

FORESIGHT

Spring/Summer 2012, Volume 37, No. 2



American Heritage Center Collection
Engineering Building, University of Wyoming, Date Unknown



UNIVERSITY OF WYOMING

COLLEGE OF ENGINEERING
AND APPLIED SCIENCE

College of Engineering and Applied Science

Dean

Rob Ettema

Associate Dean, Academic Programs

Steven F. Barrett

Associate Dean, Facility Development

Jay Puckett

Departments

Atmospheric Science

Al Rodi, Head

(307) 766-4945

www.atmos.uwyo.edu

Chemical and Petroleum Engineering

David Bagley, Head

(307) 766-2500

www.uwyo.edu/chemical

Civil and Architectural Engineering

Dick Schmidt, Head

(307) 766-5255

www.uwyo.edu/civil

Computer Science

Jerry Hamann, Head

Jim Caldwell, Head (Eff. July 1)

(307) 766-5190

www.cs.uwyo.edu

Electrical and Computer Engineering

Mark Balas, Head

(307) 766-2279

www.uwyo.edu/electrical

Mechanical Engineering

Paul Dellenback, Head

(307) 766-2122

www.uwyo.edu/mechanical

Chief Editor & Graphic Design

Jonathan Barrett

Assistant Editor

Kimberly McMaster

Foresight is distributed three times per year by the College Communications Office. For additional copies contact:

CEAS Communications

Voice: (307) 766-4248

E-mail: engevents@uwyo.edu

Persons seeking admission to 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.

Message From the Dean



Student conceptual renderings of the interior of the Engineering Building Project

This issue of *Foresight* features an initiative the college is taking, together with the University of Wyoming's College of Health Sciences, regarding the statewide and interstate application of telehealth to promote state-of-the-art health care delivery in Wyoming. Telehealth involves the application of telecommunication and information technology systems to provide health care expertise and information, especially to small rural communities. The college sees this initiative as offering significant education and research opportunities, and as creating an important opportunity for the college to serve Wyoming and regions beyond.

Also featured is a recognition of the 150th anniversary of the Morrill Act. This act provided the federal legislation that led to the formation of land-grant universities.

The college's plans for substantially upgrading and expanding its facilities have made ample progress during the past four months. The **Engineering Complex**, as this effort is being termed, comprises two connected projects:

- **Engineering Building Project** - to increase the college's capacity to deliver high quality programs of education and research to more students.
- **Energy Engineering Research Facility Project** - to create additional research labs, increasing research and graduate studies in strategic energy areas.

The college is completing the first major phase of planning for the Engineering Complex. This stage entails a general study that describes the college's opportunities for further developing its education and research programs, identifies the requisite space functionalities and metrics, and indicates constraints such as building site availability.

The term “Engineering Complex” was coined by the Wyoming Legislature during its February 2012 legislative session. The Legislature and Governor Matt Mead are supportive of upgrading the college’s facilities to ensure it offers the best mix of high-quality programs the State needs. The Engineering Complex stands to be the largest capital facilities project undertaken by the State.

The Legislature has provided funds to conduct Level II planning for the Engineering Building Project, and has set aside \$30 million for this construction, whose budget is anticipated by the Legislature to approximate \$100 million. Additional funds are provided via the School of Energy Resources to conduct Level II planning for the Research Facility, which extensively involves the School. Of the \$30 million amount set aside for the Engineering Building, about \$16 million must be matched with funds raised by the college, although the full \$30 million is available to be matched by donating funds.

An important immediate task for the college (especially its Dean), with solid help from the University of Wyoming Foundation, is to pursue a vigorous fund-raising effort. When the Legislature’s Biennial Budget Session reconvenes in two years, the college must show strong progress with fund-raising in order to draw substantial additional funds from the Legislature. Elements of the effort already are in place. Donations of \$25,000 or greater will be matched dollar-for-dollar with funds provided by the Legislature; e.g., a gift of \$25,000 becomes in effect a gift of \$50,000. This dollar matching arrangement applies to one-time donations or to pledges with payments made over several years.

When completed, the Engineering Complex will be a superb learning environment, a place for inquiry and technological innovation, and a resource of technological expertise for Wyoming and regions beyond.

