The Department of
CIVIL ENGINEERING
Newsletter
Winter 2003, Volume 9, No. 1
Civil Engineering • Environmental Engineering • Bioresource and Agricultural Engineering

Department Utilizes Expertise in Water Engineering to Address Drought

The Department of Civil Engineering at Colorado State University is regarded nationally and internationally as one of the premier civil engineering programs in the United States. The recent addition of bioresource and agricultural engineering further strengthens the department's breadth of renowned expertise in civil engineering instruction, research and outreach.

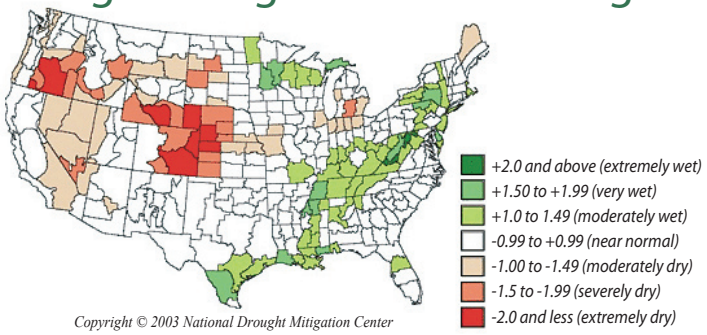
However, from its inception more than 50 years ago, the department has been most widely recognized and respected for its leadership in water resources engineering. Now, as in the past, department faculty are using this expertise to address current needs and serve local, national and international communities.

With Colorado and much of the nation focused on drought, Colorado State's Department of Civil Engineering is conducting a broad range of research to address this pressing issue. Department faculty are utilizing their water expertise to lead drought-related studies that will meet the needs of governments and citizens in Colorado, the nation and the world.

In August, as the Western drought worsened, water supplies diminished leaving local governments, water managers and entire communities uncertain about how to deal with prolonged dry conditions. Civil Engineering faculty responded by establishing DroughtLab in collaboration with the Department of Atmospheric Science and several other departments at CSU and the University of Colorado. According to co-director José Salas, the new collaborative drought analysis and management laboratory redirects resources and establishes new studies that provide information to government leaders, businesses and individuals as they plan for and manage drought events. Department of Civil Engineering faculty participating in the development of DroughtLab includes Drs. Salas, Grigg, Ramírez, Bledsoe, Carlson, Fontane, Durnford, Julien, and Ward.

In addition, The Water Center at Colorado State University, directed by Civil Engineering Professor Robert Ward, addresses multiple aspects of water, drought and related resource issues. The Water Center brings together a wealth of water-related knowledge with expertise at Colorado State. Under Ward's leadership, Center experts are putting forth extra effort to address current challenges and develop solutions to drought and related water supply issues to help reduce vulnerability to drought conditions.

In December, Civil Engineering faculty co-hosted more than 250 scientists, public officials, water managers and media representatives at the inaugural Colorado Drought Conference. Attendees analyzed current water management issues, shared lessons learned in managing the driest year on record and examined options to mitigate negative impacts of drought for 2003 and beyond.



12-month Standardized Percipitation Index through the end of February 2003

Several of the sessions of the AGU Hydrology Days 2003 conference in late March, hosted by the department and organized by professor Jorge Ramírez, focused on drought analyses, problems and solutions.

Individually, José Salas is further addressing drought issues by working with the City of Fort Collins and the Northern Colorado Water Conservancy District to study the severity and risk of droughts of the Poudre River. Neil Grigg is studying the causes and nature of the drought water shortages and going a step further to identify drought and water policy needs for Colorado.

Larry Roesner, professor of civil engineering, is addressing the water shortage by researching and developing grey water systems that will safely and efficiently allow recycled bath, sink and laundry water to be cleaned, stored and used for outdoor irrigation. Along those same lines, Professor Terence Podmore is researching the development of dual water systems for collecting and using nonpotable water supply for landscape irrigation.

These are just a few of the many, many examples of outstanding and dedicated Civil Engineering faculty addressing the state's and nation's current needs by studying drought analysis and characterization, analyzing drought impacts and consequences, and providing valuable information regarding the most effective drought response and management practices.

