CIVIL & ENVIRONMENTAL ENGINEERING

The Bridge

CEE Team Wins WERC Environmental Design Contest

Civil & Environmental Engineering students topped 45 other teams to win the best project award in the WERC Environmental Design Contest held last April at New Mexico State University. The contest annually draws hundreds of students from around the nation and abroad. CEE’s team of undergraduates Zoe See and Adam Price, graduate student Zhenxiao Cai, and Chinese exchange student Peiran Zhou, were led to victory by their advisor, Professor Mark Benjamin.

For the past 19 years, the New Mexico-based Waste Management and Environmental Research Consortium (WERC), has run a design competition that poses real-world problems for which student teams design, build, and demonstrate proposed solutions. The teams write a 25-page paper describing the proposed design, and then travel to NMSU to demonstrate a bench-scale prototype and make oral and poster presentations.

“I am very proud of our team,” said Benjamin. “They worked hard and made absolutely professional presentations at the competition. They were especially impressive when answering the judges’ questions, many of which we

(continued on page 4)

Mahoney and Lettenmaier Awarded Professorships

CEE recently recognized two outstanding faculty members by awarding them coveted endowed professorships. Professor Joe P. Mahoney has been named the Bill and Marilyn Conner Endowed Professor. Mahoney’s work focuses on transportation and construction engineering and he plans to use the funds to support his work to develop a renewable energy curriculum. Professor Dennis Lettenmaier has been named the Robert O. Sylvester Endowed Professor. He will use the funds to support his research in the areas of hydroclimatology, surface water

(continued on page 7)
Miller is New CEE Chair

Dean Matt O’Donnell has appointed long-time faculty member Gregory R. Miller to lead the department as chair. He moves into this role on December 1 after two years of serving the college as associate dean for infrastructure. Craig Benson resigned the chair position in late summer to return to Wisconsin. In the interim, CEE Professor Tim Larson has ably stepped in to serve as acting chair.

“I am confident in Greg’s ability to build on the momentum developed in the last two years to move CEE forward to become a true national and international player in the world today,” O’Donnell said.

Miller is in the structural engineering group and is a UW alumnus (BSCE ’80) who joined the faculty in 1984 and became a full professor in 1995. He earned his doctorate at Northwestern University. Miller has won several distinguished teaching awards and held the J. Ray Bowen Endowed Professorship for Innovation in Engineering Education from 2000–2003.

“Having received my undergraduate degree from this department, I have a great respect for its long record of excellence, and I am quite excited to be working with everyone here as we move into what should prove to be a time of significant change and growth,” Miller said.

Welcome to New CEE Faculty

Associate Professor Cynthia Chen joins the faculty from the City College of New York. Her research interests range from land use and travel behavior to the use of technology in travel surveys, residential search and location decisions, and transportation safety using non-engineering methods. These studies often involve the collection of original data sets using a variety of methods including focus groups, verbal protocols, and interviews. Her work has appeared in numerous journals including Transportation Research, Environment and Planning, Journal of Transport Geography, and Transportation Policy.

Chen chairs the subcommittee on Time Use and Activity and Travel Patterns at the Transportation Research Board, a division of the National Research Council. She is also a member of two other Transportation Research Board committees.

She earned her BA from Nan Kai University in China, her MS from New Jersey Institute of Technology, and her doctorate in CEE at the University of California, Davis.

Assistant Professor Erkan Istanbulluoglu joins the Department of Civil and Environmental Engineering from the University of Nebraska where he was an assistant professor of natural resources and biological systems engineering. He previously was a postdoctoral associate and research affiliate at Massachusetts Institute of Technology.

His highly interdisciplinary research aims to understand the role of climate on ecolohydrological and geomorphological response of landscapes, sediment transport, and water balance of large basins. He uses empirical field observations, satellite-derived data, and numerical models to examine the response of a landscape system to disturbances.

