Scholarship
- the Harold O. Kester Graduate Fellowship
- proceeds of the 300-page book on the history of Eagle Construction that he wrote in the last year of his life went to the College
- also in the last year of his life, Kester earmarked $600,000 for the College's Engineering Scholastic Excellence Fund

Harold and Bonnie Jane Kester loved the University of Wyoming. They considered us part of their family and have touched uncountable lives with their generosity. When success showered them with blessings, there was never any question where to use it: the University of Wyoming.

Cowboys give back.

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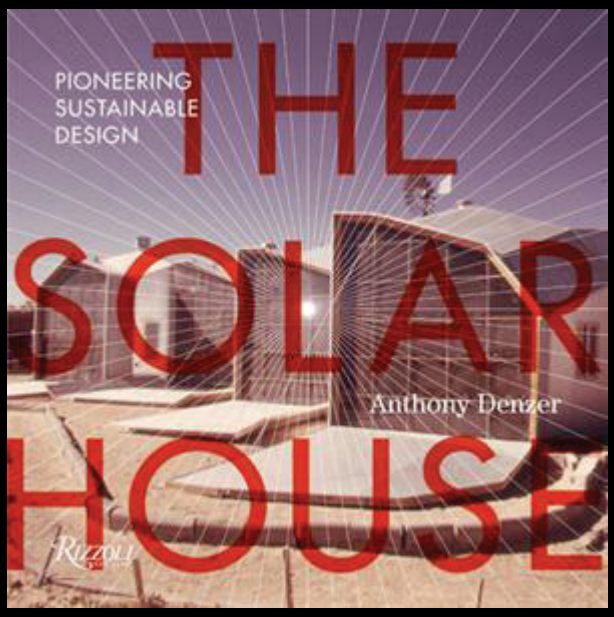
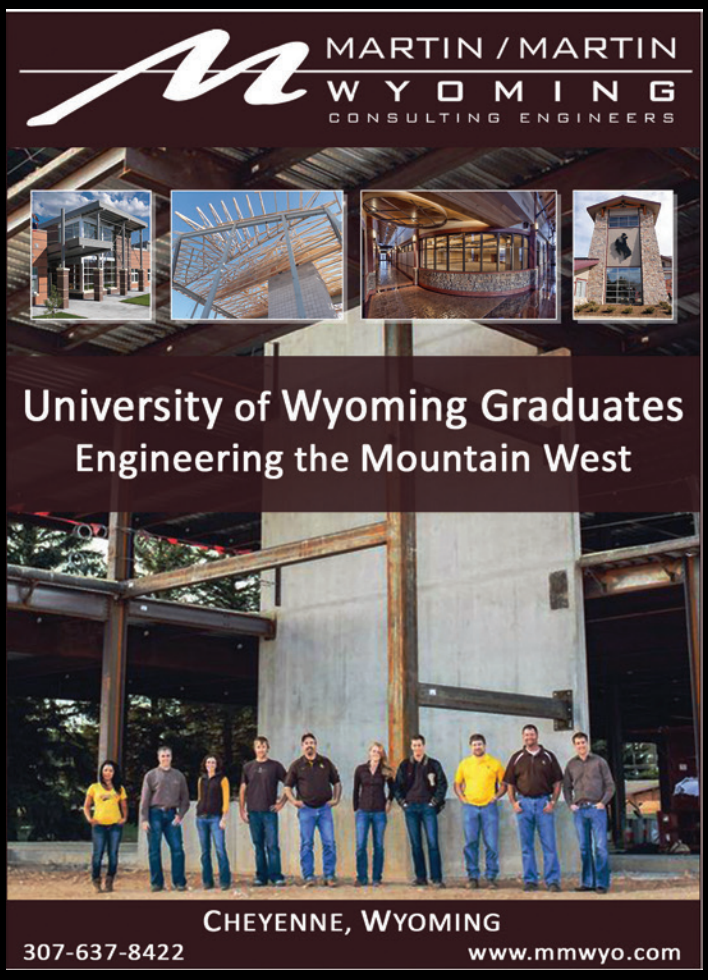


Dr. Anthony Denzer's, Department of Civil and Architectural Engineering, *The Solar House: Pioneering Sustainable Design* is now available in hardcover. The book presents the first comprehensive study of the development of solar house design in the United States and around the world. The Solar House explores the development of solar residential architecture over the course of the twentieth century and up to the latest designs today.



In Memoriam

Since our last issue, we regret to announce the passing of the following alumni. Our greatest sympathy is extended to the families of these valued friends.