Although the drought is commanding a considerable amount of time from faculty, existing water research and education duties are not being neglected. In addition, faculty are also addressing other needs of national interest including terrorism and infrastructure security.

According to Department Head Sandra Woods, as Civil Engineering's outstanding teaching and research increasingly gain national recognition, the department will continue to utilize its expertise in civil engineering, bioresource and agricultural engineering, and environmental engineering to focus on issues of current need with the goal of improving lives throughout the world.

Water Web Resources

Colorado Water Resources Research Institute
http://www.cwrri.colostate.edu
http://www.cwrri.colostate.edu/droughtpubs.html

Colorado Climate Center
http://climate.atmos.colostate.edu/

Cooperative Extension Drought and Fire Resources
http://www.ext.colostate.edu/menudrought.html

Colorado State University Water Center
http://www.watercenter.colostate.edu/overview.html

Colorado Water Conservation Board
http://cwcb.state.co.us/

Colorado Water Knowledge
http://waterknowledge.colostate.edu/

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Knowledge to Go Places

Alumni News

An honorary degree will be awarded at Spring Commencement to **Walter Scott**, B.S. 1954 Civil Engineering.

Baum K. Lee, M.S. 1969, Ph.D. 1973 Civil Engineering, received the 2002 Hans Albert Einstein Award for his worldwide reputation and outstanding accomplishments as a practitioner in the field of sedimentation engineering.

Vijay P. Singh, Ph.D. 1974 Civil Engineering, received the 2002 Arid Lands Hydraulic Engineering Award in recognition of his leadership and exceptional research contributions.

A. Ghaheri, M.S. 1978, Ph.D. 1983 Civil Engineering, is the head of the Civil Engineering Department at Iran University of Science and Technology.

Dr. Ahsan Kareem, Ph.D. 1978 Civil Engineering, is the first recipient of the ASCE Jack E. Cermak Medal. Dr. Kareem is currently a professor at the University of Notre Dame.

Carlos Tucci, Ph.D. 1978 Civil Engineering, has been appointed manager of a new Brazil water research fund. Dr. Tucci is a professor at the Institute of Hydraulic Research (IPH) at the Federal University of Rio Grande do Sul, Brazil.

Professor Dr. Mohammed Y. Al-Ani, M.S. 1980 Civil Engineering, has moved to a new position as Dean Assistant for Higher Studies and Research at Al Mustansyria University in Baghdad. He started the Environmental Engineering Department there in 1994 and was the department head.

Ronald L. Elliott, Ph.D. 1981 Agricultural Engineering, was named a Fellow of the American Society of Agricultural Engineers.

José Amundaray, B.S. 1985 Civil Engineering, received his Ph.D. in Civil Engineering with emphasis in Geotechnical Engineering at Purdue University in 1994. He now owns a consulting comapny and teaches at the Universidad Simón Bolívar in Caracas, Venezuela.

William Winter, B.S. 1986 Civil Engineering, is a recruiter for the Los Angeles County Department of Public Works.

Paulo Afonso Silva, M.S. 1989 Civil Engineering, is working at Codevasf, a federal government agency in Brazil dealing with the development of the Sao Francisco river valley.

Professor Mohamed Abdelmotaleb, M.S. 1989, Ph.D. 1993 Civil Engineering, is now the director of the Water Resources Research Institute (WRRI) in Egypt. The WRRI performs studies, designs projects, studies Nile Basin projects, create strategies and policies for sustainable use of water resources and contributes to major national projects.

David Thaemert, B.S. 1989 Agricultural Engineering, has taken a position with the Fort Collins office of Short Elliott Hendrickson, Inc., as a senior water resource engineer and project manager.

Dr. Mohammad H. Makkawi, Ph.D. 1998 Civil Engineering, has started a research project to map groundwater surface by integrating Ground Penetrating Radar (GPR) technique and geostatistical methods. The project is sponsored by the Research Institute of King Fahd University of Petroleum and Minerals in Saudi

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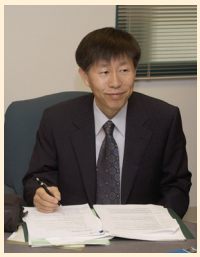
Dr. Seok-Ku Ko, Ph.D. 1989 Civil Engineering

Dr. Seok-Ku Ko and his wife Cho-Ok Im

On July 26, 2002, Dr. Seok-Ku Ko returned to Colorado State University to receive a distinguished alumnus award from the University. Since his graduation from Colorado State in 1989, Seok-Ku Ko has risen through the ranks of the Korea Water Resources Corporation (KOWACO) and was appointed as the President of KOWACO last year. KOWACO is the major water agency in Korea responsible for development and management of Korea's water resources. The organization employs 3,500 people and has an annual budget of $2 billion. President Ko is widely regarded in Korea as an outstanding water resources engineer and as a national leader in the development of the water resources of his country. His accomplishments bring great honor to our Department and the University.