-- Rob Ettema

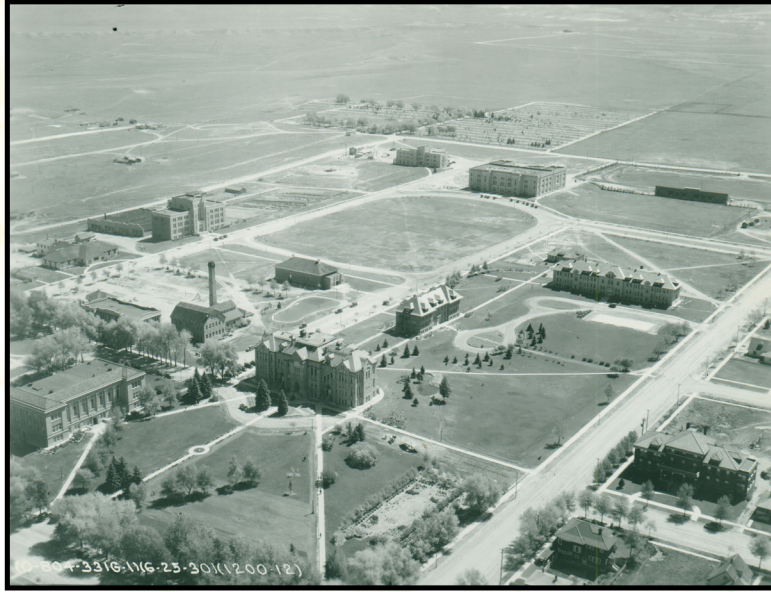
CONTENTS

Celebrating the 150 th Anniversary of the Morrill Act.....	3
Eight Students Compete in National Cyber Defense Competition.....	4
Eden Valley Telehealth Clinic Brings Telehealth to Southwestern Wyoming	5
Ahmed A.B. Mohammed Awarded Achievement in Internationalization Award.....	7
David Herr Presents Research to NSF	8
Women in Engineering	9
ME Students Develop an Improved Exhaust Brake for the U.S. Army	11
Dean Robert Ettema Elected Fellow of the IPENZ	12
Students Win Regional Design Competition	14
In Memoriam.....	15
Faculty and Staff Highlights	17

For all current news information please visit our website at: www.uwyo.edu/ceas

NOTE FROM THE EDITOR: In an effort to reduce production costs and excess waste, electronic copies of FORESIGHT are now being offered. If you would prefer to receive the magazine via electronic mail in lieu of print mail, please email JBarre10@uwyo.edu with your request. Thank you for your continued support of the UW College of Engineering and Applied Science.

Celebrating the 150th Anniversary of the Morrill Act



UW Aerial Views Photo File, American Heritage Center, 1929-1930

July 2, 2012 marks the 150th anniversary of the Morrill Act. Originating in 1862, the Morrill Act is landmarked as the first Federal aid to higher education through the donation of public lands to several states and territories that provided colleges with the necessary resources to benefit the education of students interested in the agricultural and mechanical arts.

In 1872, President of the State Agricultural College (now Michigan State University), Theophilus Abbot wrote, “Knowledge of the sciences would help any man to see what he didn’t see before. The world shows in every kind of business, men who stand vastly higher in it than others of much better natural abilities, owning the systematic learning they have” [Abbot 1872].¹ It was this type of forward thinking that allowed the engineering field of study to transform itself from a knowledge of functioning machinery to a specialized form empirical science.

By 1900, dedicated Midwest land-grant educators had come to produce the majority of the nation’s civil and mechanical engineering graduates, as documented in Reports of the Commissioner of Education, overseen by the Secretary of the Department of the Interior.¹ The 150th anniversary of the Morrill Act is a milestone that reflects back on the events that have allowed the College of Engineering and Applied Science (CEAS) at the University of Wyoming to develop into the world-renowned program that it is recognized as today.

No matter the specific area of concentration, engineers as a whole, are visionaries of the future and develop

the processes that not only increase the livelihoods for citizens of our world but also create jobs for generations to come. This has been an ongoing continuum from early alumni to the new graduates that now occupy positions created by companies and organizations founded by their predecessors.

The CEAS creates a unique atmosphere that fuels creative ingenuity, inspires on-going technological advancement and encourages further research development. Current professors are able to combine theoretical underpinnings with hands-on training that provides students with the ability to tackle societal issues on an unprecedented level.

The University of Wyoming was founded as a land-grant institution in 1886 and continues to serve as an affordable university providing a world-class education to its students. The University is one of 106 land-grant institutions and is also a member of the Association of Public and Land-Grant Universities (APLU). This year it is important to recognize the anniversary of the Morrill Act and the significance it has had on both the University of Wyoming and the College of Engineering and Applied Science’s history and development.

by: J. Barrett

Reference

1. Nienkamp, Paul. “Land-Grant Colleges and American Engineers. Redefining Professional and Vocational Engineering Education in the American Midwest, 1862-1917.” *American Educational History Journal*. Volume 37, Number 2, 2010, pp. 313-330.

Students Participate at National Cyber Defense Competition



(Left to Right) Nick Anderson, Dietrich Wambach, Jay Wuensch, coach: Jim Ward, Paul Ogle, Eric Richardson, Alex Wellock, Dustin Brown, Nate Wermers

A team of eight representatives from the University of Wyoming competed in the National Cyber Defense Competition (NCCDC) held this past April, in San Antonio for the seventh consecutive year. The 2012 national competition featured ten regional winners: California State Polytechnic University at Pomona, Rochester Institute of Technology, St. Cloud State University, United States Air Force Academy, University of Alaska Fairbanks, University of Washington, and the University of Wyoming.

The threat of cyber attacks targeting the United States is a serious issue at the highest levels of government. President Obama recently noted, “cyber threat is one of the most serious economic and national security challenges we face as a nation.” Moreover, Secretary of Homeland Security, Janet Napolitano, recently announced that the Department of Homeland Security faces thousands of cyber attacks every 45 minutes. In line with the United States’ commitment to cyber defense, Secretary of the Department of Defense, Leon Panetta, announced in his ten-year budget forecast that cyber security is one of a few select areas that will receive additional investment and resources, even as the Department of Defense readies to scale back \$487 billion in spending.

The competition is modeled from real world scenarios and obstacles. This one-of-a-kind competition features

the top ten champions of the regional Collegiate Cyber Defense Competition from universities across the country. The NCCDC pits teams of college students against each other in an environment where cyber security skills are pushed to the limit.

Each team was required to correct problems on their network, perform typical business tasks, and defend their networks from a red team that generated live, hostile activity throughout the competition. The teams were scored on their performance in those three areas and the team with the highest score at the end of the competition was crowned the 2012 National Collegiate Cyber Defense Champion.