Mr. Donovan C. Buckman	BSEE '10	Worland, WY
Mr. Max Call	BSCE '42	Payson, UT
Mr. Don E. Evert	BS '46 GenEng	Whittier, CA
Mr. Frank P. Triscari	BSCE '49	Cape Coral, FL
Mr. George E. Stein	BSAR '50	Seattle, WA
Mr. George G. Manelis	BSCE '51	Littleton, CO
Mr. William C. Grove, Jr.	BSME '54	Tujunga, CA
Mr. Carl W. Ehrman	BSEE '56	Sparks, NV
Mr. Clarence W. Huntley	BSEE '57, MSEE '58	Scottsdale, AZ
Mr. Torao Yoshida	BSEE '58	Palos Verdes Estate, CA
Mr. Harry H. Robertson	BSCE '59	Payson, AZ
Mr. Jerry F. McManamen	BSEE '60	Gillette, WY
Mr. Harley J. McKinney	BSPE '61, JD '72	Rock Springs, WY
Mr. William L. Allen	BSME '62	Houston, TX
Mr. Frank J. Holliday	BSCE '62	Fort Collins, CO
Mr. Robert S. Oram	BSCE '63	Unknown
Mr. Martin O. Rankin	BSME '63	Kennewick, WA
Lt. Col James N. McCready	BSME '64	Beavercreek, OH
Lt. Willard S. Carter	BSME '66	Morristown, TN
Mr. James D. Weeks	BSPE '69	Anchorage, AK
Mr. Nick Fournarakis	BSCE '77	Mercer Island, WA
Ms. Janet L. Shively	BSEE '79	Laramie, WY
Mr. Ron Shader	BSEE '84	Laramie, WY
Mr. Raymond A. Eickstedt	BS CompEn '86	Lander, WY
Mr. Richard C. Scriven	BSEE '87 (and Bioengineering)	Bellevue, WA
Ms. Robyn D. Otteson	BSAR '97	Everett, WA
Mr. William L. Smith, Sr.	EXP 2013 CoSci	Laramie, WY
Mr. Alexandre C. Young	EXP 2013 ArchE	Laramie, WY
Mr. Andrew J. Wood	EXP 2014 EE	Cheyenne, WY
Mrs. Bonnie Jane Kester	Wife of Harold BSCE '41	Loveland, CO
Mrs. Eugenia C. Wing	Wife of Wayman Wing	Scarborough, NY
Maj. Edward D. Connin	UW Alum, Friends of the College	Cheyenne, WY
Mr. Leonard E. Croley	UW Alum, Friends of the College	Roseville, CA
Mr. Michael B. McQuisten	UW Alum, Friends of the College	Laramie, WY
Mr. Nicholas L. Tyrrell	UW Alum, Friends of the College	Buffalo, WY

Bonnie Jane Kester

Bonnie Jane Kester passed away in 2013 at the age of 95. At the time of Harold's death in 1999, they had been married 57 years. She was truly the love of his life.

They were a wonderfully happy couple, who graced any UW event they attended. After Harold passed away, Bonnie Jane continued to come to Homecoming and Honors Banquets, until her health deteriorated. She lit up the room with her presence, and several UW presidents will fondly recall her singing "Ragtime Cowboy Joe", as she sat in the President's Box at Homecoming (pictured right at 87).

Perhaps her obituary said it best, "Bonnie Jane Kester, 95, having aged into an angelic soul with a refined sweet quality, tempered by years on the plains, molded by her love of people, burnished by Wyoming wind, and life's long blessed journey, passed away May 15."

Janet Lee (Hartung) Shively

Janet Shively, 56, of Laramie, a beloved wife, mother, daughter, and sister, died August 27, 2013 at her home with her family. After graduating from the University of Wyoming with a degree in Electrical Engineering in 1979, Janet worked for Banner and Associates for many years and then for ESC Engineering of Fort Collins, providing a Laramie office until her retirement. Janet loved Laramie, "the hills of home," and raising her daughter here.

Janet thrived in the outdoors, enjoyed skiing, hiking, horseback riding, camping, gardening, crafts, and reading. Janet centered her life on her church, family, and friends. She was a courageous, generous, thoughtful, and caring person who put others needs above her own. Indeed, hers was a life well-lived; she fought the good fight, finished the race, and kept the faith.

Eugenia 'Beah' Wing

Eugenia (Beah) Chen Wing died peacefully of heart failure at Phelps Memorial Hospital in Sleepy Hollow, NY, on June 21, 2013. She was the beloved wife of Wayman C. Wing, and the loving mother of Sandra M. Wing, and the deceased Roger G. Wing. During her last year, she was tenderly cared for by her devoted caregiver, Ursula Forster.