Istanbulluoglu earned his BS and MS degrees in agricultural engineering at Uludag University in Turkey, and his doctorate in CEE at Utah State University. He received an NSF award for collaborative research on topographic imprint of hillslope aspect controls on vegetation and landforms in central New Mexico.
Building on a Partnership: Civil Engineering and Construction Management

From the dawn of the profession, construction has been an integral part of civil engineering. As the practice became more refined and large-scale construction projects required advanced knowledge regarding management of disparate parts and people, the partnership between civil engineering and construction management evolved. At the University of Washington, faculty in the departments of Civil & Environmental Engineering and Construction Management (CM) in the College of Built Environments (formerly Architecture and Urban Planning) work together to provide students with a comprehensive and innovative approach to construction engineering.

The current undergraduate enrollment (juniors and seniors) is about 230 students for CEE and 130 students for CM. CEE has about 200 graduate students and CM about 60.

Building on this strong tradition, CEE professors Joe Mahoney, Steve Muench, and Don Janssen provide comprehensive instruction in construction engineering. Courses help students develop their knowledge around such topics as planning, methods, contracts, specifications, manual and electronic scheduling, production estimates, equipment selection, ownership and operating costs, life-cycle cost analysis, and the role of the engineer in construction and cost estimating. Conversely, CEE seniors and graduate students can take selected classes in the department of Construction Management. In particular, seniors focusing in construction engineering can take CM courses as CEE technical electives, which count toward their eligibility for graduation. Many CEE graduate students interested in construction engineering take CM graduate courses to acquire additional project management knowledge.

The departments also cooperate in courses on construction materials. Professor Janssen teaches a primary materials course for Construction Management undergraduate students. It covers the physical and mechanical properties and engineering behavior of metals, wood, asphalt, and Portland cement concrete. The curriculum includes laboratory testing, instrumentation, and investigation into macrobehavior in the More Hall labs.

Distance Learning MS Degree

Advances in materials and processes, new management practices, legal issues, environmental concerns, and the broad societal impact of major infrastructure efforts such as roads, bridges, and ports, require professionals who are armed with the appropriate knowledge and skills. Six years ago, an interdisciplinary team of faculty from CEE and CM developed the Distance Learning Masters Degree in Construction Engineering. The only master's degree of its kind in the country, this program prepares professionals to deal with changes in the heavy construction industry. Students can set their own schedules and complete the degree from anywhere. Students come from a variety of backgrounds, including construction companies, contractors, consulting firms, public agencies, and the military, and bring with them years of industry experience.

Moving into a new phase of green and renewable construction practices offers opportunity for innovation and redesign of construction engineering. Through strong interdisciplinary partnerships like that between CEE and CM, the UW is at the forefront of emerging technologies and best practices. The continuation of this partnership will prepare future engineers for the challenges before them, and also help modernize the practice to make new advances in the field.

Emeritus Professor Gives Back to His Department

Water has always been a source of wonder for Emeritus Professor Ron Nece. Ron started his career at the University of Washington in 1959 and retired after 43 years of instruction and research in fluid mechanics, fluid dynamics, and studies of water flow. Now he is providing graduate students with support to follow their passion and help tackle some of the most pressing issues regarding clean water, energy, and healthy ecosystems.

Professor Nece has established the Ron and Mary Nece Endowed Fellowship in Water Engineering in Civil & Environmental Engineering. The fellowship will support graduate students studying in the areas of hydraulic engineering, environmental fluid mechanics, surface and ground water hydrology, water resources systems planning and management, and costal engineering. Fellowships such as these provide critical funding to recruit and retain exceptional students whose research talent shows promise for great societal impact. We thank Professor Nece for supporting future engineers and an important field that can enhance the quality of life for everyone.

The Bridge Vol 3:1, Fall 2009 3
WERC Environmental Design Contest (from page 1)

had not anticipated."

Of the six design challenges presented this year, the CEE team selected a project that required pretreating brackish water from Alamogordo in preparation for desalination. The teams were charged with developing and demonstrating a low-cost, energy-efficient, simple, and reliable pretreatment system using electrodialysis reversal (EDR) and reverse osmosis (RO). The proposed solution would remove particulates, aluminum, manganese, and iron to specified levels using commercially available crossover or new innovative technologies applicable for use at the Tularosa Basin desalination facility in Alamogordo. The solution had to respect the specified EDR and RO feedwater requirements.