The national event serves as training ground for future cyber defenders while also providing the best and brightest collegiate students an opportunity to shine on a national stage and connect with the top cyber security firms in the country.

The University of Wyoming’s CCDC team is comprised of Dietrich Wambach, Nick Anderson, Jay Wuensch, Eric Richardson, Nate Wermers, Dustin Brown, Alex Wellock, and Paul Ogle. Coach: Jim Ward, Computer Science Department.

Article and photo courtesy of Department of Computer Science

Eden Valley Telehealth Clinic Brings Telehealth to Southwestern Wyoming



Eden Valley Telehealth Clinic will soon be serving the residents of the Farson and Eden Valley communities in Southwest Wyoming

With support from Dean Rob Ettema and Professor Suresh Muknahallipatna of the College of Engineering and Applied Science, partners in Southwest Wyoming will soon implement a telehealth/telemedicine clinic to improve access to healthcare for residents of the Farson and Eden communities (Eden Valley).

Wyoming is a frontier state, and with its small population and large geographic area, faces a number of related problems in delivering healthcare services to its local communities. Among these are distance, geography, inclement weather, isolated communities, and a shortage of primary care and specialty physicians.

Telemedicine is a cost-effective and efficient means of delivering healthcare to the rural resident, rather than having the resident travel to the healthcare provider. Obtaining healthcare locally reduces travel, time away from work, patient transfer costs, and keeps healthcare dollars in the local community.

Partners for this project include the residents of Eden Valley, the United Way of Southwest Wyoming, the College of Engineering and Applied Science, the Wyoming Health Information Organization, the College of Health Science, and the Wyoming Telehealth Consortium.

Through this collaborative effort, Southwest Wyoming partners will be able to interact with other telehealth users, other telehealth networks, and a myriad of telehealth service providers. Additionally, partners will gain access to the resources through the statewide telehealth website, and the ability to help shape the future of telehealth in Wyoming.

Telehealth typically involves physicians using interactive video and/or store-and-forward technologies to

treat patients. Interactive video allows medical specialists to directly communicate with their patients who are in another location, utilizing technology and specially adapted medical equipment.

This project grew from the grass roots efforts of residents of Eden Valley and the United Way of Southwest Wyoming. In December of 2011, conversation began between a volunteer Emergency Medical Service technician from Farson, WY, Mary Ann Mines, and Kathy Tacke, Director of Community for the United Way of Southwest Wyoming, regarding how health access and quality of life could be improved for frontier areas of Southwest, WY such as Farson. This initial conversation expanded to involve both the College of Engineering and Applied Science and the Wyoming Health Information Organization (WyHIO).

Travel burdens in this remote frontier are an obstacle, especially during the Wyoming winters. In a recent study, travel was the most common concern among rural cancer patients. Another need for additional health services to the region is that in Eden Valley 164 children are enrolled in local rural schools, with one school nurse on site for a total of six hours during a three week period. The nurse is required to travel 60 miles round trip from Rock Springs for each visit.

United Way of Southwest Wyoming (UWSW) believes that simply moving dollars between programs, even with the best needs assessment, the best outcomes process and the best agencies, is not enough to create the kind of significant, sustained change in conditions that the community and its residents want to see. In June 2008, following six months of study, analysis, and community involvement, UWSW Board of Directors and staff created

mission statements that would guide United Way to create change in the human condition at the community level. Organizing around a common vision of what the community wants to accomplish is a powerful tool for creating the change that the community wants to see. The three community impact outcome areas that were identified are education, basic needs, and health. While finding solutions to each impact area presents its own set of obstacles, the difficulties that access to health care in frontier Wyoming are particularly trying.

The WyHIO and Professor Muknahallipatna of the Department of Electrical and Computer Engineering had already partnered to address the problem of interoperability across the multiple telehealth networks operating in Wyoming and the Rocky Mountain region. With the help of Dean Ettema, the WyHIO and the College, they have collectively been able to extend the existing partnerships to offer technology design and evaluation services, as well as financial support for the Eden Valley project. Upon hearing of the project, the College of Health Sciences and the Wyoming Telehealth Consortium joined the efforts of the original partners.

As a private, 501 (c) (3) organization, the WyHIO bridges both the public and private sectors, provides accountability to its partners and the Wyoming Telehealth Consortium, and supports the expansion of telemedicine across Wyoming.

The Eden Valley Telehealth Center will be located in Farson as a new clinic pilot sight branching to helath care facilities in Sweetwater County. For the Eden Valley area this will be an unprecedented opportunity to bring efficient, cost-effective, quality healthcare to the rural resident, rather than having the resident travel to the healthcare provider. Thomas Smith, an Eden Valley resident, and a sophomore at the University of Wyoming, College of Engineering and Applied Science said, "This is

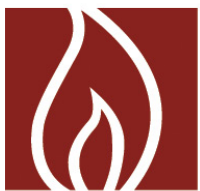
a wonderful opportunity for the Valley residents. I was a volunteer BEC with the ambulance service there when I was in high school and to see this project moving forward with the help of the Engineering College here at UW is exciting."

