

The Bridge

UNIVERSITY OF WASHINGTON
COLLEGE of ENGINEERING
A Community of Innovators

Engineers Without Borders Improving Life in a Remote Bolivian Village



In the village of Yanayo Chico, a team of locals installs the framework for a corrugated metal roof. EWB designed the roof and provided the materials.

From the first moment members of UW’s Engineers Without Borders (EWB) team set foot in Yanayo, Bolivia in 2006, it was clear they’d soon be back. Not only was the impoverished community in desperate need of an irrigation system and new road, but also new roofs and stoves for nearly all the homes dotting the mountainous terrain.

“As engineers, we focus on how to build and install our projects,” said Donee Alexander, projects director for the UW chapter of EWB, and one of many civil and environmental engineering students who are active in the program. “But we quickly found that the biggest part of our work in Bolivia would revolve around education and ensuring sustainability.”

Earlier this year the UW chapter and its members received the annual Humanitarian Award during the EWB International Conference, hosted at UW from March

27–30 and attended by more than 650 people. This award is remarkable given that the work in Bolivia is the chapter’s first project.

A team of students and faculty returned to Yanayo in summer 2007 to address some of the health issues affecting villagers, including poor nutrition due to lack of crop diversity and also Chagas disease, which is spread by a carrier that lives in thatch. The team, including CEE graduate students Greg Curtiss, Robyn Wilmouth, and Alexander, replaced 23 of the

(continued on page 6)



Jessica Lundquist, assistant professor, launches a self-recording temperature sensor into a tree in the North Cascades to test how temperature varies across the landscape and how temperature patterns match with snow duration, measured by temperature sensors on the ground.

CEE Teams Study Impact of Climate Warming on Northwest Water Resources

“Global warming is a little like a heavily loaded freight train — once in motion it can’t be immediately stopped,” said Alan Hamlet, CEE research assistant professor. Projections for mid twenty-first century strongly suggest that potential reductions in greenhouse gases will play a relatively minor role in

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Message from the Chair



Welcome to the winter issue of *The Bridge*

This new name aptly describes the purpose of our newsletter — to form a bridge between the department and you. During my first four months as chair, I have enjoyed meeting our students, CEE alumni, and friends in the community. I look forward to getting to know more of you and learning about your work and thoughts on issues important to our discipline.

Stepping into the chair role is exciting at a time when the “three Es” — economics, energy, and the envi-

ronment — are at the forefront of societal concerns. Through our mission of research and educating the next generation of engineers, CEE can make important contributions to a sustainable future. Over the next several years, we will be expanding CEE to help fill the high demand for engineers who can solve our nation’s challenges related to infrastructure, climate, and sustainability.

This academic year, we are searching for new faculty in structures and geotechnical engineering, transportation engineering, and hydrology. We also recently hired two faculty members joining us in autumn 2009. Michael Dodd, who has a PhD in environmental chemistry from the Swiss Federal Institute of Technology in Zurich, will join us after completing a postdoctoral position. Linda Boyle, an alumna of our program

(PhD ’98), joins us from the University of Iowa, where she is a faculty member in mechanical and industrial engineering.

Two recent faculty transitions deserve mention. Bob Holtz retired after a storied, 20-year career in CEE (article on page 4). After 23 years on the faculty, Rick Palmer has left to head the CEE department at the University of Massachusetts in Amherst. We wish Rick the very best.

I hope you will enjoy reading *The Bridge*. We would like to hear your comments, and to know how you are doing and what is new in your life (send to: comments@ce.washington.edu). And, if you are in Seattle, please stop by for a visit!

CRAIG H. BENSON, PhD, PE
Professor and Chair

CEE Celebrates the Inaugural Wenk Lectureship in Technology and Public Policy

More than 270 UW alumni, friends, CEE faculty, staff, and students turned out on November 6 to hear a timely presentation by former governor and U.S. senator Daniel J. Evans: “Was This a Transformational Election? Challenges Facing a New Administration.” He delivered CEE’s inaugural Edward Wenk, Jr. Endowed Lectureship in Technology and Public Policy.

Evans’ lecture focused on transformational presidencies over history including those of Thomas Jefferson, Andrew Jackson, Abraham Lincoln, Theodore Roosevelt, Franklin Delano Roosevelt, and Ronald Reagan. He posed the question: Will Barack Obama’s presidency be transformational as well? Through a discussion of current challenges that face our

nation from an engineering perspective — a failing infrastructure, global climate change and environmental concerns, and a changing economy — Evans illustrated potential ways President-elect Obama can transform our country over the next four years.