Options for inland desalination to supply fresh water are becoming increasingly important in regions that lack sufficient natural water resources. This issue is specifically critical in arid and semi-arid areas experiencing population growth, economic development, and expanding agricultural needs. Electrodialysis reversal and reverse osmosis systems show potential; however, pretreatment of brackish water would greatly enhance the ability of these systems to remove particulates and troublesome inorganic pollutants.

CEE's team approach involved lime/soda-ash softening followed by recarbonation and filtration through granular pyrolusite. The softening process removed calcium, magnesium, aluminum, and silica, and the filtration step removed manganese, iron, and turbidity.

At NMSU, the students gave a 15-min PowerPoint presentation, followed by a Q&A session with the judges. The next day, the judges came to the demos, where the students presented a poster, made another presentation, and answered additional questions about their design process. In addition to technical issues, the paper and presentations had to address cost, community involvement, health and safety, and other topics.

Finally, the team demonstrated the prototype by treating a sample of the water for which the design was intended. The effluent was then sent to a lab, with the success of the process accounting for one-third of the total team score. The judging was serious, with 10 judges evaluating each project, including professionals directly involved in making the decisions about how to solve the real-world problem.

CEE's team bested the eight other teams that chose to compete on the brackish water pretreatment task. As an added bonus, the judges who work at the desalination facility said they are interested in scaling up the proposed process to implement at their site. To win overall top honors was the ultimate validation for their excellent work.

Awards and Accolades

Professor Joe P. Mahoney and Assistant Professor Stephen T. Muench received the Best Paper award at the 2009 Southern African Transport Conference for their paper titled “Implementation of Interactive Web-Based Tools in Pavement Engineering.” Co-authors were Professor Wynand Steyn, University of Pretoria, and George White, Pavia Systems. The theme for this year’s conference was Sustainable Development.

Professor Steven L. Kramer has been awarded the Normal Medal of the American Society of Engineers for his paper titled “Return Period of Soil Liquefaction,” co-authored with former CEE PhD student Roy Mayfield. The paper illustrates how conventional procedures for evaluating liquefaction potential produce inconsistent likelihoods of liquefaction in different seismic environments and introduces a more complete and consistent procedure for use in engineering practice. The Normal Medal was instituted and endowed in 1872 by George H. Norman, M.ASCE, and recognizes a paper that makes a definitive contribution to engineering science.

Robert D. Holtz, professor emeritus of geotechnical engineering, recently toured four cities in Columbia to present a four-hour mini short course on geosynthetics engineering. In Bogota, Baranquilla, Medellin, and Cali, Holtz lectured to audiences of 95 to 300 practicing engineers and consultants. Holtz was invited to present this lecture series by Pavco, a geosynthetics manufacturer that he first met in 1998 and encountered again at a conference in Mexico last March. Holtz says it must be the “missionary” in him that compels him to continue presenting the newer technologies to practicing engineers.

Affiliate professor Neil M. Hawkins was honored with the Academic Engineer-of-the-Year award by the

Petar Zhou answering judges questions (Adam Price and Zhenshao Cai are looking on from behind the judges).
Puget Sound Engineering Council.
Hawkins was nominated by the
American Society of Civil Engineers
(ASCE) and Structural Engineers
Association of Washington (SEAW).
Hawkins held an associate professor
appointment with CEE from 1968 to
1991, served as department chair from
1978 to 1987, and as associate dean for
research and facilities for the College of

CEE senior Joshua Hatfield joined
the ranks of former President Theodore
Roosevelt, Supreme Court Justice Sonia
Sotomayor, and Amazon.com founder
Jeff Bezos when he was initiated into
Phi Beta Kappa, the oldest and most
respected undergraduate honors
organization in the nation. PBK has
fostered and recognized excellence in
the liberal arts and sciences since 1776
and at the UW since the Washington
Alpha Chapter was established in 1914.