Jerry Calkins, Ph.D., M.D., Chairman, of the college's National Advisory Board, WyHIO past chairman and board member; Larry Biggio of the WyHIO; Kathy Tacke, director of Community Impact for Southwest Wyoming; and Mary Anne Mines, Eden Valley project volunteer recently presented an informational community presentation at the Senior Center in Rock Springs. The details of the project and what it means to health care in the Valley as well as Southwest Wyoming was presented and several questions were asked by local health care providers in the community and were each addressed before the meeting concluded.

This project is scheduled for implementation in the fall of 2012.

For additional information, please contact Larry Biggio of the Wyoming Health Information Organization at contact@wyhio.org, 307.432.4025, or Professor Muknahallipatna of the Department of Electrical and Computer Engineering at sureshm@uwyo.edu, 307.766.3174.

Article and photograph courtesy of Eden Valley Telehealth Clinic



School of Energy Resources

For more information go to uwyo.edu/ser



UNIVERSITY OF WYOMING

Ahmed A. Balogun Mohammed Awarded the 2012 UW IBOA Award for Excellence in Student Achievement in Internationalization International Undergraduate Student

Ahmed Mohammed, a native of Nigeria, arrived at the University of Wyoming in the Fall of 2011 and has made his mark on internationalization ever since. With a major in mechanical engineering and a minor in economics, Ahmed is a scholar with a passion for enhancing cultural understanding at the University of Wyoming. He has become a voice for diversity and an ambassador of the cultural contributions of the Wyoming international student population.

As an active member of the Wyoming African Student Association (WASA), Engineers Without Borders, and the Muslim Student Organization, Ahmed has volunteered for numerous campus activities focused on enhancing Wyoming students' understanding of international and cultural issues. He has participated in the annual Ramadan dinner, the Soccer Fiesta, International Education Week, and is one of the members of the lauded WASA Drumming Group. He is the ex-officio representative of the United Multicultural Council to the Associated Students of the University of Wyoming, the student government of UW, and is the Secretary of the Entrepreneurs for Organizing and Networking group on campus.

Ahmed has also taken an active interest in developing his leadership skills in order to increase the impacts of his efforts to promote global understanding in Wyoming. He volunteered for the intensive two-semester Multicultural Student Leadership Initiative (MSLI) program, which is designed to assist first-year UW students to excel in the classroom and to become campus leaders. In this program, he has participated in numerous leadership



(Left to Right) Dean Rob Ettema, Ahmed A. Balogun Mohammed & Anne Alexander, Director, Office of International Programs

development activities, including designing a seminar for incoming students to assist in their transition to college and spearheading a Halloween-themed food and supply drive last fall. He also participates in the Student Leadership and Civic Engagement program's Stand Out Leadership Development Series.

Ahmed has a deep and genuine commitment to, in the words of one nominator, "increasing interaction and mutual respect between the domestic and international student communities," at UW. His efforts have made Ahmed stand out as an exceptional contributor to UW and the internationalization efforts in Wyoming.

Article courtesy of The University of Wyoming International Board of Advisors

Photo: J. Barrett

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

This past March, chemical and petroleum engineering master's student, David Herr was selected for the second year in a row to present his work to National Science Foundation (NSF) in Arlington, VA. David's research is supervised by his graduate advisor, Dr. Maohong Fan. Students were chosen by NSF based on abstracts written on their research. David's abstract was one of 32 selected out of a total of 125 submissions;

Comparison of Novel Co₂ Conversion Catalysts: Abstract

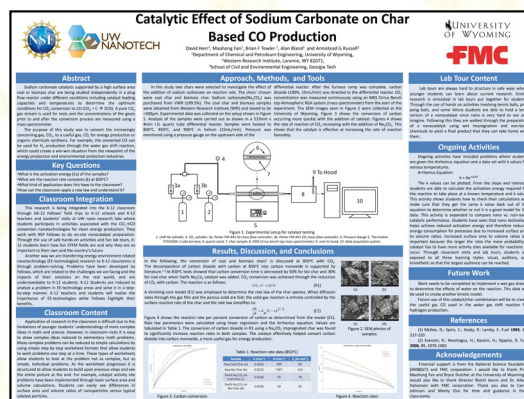
"Sodium carbonate catalysts supported by a high surface area coal or biomass char are being studied independently in a plug flow reactor under different conditions including catalyst loading capabilities and temperatures to determine the optimum conditions for CO₂ conversion to CO (CO₂+C → 2CO). A pure CO₂ gas stream is used for tests and the concentrations of the gases prior to and after the conversion process are measured using a mass spectrometer.

The purpose of this study was to convert the increasingly concerning gas, CO₂, to a useful gas, CO, for energy production or organic chemical synthesis. For example, the converted CO can be used for H₂ production through the water gas shift reaction, which could create a win-win situation from the viewpoint of energy production and environmental protection industries.

This research is being integrated into the K-12 classroom through GK-12 Fellow's field trips to K-12 schools and K-12 teacher's and student's visits at UW nano research labs where the students participate in the activities associated with the CO₂+C → 2CO



David Herr with an interactive molecule model for use with K-12 students



David Herr's research presented to the NSF in Arlington, VA

conversion technologies for clean energy production. They work with NSF Fellows to do on-site catalyst preparation. Through the use of safe hands-on activities and fun lab tours, K-12 students learn how fun STEM fields are and why they are so important to their own and country's futures.

Another way we are transferring energy-environment related (EE-technologies) research to K-12 classrooms is through problem-solving. Problems have been developed by Fellows, which are related to the challenges we are facing and the impacts of their solutions on the real world, and understandable to K-12 students. K-12 students are induced to analyze a problem in EE-technology areas and solve it in a step-by-step manner. K-12 teachers and students will realize the importance of EE-technologies while Fellows highlight their benefits."