The lectureship was made possible by a generous gift from Dr. Edward

Wenk, Jr., emeritus professor of civil and environmental engineering and of public affairs.

Appointed by President Kennedy in 1961 to monitor the sharply growing research initiatives in science and technology, and reappointed by two subsequent presidents, Wenk built his career by bridging the gap between public policy and engineering. Wenk helped found a UW graduate program in social management of technology in 1972.

Through his generous gift, he continues to share his professional legacy with students, alumni, and the academic community.

A transcript of the lecture is on the CEE website at: <http://www.ce.washington.edu/about/news/news.html>.



From left: Craig Benson, CEE chair; Edward Wenk, Jr.; Dan Evans.

Climate Change and Water Resources *(from page 1)*

mitigating the impacts of warming. “Although greenhouse gas reductions are very important in the long run, we have to get ready for the warming that’s coming in the next three to four decades,” Hamlet said.

Several CEE faculty members including Hamlet, Dennis Lettenmaier, Anne Steinemann, Stephen Burges, and Jessica Lundquist have been studying the impacts of climate change on hydrology and water resources for a decade or longer. They collaborate with interdisciplinary research units such as the UW Climate Impacts Group (CIG), Puget Sound Regional Integrated Synthesis Model (PRISM), and the UW Program on Climate Change.

One fundamental problem for water resources planners and managers is that historic streamflow records are unlikely to adequately represent future climate risks. “It’s a little like driving forward on a curvy road while looking only in the rearview mirror,” Hamlet said. “You can’t see what’s coming, and the risk of driving off the road is great. As climate researchers it’s our job to look forward and to use the best available science to understand the curves in the road ahead.”

One of the most important climate impacts in the Pacific Northwest is the loss of snowpack. The region’s water resource systems rely on snowpack to store water during the winter. Natural water storage will diminish as the climate warms. In fact, the snowpack in the Washington and Oregon Cascades, measured annually on April 1, declined roughly 30 percent from 1945 to 2006 due to the combined effects of observed warming and reduced precipitation. Projections for the future show continued declines, related primarily to temperature, particularly at moderate elevations that are

currently close to the freezing point in mid-winter.

Given a rapidly evolving climate, hydrologic modeling is an essential tool for generating useful data to guide water-planning activities.

Hydrologic models use temperature and precipitation data to simulate important variables such as snowpack, soil moisture, evaporation, and runoff. CEE’s interdisciplinary and collaborative research is an essential component of planning for Pacific Northwest climate change. Resource management agencies depend on CEE’s modeling expertise to help plan for needs related to water supply, hydropower production, flood control, storm water management, instream flow, and ecosystem services, including salmon restoration.

Climate model simulations from the Intergovernmental Panel on Climate Change (IPCC) suggest strong warming trends for the globe and the Pacific Northwest over the next three to four decades and beyond. However, long-term changes in precipitation in the Northwest likely will be relatively small compared to the natural decade-to-decade variations. During decades of warm and wet conditions we may experience increased flood risk and then unprecedented drought stress during dry decades.

These basic messages about climate warming and adaptation are generating increasing interest among state and federal natural resources managers, state legislators and policy makers, and the general public. “After a decade of education and outreach efforts, and pounding on doors, they are suddenly opening,” Hamlet said. “The volume of requests for information has been astounding, and we are delighted that people are beginning to prepare for the effects of climate warming.”

The state departments of Ecology and Community Trade and Economic Development are now turning to CIG to help assess climate impacts on water supply, natural and agricultural resources, and human health. The basic elements of the study will be published as a series of articles in a special issue of the journal *Climatic Change*. The group will release the results to resources managers, policy makers, and the community at a public workshop in February.

For more information about CEE climate change research, visit <http://www.hydro.washington.edu> and <http://cses.washington.edu/cig/>



Snowpack is declining on Mt. Rainier and other peaks in the Cascades.



CEE faculty working on climate change and water resources include (from left) Dennis Lettenmaier, Stephen Burges, Alan Hamlet, and Jessica Lundquist.