Dr. Ick Hwan Ko

Dr. Ick Hwan Ko, Ph.D. 1997 Civil Engineering

Dr. Ick Hwan Ko speaks of his experience at CSU fondly, mentioning that he continues to stay in contact with many acquaintances from Colorado State University. Dr. Ko, with assistance from his civil engineering faculty advisor Darrell Fontane, was able to tailor his CSU program to the specific situation in Korea. Upon graduation, he was able to continue his research in Korea and spent eighteen months in Vietnam on a joint project with the Korea Water Resources Corporation (KOWACO) and the Vietnamese government. Since his return to Korea, he has risen through the ranks of KOWACO and is currently Director of the Water Resources Research Institute.

Student News

Garey Fox, Ph.D. 2003 Civil Engineering, has accepted a faculty position at the University of Mississippi in environmental/water resources engineering.

Kate Rudman is assisting the department with several research projects, and as part of an NSF-sponsored project, is currently surveying civil engineers about their needs for education in information technology.

Clint Wood, a senior in Civil Engineering, has received two awards in the past year: The Nyal L. Adams Scholarship and the Computer Science, Engineering, and Mathematics Scholarship. Clint is vice-president of CSU's Chi Epsilon civil engineering honor society.

Fall 2002 Commencement **Top Row (left to right):** *Theron Broadfoot, Charlie McLean, Simon Stachnik, Johannes Gessler, Larry Roesner.* **3rd Row:** *Ken Overvold, Pat Boyer-Roberts, Nate Erickson, Tom Gilman, Gared Grube, Neil Grigg, Richard Gutkowski.* **2nd Row:** *Jeff Carlson, Tim Tuttle, Jenn Meints, Darrell Redman, Brett Sailsbery, Pierre Julien.* **Front Row:** *Jill Holladay, Caleb Thorne, Kevin O'Shea, Brittany Albrandt, Miranda Larsen, Amber Appel, Dana Buchwald, Mark McWilliams, Laurie Howard, Sandy Woods.*

Faculty News

A paper, "Logistic Analysis of Channel Pattern Thresholds: Meandering, Braiding and Incising," published by **Dr. Brian Bledsoe** and **Dr. Chester Watson** was one of one of the top 10 downloaded papers published in *Geomorphology* last year. The number of downloads for the top 10 papers ranged from 468 to 1082.

In the next few months **Brian Bledsoe** and his students will be completing a project funded by the US Army Corps of Engineers and the US Environmental Protection Agency that provides modeling tools and a management framework for mitigating stream instability and habitat loss in urbanizing watersheds. Several peer-reviewed journal articles have already resulted from this work and it is anticipated that the final report will be widely distributed among urban watershed managers and practicing stormwater professionals.

Brian Bledsoe

Dr. Luis Garcia was named Associate Director of the Colorado Agricultural Experiment Station last spring. He continues his work as Director of the Integrated Decision Support Group (IDS) at CSU. One of the projects that Dr. Garcia and the IDS Group have been working on is the development of the South Platte Mapping and Analysis Program (SPMAP), a decision support system (DSS) that consists of a GIS component, a consumptive use model, and a stream depletion model for determining augmentation requirements. SPMAP is a user-centered DSS: the users of the SPMAP tools have directed their development and implementation. Over the last six years, this project has been funded by water users in the lower South Platte River, the Division 1 Office of the State Engineer, the Colorado Water Resources Research Institute, the Colorado Agricultural Experiment Station and Cooperative Extension. The SPMAP tools have been used widely in the South Platte Basin and have proven to be very valuable during the recent drought.