While in the classroom David emphasizes that hard work and dedication, not natural ability, are the keys to success for anyone trying to better themselves. After observing students in grades K-12 being intimidated by math and science, he began to focus his efforts on developing a personal teaching method that balances concrete material while also introducing real world scenarios to eliminate discouragement of students to follow educational and career paths involving science, technology, engineering, and math (STEM). David continues to stress that students do not have to be at the top of their class or even in an honor society to make a difference. They only need the drive, just as he has aptly demonstrated.

by: J. Barrett

Photos courtesy of D. Herr

Women in Engineering

While declining female enrollment in undergraduate engineering programs has been a continuing issue at universities nationwide, the women of the College of Engineering and Applied Science have emerged as some of our College's top leaders. These scholars continue to hold significant leadership roles and are consistently recognized for their unprecedented work ethic and academic achievement.

At the beginning of the Spring 2012 semester, a series was developed to showcase the accomplishments of these women. Most recently Christine Sednek, an Environmental Engineering masters candidate and UW Triathlon Club President, was highlighted.

Women in Engineering: Christine Frances Sednek

In December 2012, Christine Frances Sednek will graduate with a masters degree in Environmental Engineering with research focusing on anaerobic digestion. Anaerobic digestion is a microbial process in that any type of carbon-based waste will yield energy in the form of methane; and is then contained, burned and utilized as heat energy. It is a process that is becoming commonplace in waste water treatment and is a large component of sustainable energy practices as it aids in the development of cleaner energy. Her research allows her to understand the process of meeting resource needs for communities and populations.

Christine grew up on a farm in Kersey, CO, which exposed her to the "hands on" mechanical work associated with the maintaining of farm operations. During high school she was very interested in chemistry and participated in the International Baccalaureate Program offered by her school district. This gave her access to levels of math and science that were much more advanced than that of the regular curriculum. Collectively, she gained a natural inclination toward the field of environmental engineering.

She completed her undergraduate studies at Colorado State University at Fort Collins where she studied Environmental Engineering. After being accepted to CSU's graduate program she made the personal decision to relocate to Laramie to complete her graduate studies. Removing herself from her familiar atmosphere allowed her to become more independent: she established a new friend base by joining clubs and finding a community of dedicated athletes and multi-faceted individuals throughout the University of Wyoming campus.



Christine Sednek racing the road bike portion of the 2012 National Championship

On top of her academic achievements, Christine is currently the President of the UW Triathlon Club. This opportunity has provided her with a means to develop greater leadership skills while simultaneously developing into a better, overall athlete. It has also acted as a self-actualization process in the discovering of her personal potential.

Despite the harsh winters of Laramie, the triathlon club trains year round whether the conditions include rain, ice or snow. This past year, under Christine's leadership, the team qualified for the Collegiate National Championships competing against schools such as Duke, Penn State, Colorado State University, Stanford, UC Davis, and Texas A&M. The team has evolved into a family who train, travel, and race together, establishing dedicated members and lifelong friends.

Christine also serves as a mentor with the Office of International Programs. This semester she has worked with Etizaz Hassan Shah of Pakistan, a student in the Global Undergraduate Program. This program is sponsored

by the U.S. Department of State and administered by the International Research Exchange Board. Having experienced the exchange process first hand in Valparaiso, Chile for six months during her undergraduate studies, Christine jumped at the opportunity to serve as a mentor for incoming exchange students to the University of Wyoming.

Through her accomplishments in the classroom, as an athlete, as a leader, and as a mentor, Christine continues to demonstrate the qualities associated with the student body at the University of Wyoming. Coupled with her exuberant personality, Christine continues to set precedents in all that she sets out to do.

To view the articles written on each of these individual women please visit the college's website news archive at:
www.uwyo.edu/ceas/news/current.html

by: J. Barrett
Photos courtesy of C. Sednek



*Christine Sednek
Environmental Engineering*

Women in Engineering: 2012 Featured Students



*Gretchen Heberling
Architectural/Civil Engineering*



*Mallory Hunt
Civil/Transportation Engineering*



*Dana Schultz
Electrical Engineering with a
Biomedical Engineering Option*



*Melinda Kolm
Architectural Engineering*



*Margaret Kimble
Civil Engineering*



*Anita Khannikova
Chemical and Petroleum Engineering*



Gabriel Stuckenschneider

Chemical and Petroleum Engineering

Mechanical Engineering Students Develop an Improved Exhaust Brake for the U.S. Army



Original Exhaust Brake Design Improved Exhaust Brake Design

In the fall of 2011, The Army Material Systems Analysis Activity, located in Aberdeen, MD, commissioned Audax Engineering, a Mechanical Engineering Senior Design team from the University of Wyoming, to develop an improved exhaust brake that will last the life of an engine.

The U.S. Army installs exhaust brakes on their heavy diesel trucks and troop carriers to provide vehicle operators with more control and extend the life of traditional friction brakes when the vehicle descends steep grades. The exhaust brakes, butterfly valves installed in the engine exhaust systems downstream from the turbochargers, provide back pressure on the engines to achieve a braking effect.