Stephanie Abegg, masters student in
geotechnical engineering and Valle
Fellowship recipient, and Jenna
Forsyth, masters student in hydrology,
water resources, and environmental
fluid mechanics, have received 2009
National Science Foundation Graduate
Research Fellowships. The program
recognizes and supports outstanding
graduate students in NSF-supported
science, technology, engineering, and
mathematics disciplines.

Rebecca Rule (MSE 2009) was a
co-recipient of the 2009 Harrison
Prescott Eddy Medal for Outstanding
Contribution to Wastewater Principles/
Processes Research. As a University of
Idaho undergraduate student and later
as a junior engineer for Blue Water
Technologies, Rule was a part of UI's
interdisciplinary research team that
worked to identify abiotic and biotic
mechanisms in a new water treatment
process. The Eddy Medal is a prestigious
international research award bestowed by
the 35,000-member Water Environment
Foundation following a blind nomination and review process.

Complex Dynamics of Tidal Flats
Draw New Doctoral Student

J. Paul Rinehimer, a first-year CEE
doctoral student, spent most of the
past summer wading around on
intertidal flats. When not on the
flats, he was flying above them in
a small plane for hours at a time.
From either vantage point, he was
looking for heat. As part of a large,
multi-investigator project funded
by the Office of Naval Research,
J. Paul is using infrared sensing
to detect physical processes and
properties of tidal flats. The infra-
red signals result from strong solar
heating of sediments exposed during
low tides and the temperature
differences between the cold river
discharge and the relatively warmer
bay water.

For flats located by a river
mouth, such as the Skagit River,
the incoming tidewater mixing
with the outgoing river water cre-
ates striking infrared patterns. In
regions with less river flow, such
as the Willapa Bay on the southwest
Washington coast, infrared signals
result from the mixing of tidewater
and groundwater. Rinehimer is
using the infrared observations to
quantify the mixing and to under-
stand the importance of channel
network geometries.

J. Paul is new to Northwest
waters. The Pennsylvania native
earned his BS in environmental
geosciences at Boston College and
an MS in marine science with a
concentration in physical oceanogra-
phy from The Virginia Institute
of Marine Science at the College
of William and Mary. On the East
Coast he primarily studied estuaries.
Now, tidal flats are his focus.

“The interface between rivers
and the sea is an interesting place
due to the dynamics of mixing
between salt and fresh water, and the
complex effects of wind and cur-
rents,” Rinehimer said.

Wading around tidal flats has its
challenges. The sheer size of the flats
can require lengthy walks to place
instruments, or hopping in and out
of the boat to drag it over sandbars
through water that may be knee deep.

“The channels through the braided
flats are constantly changing, so
navigating through them in an inflat-
able dinghy is an exercise in reading
surface water patterns and trying to
discern the location of the channel”
he said.

Most of the flats at Skagit are
sandy and easy to traverse on foot,
while the flats at Willapa consist of
deep, unconsolidated mud. “You
sink in them halfway to your knee or
more. They may be flat, but crossing
the muddy areas is like climbing stairs
while fighting the force of suction and
the extra weight of mud clinging to
your feet,” Rinehimer noted.

Rinehimer is working with
assistant professors James Thompson
and Alexander Horner-Devine.
Practical applications from their
work include improved remote sensing and
improved predictive models of tidal
flats. These advanced tools can be
used to inform decisions on envi-
ronmental projects such as habitat
restoration, and on naval operations
such as shore landings. Rinehimer’s
research is at the intersection of
several active areas in environmental
fluid mechanics, including sediment
transport, estuarine circulation, and
coastal morphology.

More information on the project
is available at www.tidalflats.org.

The Bridge Vol 3:1, Fall 2009  5
Berg Endowment Converts to Professorship

A donor's flexibility and forward thinking has led to the establishment of another new CEE professorship. The Henry Roy Berg Endowment was established in 1985 through Berg's estate to support professional development for faculty. It also provided a faculty award in conjunction with a public lecture to academic and professional colleagues on the recipient's topic of choice. A clause in Berg's will allowed the department to convert the fund into a professorship when the fund exceeded the minimum amount required to do so. CEE recently amended the endowment to establish the Henry Roy Berg Endowed Professorship and will name the first recipient next year.