Luis Garcia

After 37 years as a faculty member in civil engineering and 13 years as Associate Dean, **Dr. Johannes Gessler** will retire at the end of this semester. A scholarship fund has been established by Johannes and his wife to support COE students studying abroad. The scholarship will provide students with funds for living expenses, airfare, etc. To honor Dr. Gessler, please consider making a gift to this fund. For information, call the Engineering Development Office at 970-491-7028.

Johannes Gessler

David Gilbert was a speaker at the "Partners in Environmental Technology Conference and Symposium" held in Washington D.C., December 2002. Dr. Gilbert also completed a fall installation of the first electrolytic permeable reactive barrier for treatment of groundwater contaminated with TCE (*photo at right*). His new projects for Spring 2003 include laboratory investigation into electrolytic degradation of perchlorate and reaction mechanisms for electrolytic degradation of aqueous phase explosives.

David Gilbert

Professor Neil Grigg hosted an international workshop on Integrity of Water Distribution Systems on April 3-4, 2003. Neil Grigg is also conducting an AWWARF-sponsored project on integrity of water distribution systems, and will be making recommendations on a national research agenda for condition assessment, prioritization for rehabilitation, and methods for pipe renewal.

Neil Grigg

Professors Neil Grigg, **Marvin Criswell**, **Darrell Fontane**, and **Tom Siller** are hosting an NSF-sponsored workshop on Information Technology in the Civil Engineering Curriculum on April 11, 2003.

Professor Richard Gutkowski is the principal investigator on a project entitled "Performance Testing of Roadway Safety and Security Barriers" funded by the U.S. Department of Transportation (*photo at right*). Recent interest in portable barriers has heightened with concern about terrorists attacks. The Fort Collins Army Reserve began using one of the portable barrier systems as a safety shield for its facilities. The objective of the project is to develop a test site for preliminary examination of impact performance by federal guidelines in an affordable way so as to justify manufacturers considering expensive federal crash tests. Although envisioned as a preliminary test, the proposed test method might itself prove to be sufficient for that need.

Professor **Paul R. Heyliger** recently started a study funded by the National Science Foundation entitled "The Mechanics of Inorganic Nanotubes from Molecules to Materials." Working in collaboration with Dr. Anthony Rappe in the Department of Chemistry at CSU, these researchers and their students are modeling these promising components over a range of scales in hopes of developing stronger, stiffer, and more reliable materials.

Paul Heyliger

Richard Gutkowski

Dr. Pierre Julien was awarded the Borland Professorship in Hydraulics. In addition, he currently serves as editor of the ASCE Journal of Hydraulic Engineering.

Pierre Julien

As if we didn't have enough problems due to lack of water, many Colorado Front Range cities are facing rather significant declines in the quality of their drinking water supplies due to nutrient inputs to their reservoirs. **Jim Loftis**, with colleagues Brett Johnson in Fisheries and Wildlife Biology and Laurel Saito at University of Nevada Reno, is putting the finishing touches on a project called "Eutrophication of Reservoirs on the Colorado Front Range." This project, jointly funded by Front Range water suppliers and the Colorado Water Resources Research Institute, is a first attempt to identify similarities among reservoirs that may lead to a regional approach to dealing with the problem.

Jim Loftis

Dr. David E. Neff was selected to be on a National Research Council steering committee titled "Tools for Tracking Chemical/ Biological/ Nuclear Releases in the Atmosphere: Implications for Homeland Security." The National Research Council, a branch of the National Academies (Science, Engineering and Medicine), brings together experts to serve as volunteers to address critical national issues and give unbiased advice to the federal government and public. During 2002, David attended three committee workshops at Woods Hole, MA and Washington D.C. where experts in the field of transport and dispersion modeling made presentations to the committee and

David Neff

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Departmental Donors

The gifts listed below represent more than $4,000,000 in funds from over 450 donors during 2002. (I apologize if we have missed anyone.) The list does not include gifts made to the College of Engineering, but only those directed to the Department of Civil Engineering. Each one made a difference to a civil engineering, environmental engineering, bioresource, or agricultural engineering student.

These gifts have an incredible impact on our department. They fund scholarships, equipment, faculty positions, student design projects, and a wide variety of activities. We thank you for thinking of us and for your generosity.