Beah was always her husband's primary supporter in their personal lives, as well as their business ventures. She loved sports and games, especially golf and tennis. She loved music and the arts, and was an avid piano player. She directed many memorable annual family reunion talent shows and instilled music appreciation in her children.

She was a devoted mother, wife, and friend to all. She had a wonderful sense of humor, was always fun to be with, and had a warm, generous heart. She will be missed by all who knew and loved her.

I/we would like to make my/our gift to the College of Engineering and Applied Science:

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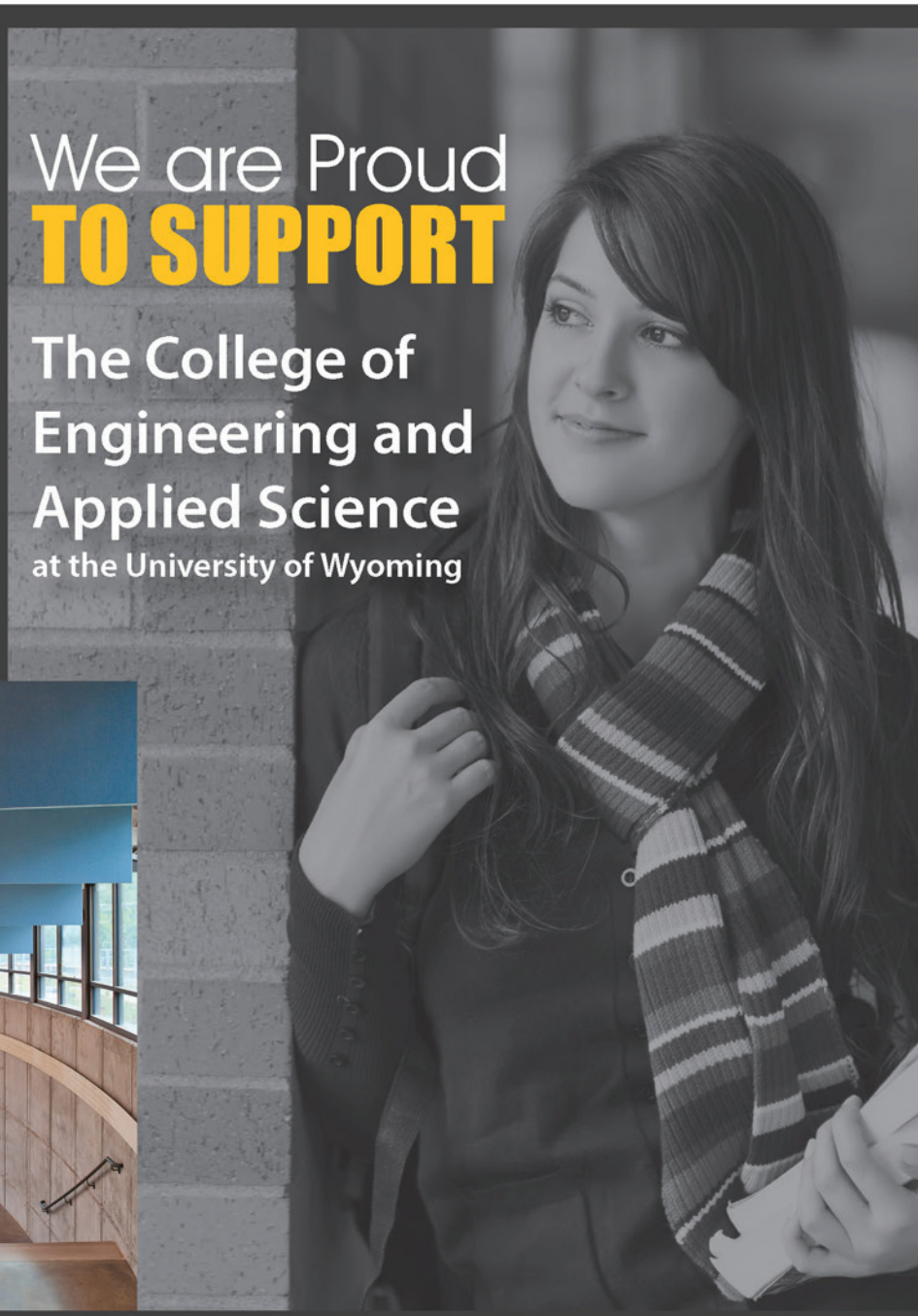

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Abby Huyler - Fort Collins, CO • Cameron Mock - Gillette, WY • Brian Hill - Cheyenne, WY

Additional information on the web at www.uwyo.edu/ceas/ambassadors