Fellowship Honors Lifetime Achievements of Professor Robert Holtz



Robert D. Holtz

After thinking back on his 20 years at the University of Washington, Professor Emeritus Robert Holtz said the best part has been working within the CEE family.

“My colleagues, the staff, and students are just wonderful here,” he said. “It’s way more than I ever expected.”

Holtz, who retired in June, had a remarkable last few years at the UW. This year he gave the annual Henry Roy Berg Lecture on the topic of geosynthetic materials and their applications in filtration, erosion control, soil reinforcing, and landfills.

The ASCE named Holtz a Distinguished Member in November 2007. Such an honor is an extraordinary achievement, conferred by ASCE on only 188 of its 140,000 members. The ASCE recognized him for “exemplary service, leadership, research accomplishments, and written contributions to the field of geotechnical engineering and his pioneering work with geosynthetics.”

Before joining the UW faculty two decades ago, Holtz served for 15 years on the faculty at Purdue University. Professor Emeritus Colin Brown, CEE’s chair from 1987 to 1992, recruited Holtz.

During his distinguished career in geotechnical engineering, Holtz worked for the California Department of Water Resources, Swedish Geotechnical Institute, National Research Council Canada, and as a consulting engineer

in Chicago, France, and Italy. His research sponsors have included the National Science Foundation, the Federal Highway Administration, U.S. Air Force, the Indiana and Washington highway departments, industry, and professional associations. Holtz is the author, co-author, or editor of 22 books and book chapters, and author or co-author of more than 270 technical papers, discussions, reviews, and major reports.

To honor Holtz’s accomplishments and contributions to the industry, the Geotechnical Group of the Seattle Section of the ASCE established the Robert D. Holtz Endowed Fellowship, with contributions from the local geotechnical community. This endowment will support graduate student education and research in geotechnical engineering at the UW.

Professor Holtz and his wife, Cricket Morgan, recently made their own personal contribution to the fund. Their gift will be matched at 100% by the Faculty-Staff-Retiree Campaign for Students.

Holtz still plans to remain active in CEE. “I’m not willing to quit cold turkey,” he said with a laugh. “So far, it’s been a wonderful ride.”

To contribute to the Robert D. Holtz Endowed Fellowship, contact Megan Kagel at 206-685-1378 or mkkagel@u.washington.edu.



Judy Mahoney, CoE assistant dean for advancement, with members of the ASCE Geotechnical Group who helped raise funds for the endowment to honor their former professor. From left: Stan Boyle (PhD '95), Shannon & Wilson; Mark Robrbach (BS '00, MS '02), Lachel Felice & Associates; Mike Harney (MS '01), Shannon & Wilson.

CEE Campaign UW Achievements

Over the last eight years, our alumni and friends have helped us raise more than \$6 million in new endowments for CEE. We are grateful for your generosity and commitment to our department. These gifts will help us prepare the next generation of leaders in our field, and for that, we can't thank you enough.

July 1, 2000 to June 30, 2008

• 21 MAJOR ENDOWMENTS

- 3 professorships
- 8 scholarships
- 10 fellowships

• 8 SPECIAL FUND ENDOWMENTS

- 1 research fund
- 1 lectureship
- 2 student awards
- 4 student support funds

Students Remain a High Priority for Retired Professor



Many members of the UW community participated in Campaign UW through the Faculty-Staff-Retiree (FSR) Campaign for Students, which runs through December 31, 2008. Endowment gifts of \$5,000 to \$10,000 qualify for a 100 percent UW match. These gifts offer CEE the flexibility to supplement scholarship or fellowship support or to fund other student needs. Faculty and staff can create individual endowments or contribute to existing ones, and gifts can be paid over five years.

Thanks to his highly regarded expertise in air resources, August T. Rossano traveled the world on countless assignments with the World Health Organization, the World Bank, and U.S. Department of State. First working for the U.S. Public Health Service, and later as a member of the UW faculty, Rossano defined himself as a true leader in the field.

He joined the CEE faculty in 1963 to develop a teaching and research program in air resources. Nearly 20 years later he transitioned to professor emeritus status, but continued teaching classes through 1986.

Although Rossano is long retired, his support of students remains strong. Through the Faculty-Staff-Retiree Campaign for Students, Rossano created an endowed fellowship to support CEE graduate students studying environmental engineering.