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St. Andrews Episcopal Church
Tipton & Kalmbach, Inc.
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Gifts On Behalf of Others

Cathy A. Bittinger
Ray H. Center
J. Alan and Shirley A. Dale
William B. Danly
Barry J. Gutwein
Charles L. Hatch
William M. Henghold
Jill Holladay
Bryan T., and Elizabeth S. Law
Jeong S. Liu
Warren H. Mesloh
John D. Nelson
Ronald T. Rozak
Elise A., and John M. Shafer
Clare and Hsieh W. Shen
Steven E. Shultz
Kyle C. West
Brian D. Westfall
J. Brian Zick

Alumni News *continued*

Arabia and will be completed by mid July 2003.

Dr. Oli G. Sveinsson, M.S. 1998, Ph.D. 2002 Civil Engineering, is currently post-doctoral fellow at the International Research Institute of Columbia University where he is engaged in research on long range forecasting of hydroclimatic processes.

Kyle Gustafson, B.S. 1999 Civil Engineering, has been focusing on structural design of facilities and bridges with his position at URS in Colorado Springs. In the fall they completed work on a large pumpstation in Las Vegas, Nevada and on a highway extension involving four bridges in Colorado Springs.

During the last two years, **Robert J. Kodoatie**, Ph.D. 2000 Civil Engineering, has written four books. The titles are *Applied Hydraulics – Open Channel Flow and Pipe Flow*; *Floods – Some Causes and Methods in Environmental Perspectives*; *Water Resources Management in the Regional Autonomy*; *Infrastructure of Regency/City – Management and Engineering*.

Michael Singleton, B.S. 2001 Civil Engineering, is working in military construction for the US Navy. He was the project manager for the National Innovative Technology Mission assurance Center and for the Theatre Warfare Integration Center.

Jason Smith, B.S. 2001 Environmental Engineering, is working for the USDA-NRCS in California.

David Pizzi, M.S. 2002 Civil Engineering, is employed by Tetra Tech in Research Triangle Park, NC where he is working on urban stormwater, stream restoration, and water quality issues.

Jerson Kelman Receives 2003 World Water Prize

The 2003 inaugural edition of the Hassan II Great World Water Prize has been presented to Jerson Kelman, Ph.D. 1977 Civil Engineering. Dr. Kelman is the director and president of the Brazilian National Water Agency (ANA) and is known for his contribution to the river basin restoration program to develop policies and institutional arrangements in the field of irrigation, hydro-power, water and sanitation. Dr. Kelman's advisor at Colorado State was Professor Vujica Yevjevich.

This is the second consecutive year that a Civil Engineering alumni from Colorado State University has been presented with a prestigious water prize. The 2002 Stockholm Water Prize was given to Ignacio Rodriguez-Iturbe, Ph.D. 1967 Civil Engineering.

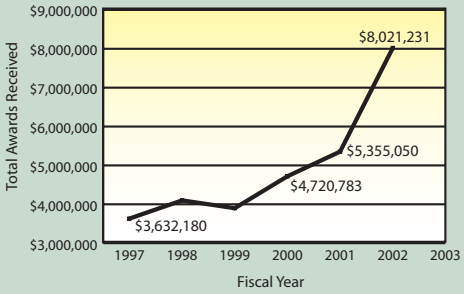
Mark Your Calendars

Civil Engineering Alumni Picnic
Saturday, August 16, 11:00 am - 2:00 pm
Fort Collins City Park

Please bring a dish to share. We will provide hamburgers, buns, and drinks.

Letter from the Department Head – Focus on Research

I've been at Colorado State for two years and with each year that passes, my respect for the faculty and department has grown. When I came to CSU, I knew that the Department of Civil Engineering was among the top-ranked departments in the nation for graduate and undergraduate education; I was aware of our historical strengths in wind engineering and in water resources; and I knew that the department was a leader in undergraduate education.



Strong departments continuously strive to improve academic, research, and outreach programs. They invest in new programs and hire the best new faculty. We are fortunate at Colorado State to be able to build on the legacy created by our alumni, faculty, and emeritus faculty. In the last few years, we have made excellent new hires and made investments in new programs that will allow us to build on this legacy.