Henry Roy Berg studied civil engineering at the University of Washington for approximately three years, then left to take a job with Western Electric. Next, after a brief stint working for the City of Seattle, he entered the military during World War II. After the war, he returned to Seattle and worked for the city until his retirement. We welcome any additional information about Mr. Berg, as our records reveal only this basic outline of his life and career.

If you can provide more information or would like to learn more about establishing an endowment in the Department of Civil & Environmental Engineering, please contact Megan Kagel at (206) 685-1378 or mkkagel@uw.edu.

Memory of Joe Colcord Lives on In More Hall

Old friends from the classes of 1956 and 1957 gathered on August 3 to dedicate the More 230 classroom in memory of Professor Joe Colcord. Alumni Howard Wahl and Kay Jones co-hosted the event and welcomed their old chums for this occasion. The two classes successfully raised funds for the classroom remodel with dual goals to recognize their favorite professor and help current students excel in their studies.

Their generous gifts and additional support from the college enabled CEE to combine two small classrooms to create a spacious one that can seat 60 students. The room has new ergonomic seating with curved work tables, dual PowerPoint projectors and projection screens, a new teacher's podium, a 10-foot sliding white board, new flooring and window treatments, and a new coat of paint. When funds are available, the department would like to add a tablet PC and digital visual presenter (also known as a document camera) to help professors with their instruction.

Professors Joe Mahoney and Marc Eberhard were on hand to express their thanks to the group and detail how this new classroom will benefit students. More Hall facilities manager Jack Herndon presented the technical side of the modifications and answered questions. The group was treated to a nostalgic PowerPoint presentation of campus scenes from the 1950s and then adjourned for lunch at the UW Club. It is not too late to contribute to this 1956–57 class gift. If you would like to make a gift in memory of Joe Colcord to complete the renovations to his namesake classroom, please contact Megan Kagel at (206) 685-1378 or mkkagel@uw.edu.

Wenk Lecture Puts Puget Sound Air Quality in the Spotlight

**Thursday, December 3, 4 pm**

*Kane Hall 220, reception in foyer following lecture*

*Please join us for this free public lecture*

**Dennis McLerran**, executive director of the Puget Sound Clean Air Agency, is the featured speaker for a talk titled “Innovation and Collaboration Leading to Cleaner Air in the Puget Sound Region.” McLerran is a board member of the National Association of Clean Air Agencies and a member of the EPA's Clean Air Act Advisory Committee. He participated in the West Coast Governors' Global Warming Initiative and Governor Gregoire's Climate Action Team.

The Edward Wenk Jr. Endowed Lectureship in Technology and Public Policy brings to the University distinguished practitioners in the areas of civil and environment engineering and public policy who engage the context of social, economic, political, and environmental impacts.
Three Alums Return to More Hall with Words of Wisdom for Students

Civil & Environmental Engineering's inaugural Leadership Lecture Seminar Series drew an attentive group of juniors and seniors Spring quarter. CEE alumni Tom Draeger (BSCE '68), George Bye (BSCE '80), and Tom Gibbs (BSCE '54, MSCE '66) returned to More Hall to talk with students about their careers and to share advice on how to be strong leaders in industry.

The series is designed to demonstrate that a CEE degree can be a foundation for success in a wide-variety of industries and careers. From business management to innovative technology and entrepreneurial ventures, industry executives share their stories and convey insights on the skills, attributes, and approaches that can lead to outstanding careers for future graduates.

A dedicated mentor to countless young engineers, Tom Draeger was senior vice president of the Bechtel Group, Inc., and president of Bechtel Construction Operations, Inc., where he was responsible for the functional direction, personnel administration, and operations of Bechtel's global construction activities. He was a 2007 recipient of ASCE's OPAL Lifetime Achievement Award and is head of The Beavers, a heavy construction professional association for the West Coast. He shared with the class his insights on balancing a career with family and reaching out across traditional roles to develop meaningful and loyal relationships with colleagues.