To make an FSR gift by December 31 or for more information, please contact Megan Kagel, CEE advancement officer, at (206) 685-1378 or mkkagel@u.washington.edu.

Enthusiastic Support for “Students First”

Fourth Hawkins Endowment Supports Undergraduates

Neil M. and S. Ann Hawkins are no strangers to the CEE community — thanks both to his distinguished UW career and their continued support of the department’s students. Hawkins’ joined the UW faculty in 1968, became a full professor in 1972, and in 1978 began a nine-year tenure as department chair.

Hawkins later served the UW as associate dean for research, facilities, and external affairs in the College of Engineering, associate director of the college’s Valle Program for scholarship and exchange in Scandinavia, and as adjunct professor of architecture. Throughout his career, Hawkins’ area of interest focused on reinforced and prestressed concrete and composite construction.

Though now retired, his legacy continues. He and his wife have gifted four endowments to the department. Their latest gift, the Neil M. and S. Ann Hawkins Endowed Scholarship, which received a 50 percent UW match through the “Students First” program, will help financially needy undergraduates fund the cost of attending the UW.



Neil M. Hawkins

Power of Inspiration Lives on in Bevlin Gift

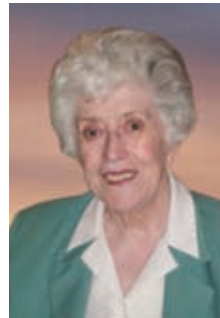
At the site of the Mitchell Point Tunnel, located along Oregon’s old Columbia River Highway, stands a bronze plaque honoring the work of CEE alumnus John Arthur Elliott. It reads: “Here at Mitchell Point, John A. Elliott faced a sheet of rock wall and conquered this challenge to produce a work of art.”

The tunnel, carved completely from a natural cliff, was a renowned engineering achievement that drew visitors from all over the world. Built in 1915, the tunnel became an essential link for automobiles and trucks traveling across the Cascades. Although it was destroyed in 1966, memories of this engineering marvel live on.

Elliott dedicated his life to helping build this country’s extensive highway system. As a tribute to his life and work, Elliott’s daughter, Marjorie Elliott Bevlin, and her family, created the John Arthur Elliott Endowed Scholarship in Civil and Environmental Engineering.

An expert in design and the fine arts, Bevlin used royalties earned from her textbook, *Design Through Discovery*, to fund the scholarship. Published in 1963, the book has nine editions and has sold more than 250,000 copies.

Elliott’s legacy lives on through the endowment, which supports current CEE undergraduate students. The gift carries with it a significant message: although no human structure will last forever, the dream that inspired it will continue to spark future generations.



Marjorie Elliott Bevlin

Knudson Fellowship “Pays It Forward”

After two years of working on his civil engineering master’s degree at the UW, Rodney O. Knudson faced a major hurdle — he could no longer afford the tuition.

Following service during World War II, Knudson attended the UW on the GI Bill and earned his bachelor’s degree in forestry in 1950. However, after working in the field for two years, he realized he still had more to learn. He returned to his alma mater, but this time as a civil engineering graduate student.

To ensure that Knudson could continue his graduate education, the Civil Engineering department offered him a fellowship. After receiving his master’s degree in 1954, he enjoyed a long and rewarding career as a structural engineer.

In true “pay-it-forward” spirit, Knudson and his wife, Methyl, recently established an endowed fellowship to help other students pursue their CEE graduate studies. In gratitude for the opportunities made possible by his education and graduate fellowship, Rodney and Methyl Knudson created the fellowship via the Students First Matching Challenge Fund. During Campaign UW, the University matched all gifts to this fund on a 50 percent basis, enabling more students to fulfill their dreams through education.

Engineers Without Borders *(from page 1)*

community's thatched roofs with corrugated metal and installed a gravity-fed irrigation system to boost crop production. Another priority was to build 21 new Lorena-type stoves for the local women, who were using open-fire stoves in their small homes.

"The kitchens were blackened from all of the smoke," said Wilmouth. "These women would spend hours in these unhealthy conditions, many times with their small children nearby. They would wake up at night coughing, and they sometimes had a hard time going up and down the mountainsides."

Several students and faculty returned to Yanayo in summer and fall 2008 to build 21 more stoves and roofs in two nearby villages with the assistance of community members they had trained the year before. One of EWB's goals is building capacity by teaching the residents how to construct, use, and maintain their infrastructure.