These valves fail from corrosion by seizing when they reach the end of their design life at approximately 10,000 hours. However, the U.S. Army expects the engines in their vehicles to last for about 40,000 hours, or 1,000,000 vehicle miles, so the exhaust brakes must be replaced three



(Left to Right) Jeff Watters, Mark Schimelpfenig, Kate McKinnon, Eric Jensen

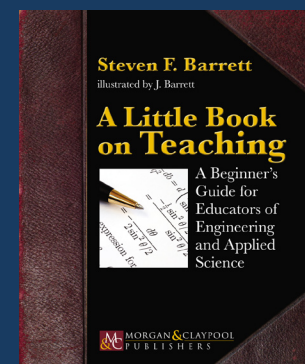
times during the life of a typical engine. These failures require down time, the expense of parts and labor for replacement, and potentially create dangerous conditions for United States military personnel.

To improve the brake, key components of the butterfly valve have been replaced with corrosion resistant stainless steel parts and stainless steel bushings have been shrink-fitted into the valve housing. The stainless steel parts were selected to minimize the magnitude of thermal stresses, the probability of galling, and galvanic corrosion. The design modeling for the improved exhaust brake has been verified by successful testing for mechanical loading, thermal shock, corrosion resistance, and cyclical operation at ambient and elevated temperatures. The improved brake is ready for field testing at the Aberdeen Proving Grounds to determine if the improved exhaust brake will operate for the extended life of an engine.

*Article courtesy of Department of Mechanical Engineering
Photos: J. Barrett*

It is a quick transition from being a student to a teacher. Dr. Steven F. Barrett, Associate Dean of Academic Programs and Professor of Electrical and Computer Engineering, wrote the book "A Little Book on Teaching: A Beginner's Guide for Educators of Engineering and Applied Science," as a basic primer for college-level learning and teaching to help new faculty members make this transition successfully. The book contains information on effective teaching practices from the literature as well as lessons Dr. Barrett has learned along the way.

For more information about his book, visit <http://www.alittlebookonteaching.com>.



Dean Robert Ettema Elected

Fellow of the Institute of Professional Engineers New Zealand

Dean Robert Ettema was recently elected a Fellow of the Institute of Professional Engineers New Zealand (IPENZ) for his contribution to the advancement of practices in the field of bridge engineering.

A New Zealand native, Ettema's primary focus is in the design of bridges for river crossings. Owing to its rugged terrain and relatively low population, New Zealand has more river-crossing bridges per capita than most countries. Consequently, the country spends a considerable amount of its transportation-infrastructure funds protecting and maintaining these structures.

The photo to the right shows Ettema receiving his fellowship certificate from IPENZ President, Steve Reindler, during the IPENZ awards dinner that took place in Wellington, New Zealand on March 16, 2012.

Ettema is responsible for developing improved bridge design methods that are now being adopted as standard design procedures by the U.S. Federal Highway Administration, similar agencies in New Zealand, and at additional locations around the globe. Most recently, he and a panel of engineers completed a state-of-the-art review of current bridge waterway design for the U.S. Transportation Research Board.

Bridge washout during floods is the leading cause of bridge failures worldwide. This subject continues to be a vital research topic at the University of Wyoming's College of Engineering and Applied Science. Ettema, UW faculty colleagues, and students, have studied how bridge abutments and piers fail during flood flows. Collectively,



Dean Rob Ettema with IPENZ President, Steve Reindler

they have utilized special laboratory techniques to diagnose specifically what causes bridge failure during these periods of heavy water flow. These previously unperformed experiments are funded by the Mountain Plains Consortium, a transportation-research program sponsored by the U.S. Department of Transportation.

Being named a Fellow of the Institute of Professional Engineers New Zealand is an accomplishment reached by very few in the field. Congratulations are extended to Ettema for reaching this milestone of his career as a professional engineer while simultaneously continuing the educational advancement for each of his students.

By: J. Barrett

Photos: ipenz.org.nz (above), Department of Civil and Architectural Engineering (below)

Graduate student Josh Fuller examines how the geotechnical behavior of a bridge abutment affects channel scour and abutment failure





*Feeding the world, protecting health, and
providing the conveniences of life!*

*Superior technology, strong partnerships with customers
and solutions to help change lives for the better*

Today, FMC maintains leading positions in three chemical markets:
Agricultural, Specialty, and Industrial.



Employing UW graduates (back row, left to right): Cyndi Johnson, Corey Saner, Jeremy Wiig, Mike Welsh, Lou Koritnik, Dallin Lancaster, Brian Stampe, Bill Philpot, Colter Rieke, and Tim Redmon. Front row, left to right: Josh Johnson, Jeremiah Johnson, John Gilchrist, and Bret Pizzato. Other UW graduates employed by FMC not shown above: Joe Vasco, Ryan Pauley, JR Maxfield, Clark Anderson, Tyrel Kennedy, Bill Bonini, Joe Arambel, and Mark Babel. Photo courtesy of FMC Corporation.

FMC Corporation

PO Box 872

Green River, WY 82935

307.872.2300

Students Claim 1st Place at Regional Design Competition



(Left to Right) Lesley Young, Ryan Williams, Davis Fay, Alisa Frohbieter

A University of Wyoming team claimed first place among 19 university teams in the American Society of Mechanical Engineers (ASME) recent design competition in Baton Rouge, LA.

UW's team members were Daniel Barkhurst of Encampment; Kodi Dixon of Gillette; Cody McKinney of Pinedale; and Tyler Stingley of Powell. All are juniors in the Mechanical Engineering Department. They were challenged to design four self-propelled devices that could collectively complete a relay race in the shortest period of time. Each device had to contain a unique, on-board energy source and trigger the motion on the next device. Designs had to meet a rigid set of guidelines.