George Bye, founder of Bye Aerospace and Bye Energy, has two decades of experience as an aerospace entrepreneur, manager, and executive. He recognized the market urgency and technology advances in alternative energy with aviation applications and recently formed Bye Energy, Inc. Bye pulled from his military leadership experience to demonstrate to the class the importance of teamwork, active listening, and grace under pressure. Sharing his experiences as an entrepreneur exemplified that an engineering degree can prepare students for a wide variety of career choices.

As a champion of clean water issues, Tom Gibbs served as executive director of Seattle Metro at its infancy and helped finish the cleanup of Lake Washington and adjacent Puget Sound waters, and created what is now called Metro Transit. In the 1970s he founded the Association of Metropolitan Sewerage Agencies (AMSA), helped write parts of the Clean Water Act, and became program director for Milwaukee's Water Pollution Abatement Program. Draeger completed his career at CH2M Hill as executive vice president and director of water practice and continued to serve as a consultant on large water-related projects across the globe. Draeger stressed the importance of demonstrating leadership by giving back to the community. He emphasized that students will need to work with a variety of stakeholders across organizations and that they should be prepared to use their communication, delegation, and leadership skills to be successful in their careers.

Thank you to the outstanding alumni who participated in this lecture series. Sharing their years of experience truly demonstrated to students the meaning of leadership.

Endowed Professorships (from page 1)

hydrology, GIS, and remote sensing.

The Conner and Sylvester families gathered on campus on October 5th for a reception celebrating the professorship installations. The donors and their guests met their recipient professors and spoke to attendees about their philanthropy. CEE faculty and staff joined in to pay tribute to these special alumni and distinguished professors.

Professorships are vital to the academic advancement of the department. These funds help recruit and retain top faculty, who in turn attract bright students, build robust research programs, and spur innovation in the classroom. Professorships provide significant financial support to a faculty member in the area or program specialization of the donor's choice. The income from this type of endowment typically provides additional support for special purposes related to instruction and research. Examples include facilitation of professional seminars, publication of purchases to complement the professor's work, travel for meetings or research, and hiring students to assist the professor in research projects.

We thank the families for their generous support of the department.
Canoe Team Powers Through Challenges to Compete at Nationals

Neither rain nor snow nor a leaking canoe could keep ASCE Concrete Canoe captains Seth Thomas and Kasey Faust from leading their team to nationals this year. It all began with a treacherous, 5-mph drive over the Cascade Mountains, in near-blizzard conditions, while hauling the 300-pound Evergreen and trailer to the regional competition held April 2-4 at Carroll College in Helena, Mont.

"There is always a rivalry with WSU, but this year Idaho’s boat and racing team proved to be our toughest competition at regionals," said team member Melissa Tremayne. The UW team placed first in the races and second in the overall competition, behind the University of Idaho. The team was chosen to represent the Northwest region at nationals based on a ruling from the nationals judges.

The national competition, June 11-13 at the University of Alabama in Tuscaloosa, coincided with UW finals week and graduation festivities, so the canoe had to be shipped to nationals. Upon arrival, the team found it had been damaged during transport. With the help of several other teams, they were able to repair the canoe sufficiently to compete.

With duct tape and plastic bags in place, team Evergreen took to the water with a desire to succeed, placing sixteenth overall and eighth in the oral presentation — "a great achievement for us," said team member Elyse Hanson. The winner was the University of California, Berkeley.

Each year the competition rules and regulations change in an effort to improve the event and ensure that competitors design and build new canoes. This year's changes included adding a “green” element to the canoe, requiring a recycled materials content of at least 25% for the aggregate(s), based on the total amount in the concrete mixture.

"Seeing all the creative ‘green’ work by the teams, both regional and national, shed new light on the different ways to become environmentally friendly and have fun at the same time," said Tremayne.