An improved road was one of the first needs the village identified in 2006. The government bulldozed a new road to the area in February 2007, but it was not properly designed and large portions washed out during the first rainy season. Villagers again lacked a way to get to schools, hospitals, or markets except by walking for hours. With the support of Peter Schiess, a forest road engineer, and engineers at Shannon & Wilson, Inc., students developed ways

to stabilize the road. In September, Alexander, professional mentor Pete Sturtevant from engineering firm CH2M Hill, CEE graduate students Mark Raleigh and Jeff Walters, and undergraduate Joe Jenkins worked on seven of the 15 miles of road with locals from four villages in the area. Using a dump truck, shovels, and picks, they stabilized critical stretches with dry walls, ditches, and rolling dips. EWB members will return in February to see how the road survived the rainy season and to continue stabilization work. They also will lay the groundwork for providing roofs and stoves for a village with 75 households.

The UW chapter is extending its reach beyond Bolivia. In September, Patrick Keys, a graduate student and project lead, Professor Mark Benjamin, and Ken Ludwa, a professional engineer from RW Beck, did a site assessment in two



CEE grad student Donee Alexander tests the efficiency of a stove design.



Mountain road repair is a strenuous, dirty job. CEE graduate student Mark Raleigh (inset) helped guide the work done by the village men.

villages in Suriname in northern South America. Villagers suffer a high incidence of skin rashes and diarrhea and the team is working on solutions to provide desperately needed potable water.

Several other CEE graduate and undergraduate students and faculty are active in the UW chapter, including adjunct professor Susan Bolton. Taking on these projects not only benefits the recipients, but also the students and faculty who participate.

"This program gives engineering students an opportunity to expand their global awareness, think on their feet, and realize that what they are learning today not only applies all over the world, but also truly makes a difference," Alexander said.

For more information on the EWB chapter, or to make a donation, visit <http://students.washington.edu/ewbuw>.

Alumni Spotlight

Thomas Draeger New ASCE Fellow

The American Society of Civil Engineers (ASCE) honored Thomas R. Draeger ('68) with the 2007 OPAL Lifetime Achievement Award and also elected him a Fellow. Draeger is senior vice president of the Bechtel Group, Inc. and president of Bechtel Construction Operations, with responsibility for global activities. He oversaw construction of the new Tacoma Narrows Bridge.

MacArthur Award Winner Speaks at College Event

Marc Edwards (PhD '91), a professor at Virginia Tech University and winner of a MacArthur "genius" award, presented a lecture at the College of Engineering's "Innovators & Geniuses" event on May 29. It showcased the work of five engineering faculty and alumni who were honored in fall 2007 by the MacArthur Foundation or MIT's *Technology Review*. His lecture was titled, "Lead in Drinking Water and Public Health: A Scientist's Descent into the Activist Netherworld."

Mark Kilgore Elected to the EWRI Governing Board

Mark Kilgore ('84) has been elected to the Environmental and Water Resources Institute's (EWRI) governing board. This ASCE organization serves 24,000 engineers and scientists. Kilgore is active in EWRI's Water Resources Planning and Management Division, serves on the ASCE University Advisory Committee, and is a past president of the Seattle section of ASCE. He is a principal water resources engineer with the Louis Berger Group and manages the firm's Bellevue office.

Awards and Accolades

Benson Elected ASCE Fellow, Wins Two Paper Awards

CEE's new chair, Craig Benson, has been elected a Fellow of the American Society of Civil Engineers (ASCE), an honor accorded to less than five percent of ASCE's membership. He also received two ASCE awards for his paper "Hydraulic Conductivity of Geosynthetic Clay Liners Exhumed from Landfill Final Covers," published in the May 2007 *Journal of Geotechnical and Geoenvironmental Engineering*. In selecting Benson and co-author Stephen R. Meer for the 2008 J. James R. Croes Medal, the committee noted the paper's contribution to engineering science. The paper also recently won the 2008 Alfred Nobel Prize, with recognition for its "significant immediate practical implications."

Burges Receives the ASCE 2008 Van Te Chow Award

Professor Stephen Burges recently received the American Society of Civil Engineers (ASCE) 2008 Van Te Chow Award "for an exceptional career in education and research in engineering hydrology and water resources management, outstanding service to the profession, and mentoring of young hydrologic engineers." The committee that selected Burges for this honor particularly noted his leadership in hydrologic modeling.