"This team was particularly impressive since the four students undertook this project on their own time. The project was not part of their course work, and the students did not get any academic credit for working on this project as was the case for many other university participants," said Department Head Paul Dellenback.

The UW students utilized custom electronics for initiating the vehicles, programmable disc brakes, clever

power sources, and vehicle chassis that were constructed with a rapid prototyping machine in their designs. Their final solution resulted in the four vehicles traversing the 12 meter course in just over 5 seconds. "We are certainly proud of their effort" said Dellenback.

Specifically, the contestants had to design a system in response to the March 2011 Japan earthquake and tsunami. The nuclear industry issued a Request for Protocol (RFP) to design and build a small, remotely-controlled inspection vehicle to determine the level of radioactivity at specified locations and inspect for damage.

According to the ASME problem statement, "Providing energy to a world with a growing population and rising expectations is a challenge that engineers must embrace and solve. So many factors must be considered and balanced: cost, efficiency, resource availability, environmental impact, sustainability, and more."

*Article courtesy of The University of Wyoming Institutional Communications
Photo: J. Barrett*

205 S. 3rd Street
Lander, WY 82520
Phone: (307) 335-8466

**LOWHAM
WALSH LLC**
Engineering & Environmental Services

P.O. Box 536
Gillette, WY 82717
Phone: (307) 685-3137

Engineering and Design • Water Resource Management • Regulatory Compliance • Surveying
Environmental Health and Safety • Construction Management Reclamation • Air Quality
Ecological Assessment • GIS/Remote Sensing

In Memoriam

The College of Engineering and Applied Science regrets to announce that **Dr. Sukky Jun** passed away in March 2012 at age 47, after a brief battle with cancer. Sukky had been a faculty member in the department of mechanical engineering since 2006, when he was hired as an assistant professor. His technical interests were in the area of computational materials science. Having authored over 40 journal articles in the area, he was an internationally-recognized expert in modeling materials at the molecular scale. Sukky taught a variety of classes and introduced two new graduate classes into the mechanical engineering curriculum. His teaching and research accomplishments resulted in his being awarded tenure and promotion to rank of associate professor this year. Sukky was a thoughtful, collegial colleague and instructor whose contributions to the College will certainly be missed. He is survived by his wife Hye-Sook Park and two children.

Larry Ernst McDaniel of Centennial, CO, passed away February 2012, at home with his wife of 52 years, Kathy, by his side. He received his B.S. of Petroleum Engineering from the University of Wyoming.

Larry began his lifelong petroleum engineering career with Reed Tool Company as a field engineer, later becoming a product manager, area manager, domestic sales manager, and international sales manager for the company. On retirement from Reed, he worked for Brinkerhoff Drilling Company as an area drilling manager in Denver and later as Vice President of U.S. Drilling Operations for Thompson Drilling, Inc. In 1977, he formed McDaniel Specialty, Inc. an oil field equipment rental company. For the past 28 years he has owned and operated Combined Petroleum Services, Inc. *Published in the Laramie Boomerang*

Richard Albert Wahl, age 99, of Clearwater FL, passed away in April 2012. He was born on September 23, 1912 in Laramie, WY, to his parents, the late Wilhelm and Alla (Perleberg) Wahl. Richard was the youngest of four children raised on the Wahl Ranch south of Laramie.

Richard attended the University of Wyoming and graduated with a degree in civil engineering in 1934. He received the "Distinguished Alumni Award" in 1975 from the UW Alumni Association. He was also one of the original six members inducted into the first class of the College of Engineering Hall of Fame. *Published in the Laramie Boomerang*

Long time Casper resident and dear friend of the College of Engineering and Applied Science, **Jim Bailey** passed away at his home in March 2012. He was 98 years old. Mr. Bailey moved to the state in 1915, when his family homesteaded in northeast Wyoming. He later took over the family business, Bailey School Supply.

Jim and his wife Audrey started the Jim and Audrey Bailey Foundation Scholarship that is awarded annually to a student of the College of Engineering and Applied Science.



Since the 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. Robert W. Hastings

Mr. Shigeki Hiratsuka

Mr. Morris D. Kemper

Mr. Edmund T. Reilly

Mr. Charles V. Hallenbeck, Jr.

Mr. L. Louis Poitras

Mr. William C. Wyatt

Mr. Tom Williams

Col. Paul W. Feilner

Mr. Theodore A. Vautrinot

Mr. Barney Vanauken

Mr. David A. Poage

BSCE '39

BSME '45

BSCE '48

BSEE '52

BSCE '54

BSME '57

BSPE '61

BSEE '63

BSEE '63

BS '67 Gen. Eng.

BSME '69

BSCH '73

Springville, UT

Sierra Vista, AZ

Cheyenne, WY

Freemont, CA

Hotchkiss, CO

Carmel, CA

Guam

Littleton, CO

Alamogordo, NM

Naples, FL

Buffalo, WY

Arkansas City, KS

Natural gas fueling solutions delivered.

Encana Natural Gas Inc. offers complete fueling solutions tailored to your needs. For heavy-duty vehicles, we offer an innovative and proven liquefied natural gas (LNG) mobile fueling station – a solution that is customizable and deliverable to your “door.”

Encana is with you every mile of the way.