Nihan Honored with the S.S. Steinberg Award

Professor Nancy Nihan received the S.S. Steinberg Award earlier this year from the American Road & Transportation Builders Association (ARTBA). The award, named for the first president of ARTBA's Research and Education Division, recognizes "an individual who has made remarkable contributions to transportation education."



Photo by Peter Mackenzie.

Concrete Canoe Team Wins in Northwest, Competes at Nationals in Montreal

For the third year in a row, CEE's Concrete Canoe Team won the Northwest regional competition, beating Gonzaga by one point and the University of Idaho by 1.5 points. The victory again enabled the team to represent the department, the University, and the Northwest at the ASCE (American Society of Civil Engineers) National Concrete Canoe Competition, this year in Montreal, Canada.

Our team "started" the June 19–21 competition by driving the canoe across the country right after the department's graduation ceremony. Four days later, canoes went on public display at Place du Canada in the heart of Montreal, where expert eyes judged quality of design and production. Day two was dedicated to technical presentation and discussion, and day three demanded huge effort during an exhausting sequence of five races (men's and women's slalom and sprint and a co-ed sprint) in a facility built for the 1976 Olympic games.

The 2008 competition, won by the University of Nevada–Reno, drew 22 outstanding teams from the U.S. and Canada. Although our team finished seventeenth overall, the experience was invaluable and the emerging team of 2009 brought home a better sense of their competitors, new ideas, virtually unlimited motivation, and a memory of a lifetime.

The team's core of 20 active members and many more helping hands, led by co-captains Candice Au-Yeung and Ryan Mak, worked more than seven months to create CEE's canoe, dubbed "LIFE" after the four columns in the Sylvan Grove Theater. LIFE is an acronym for "loyalty, industry, faith, and efficiency."

"It was great to see how many enthusiastic people were willing to help out on this project," said Au-Yeung.

Photos from the Northwest regional competition are available at: <http://www.ce.washington.edu/about/news/news.html>. To make a donation to the 2009 team, contact Beth Thomas, htebst@u.washington.edu or 253-224-0837.

Mentors and Sponsors: The team's faculty mentors are Professors Donald Janssen and Peter Mackenzie. Lab technicians are Yiming Liu and Vongsant (Vince) Chaijaroen. Sponsors for the regional competition were Otto Rosenau and Associates, Harris Rebar Seattle, Golder Associates, Salmon Bay Sand and Gravel, American Engineering Corp., David Evans and Associates, ACC Hurlen Construction, The Boeing Company, Concrete Technology Corp., D.R. Strong Consulting Engineers, Structural Engineers Association of Washington, Geoenvironmental Engineers, Magnusson Klemencic Associates, and HDR. Material donors included Lehigh White Cement and Fiberlay.



June Graduates Sent Off with Pomp and Celebration

More than 500 guests attended CEE's graduation celebration on Sunday, June 15. The day began with a catered brunch followed by a formal recognition ceremony in Kane Hall. Before the start of the ceremony, guests enjoyed a showing of photos taken over the past year. At the first notes of "Pomp and Circumstance," the graduates began entering the hall.

Tim Larson and Craig Benson congratulated the graduates as outgoing and incoming department chairs, respectively. The keynote speaker, Jon Magnusson ('75 BSCE), chairman and CEO of Magnusson Klemencic Associates, offered a lively 25-minute "welcome to the profession" address that was thoughtful and punctuated with humor. Affiliate Professor Neil Hawkins then spoke briefly about the inspiration behind the Neil & Ann Hawkins Prize, and Professor Larson announced the winners: Bethany Nevitt (1st place) and Carly McArdle (2nd).

Candice Au-Yeung was honored with "Most Inspirational Student"

award amid great cheering and applause from the student section. The students also nominated two faculty members for recognition awards: Joe Mahoney as "Outstanding Faculty Mentor" and Greg Miller as "Outstanding Teacher."

The ceremony closed with the recognition of graduates, who came up on stage one by one to receive a handshake and class pin from Tim Larson. Participants included 89 BS recipients (of 123 awarded) and 15 MS and four PhD students.

Kudos to staff organizers for the resounding success of CEE's first formal graduation ceremony in many years.



Jon Magnusson speaks to graduates.



Civil & Environmental Engineering

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The Bridge

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