For more information please email ngv.info@encana.com or call 866.251.0032.

encana
natural gas

  
encana.com

Faculty and Staff Highlights

Dave Whitman - President's Outstanding Engineer Award 2012 - The Wyoming Engineering Society

The criteria for this award is based on service to the profession, the society, and the State. Some significant highlights of Whitman's ongoing achievements include being awarded the University of Wyoming, College of Engineering Outstanding Undergraduate Teaching Award in May, 1990 and April, 2004. Additionally, he was awarded the Wyoming Eminent Engineer Award from the University of Wyoming Chapter of Tau Beta Pi in April, 2009. His awards for public service include:

- Gubernatorial appointment to the Wyoming State Board of Registration for Professional Engineers and Professional Land Surveyors, April, 2001 thru March, 2013. He was also named the Board President for the period of March, 2007 through March, 2013.

- Elected as the Western Zone Vice-President for the National Council of Examiners for Engineering and Surveying (NCEES), August, 2006 through August, 2008, representing 15 registration jurisdictions on the NCEES Board of Directors.

- Elected as the NCEES President-Elect for August, 2008 through August, 2009, NCEES President for August, 2009 through August, 2010, and NCEES Past-President for August, 2010 through August, 2011.

Cameron Wright - Ellbogen Meritorious Classroom Teaching Award

Wright's dedication to his students' success has earned him the Ellbogen Meritorious Classroom Teaching Award, established in 1977 by businessman John P. "Jack" Ellbogen, to "foster, encourage, and reward excellence in classroom teaching at UW." Winners are selected from a list nominated by students and the awards are based entirely on classroom performance and helpfulness to students.

Allyson Anderson and Jerry Hamann - Promoting Intellectual Engagement in the First Year "PIE Award"

This award recognizes faculty who do outstanding work teaching and engaging first-year students. This year, the PIE committee received nearly 200 nominations from freshman and sophomore students via an online survey. The committee selected 34 award recipients based on a number of criteria and student comments about the nominee.

Gale Bandsma and Susan McCormack- Mortar Board's Tip of the Cap Award

Tip of the Cap is the UW chapter's annual recognition of outstanding UW staff. Each Mortar Board member chooses a staff member who has made a difference in his or her academic life. A ceremony is held, during which the members make an oral statement about the importance of their chosen staff person and present them with a certificate and gift.



Since 1980

www.wwcengineering.com

Offices in

Laramie

Casper

Sheridan

Helena, MT

Water Resources, Municipal and Transportation
Engineering; Environmental Compliance

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



- ☐ College of Engineering and Applied Science
- ☐ Department of Atmospheric Science
- ☐ Department of Chemical and Petroleum Engineering
- ☐ Department of Civil and Architectural Engineering
- ☐ Department of Computer Science
- ☐ Department of Electrical and Computer Engineering
- ☐ Department of Mechanical Engineering
- ☐ Other _____

FOUNDATION

1200 East Iverson Street
Laramie, WY 82070
(307) 766-6300 • (888) 831-7795

N12F2

ONLINE: Make a payment online using our secure server: www.uwyo.edu/giveonline.

PHONE: Call the University of Wyoming Foundation during normal business hours at (307) 766-6300 or (888) 831-7795.

MAIL: Make checks payable to the UW Foundation, indicate your allocation preference and mail to the address above.
Your gift is tax-deductible by law.

Please indicate any changes to your name and/or address: _____

Please send future issues of *Foresight* electronically to my preferred e-mail address: _____

Thank you for your continued support!

WYOALUMNI

The Online Home for All UW Friends, Alumni, and Supporters

The mission of WyoAlumni is to be the online home for everyone associated with the University of Wyoming - including friends, alumni, and supporters. WyoAlumni strives to be the primary online destination for people to connect with the UW and its people.

The Possibilities of WyoAlumni are Endless:

DISCOVER

- Find your friends and classmates
- Check out the latest UW news
- Register for university events
- Support your favorite college or department
- Get involved with the Alumni Association
- Find your dream job with multiple career resources
- Access the UW Libraries databases

CONNECT

- Create and customize your own profile page
- Connect seamlessly with Facebook
- Share photos
- Post class notes

COMMUNICATE

- Contact friends
- View photos
- Read alumni notes
- Chat online

NETWORK

- Make business connections
- Post and search resumes and jobs
- Check out mentoring opportunities

Get connected to WyoAlumni today: wyoalumni.uwyo.edu.

Please call (307) 766-7000 or e-mail wyoalumn@uwyo.edu if you have questions.



UNIVERSITY OF WYOMING
College of Engineering and Applied Science
Dept. 3295
1000 E. University Avenue
Laramie, WY 82071-2000

Nonprofit Organization
U.S. POSTAGE PAID
PRINTCO GRAPHICS

Upcoming Events

June 9-30

Summer High School Institute

June 17-23

Engineering Summer Program

August 27

Fall Classes Begin

October 13

Homecoming Weekend

December 8

**Fall Commencement
Art & Sciences Auditorium**

January 31, 2013

**Deadline for Hall of Fame &
Distinguished Engineers Nominations**

February 7-8, 2013

**Wyoming Engineering Society Convention
Casper Parkway Plaza**

February 15, 2013

**Nominations due for:
Wyoming Outstanding Alumnus Award &
Wyoming Eminent Engineer Award**

Event questions? Call us at (307) 766-6433 or
contact us by e-mail to engevents@uwyo.edu.