In this newsletter, I'd like to focus on one example of the department's commitment to excellence. Clearly, research and the generation of new knowledge are critical to providing an excellent education for graduate students. However, many do not realize the impact that a strong research program has on undergraduate students. For example, many undergraduates participate in research projects. Without a strong research program, we would likely have one-third fewer faculty members and its course and program offerings would be less varied. But more importantly, the faculty who are actively conducting research bring new knowledge to their classes—creating cutting-edge programs for our students.

While contracts and grants are only one measure of research and scholarship activity, new awards (figure at left) have increased dramatically in recent years. Clearly, we are benefiting from the merger of the civil and bioresource engineering faculty, but much of this increase is due to faculty leadership and participation in interdisciplinary research initiatives. Faculty are developing research projects with other faculty in the department, throughout Colorado State University, and with faculty at institutions throughout the U.S. and the world.

I believe that our new graduate students in 2003 will be among the best classes in recent years. Because of this increase in research, we were able to double the number of graduate assistantships that we offered this year. Although we have always had a strong graduate program, this increase in research activity will allow us to recruit even more and better graduate students.

I hope that you will enjoy reading this newsletter and that you will continue to keep in touch with the department. Whether you are a civil, bioresource, agricultural or environmental engineer, please write us at civil@engr.colostate.edu and let us know how you are doing.

Sandra Woods

Sandra Woods, Professor and Head, Department of Civil Engineering

Faculty News *continued*

various federal officials involved in Homeland security. The committee is writing a report on the current status and future needs of event emergency response, observational data requirements and transport and dispersion modeling issues. The report will be in the public domain. More information is posted at http://www7.nationalacademies.org/basc/.

David Neff also has been working with the solar power industry to design wind resistant solar power arrays for rooftop installations. Both computational fluids dynamics and wind tunnel modeling have been utilized to predict product failure wind speeds.

Assistant Professor Amy Pruden has received a *Journal of Environmental Engineering* Editor's Prize, 2002. The prize is awarded to authors receiving two or greater above average reviews on papers accepted for publication. The titles of Amy's two papers are "Effect of BTEX on the Degradation of MTBE and TBA by a Mixed Bacterial Consortium" and "Biodegradation Kinetics of MTBE in Laboratory Batch and Continuous Flow Reactors." Both papers appeared in the Special MTBE Issue, September 2002.


Amy Pruden

Professor José D. Salas (Pepé) is spending his sabbatical leave at the ETH, Zurich where he is conducting research on subjects related to Hydrology and Water Resources. This year Pepé was awarded the Borland Professorship in Hydrology from the Whitney Borland endowment. In addition, the 2003 AGU Hydrology Days has been dedicated to honor his contributions to hydrologic science in the areas of stochastic modeling and simulation of hydrologic processes, flood prediction and forecasting, and drought analysis.


José Salas

José Salas has also been continuing his research on the characterization of extreme droughts using stochastic approaches, long range forecasting of hydrologic processes, modeling of short term rainfall processes, and risk and uncertainty analysis of extreme hydrologic events. The research is conducted in collaboration with NOAA/GLERL, USBR, and Hydro-Quebec. In 2002 Salas was the leading CSU Faculty behind developing the Drought Analysis and Management Laboratory (DroughtLab).

The 5-year, $4M Rocky Mountain Regional Hazardous Substance Research Center focused on remediation of mine waste sites and funded by the U. S. EPA is in its second year of activity. The Center currently is funding 6 research projects as well as several outreach activities. **Professor Charles Shackelford** is the Director of the Center. Get more information at: www.engr.colostate.edu/hsrc/.


Charles Shackelford

Professor Charles Shackelford has been invited to give the keynote address for the 16th International Conference on Soil Mechanics and Geotechnical Engineering to be held September 2005 at Osaka, Japan. The conference is held every four years for researchers and engineers from all over the world on the latest developments in geotechnical engineering fields.

Emeritus Centennial Professor Maurice Albertson was installed as an honorary member of the ASCE at the 2002 Honorary Members' Luncheon. He was honored for his global leadership spanning six decades in water resources engineering, international development and higher education.

Emeritus Professor Norman A. Evans is working with local citizens on a history project to renew the old Fort Collins water pump house.

Emeritus Professor Everett Richardson, **Emeritus Professor Daryl Simons** and their colleagues at Ayres Associates in Fort Collins completed a new expanded edition of *River Engineering for Highway Encroachments: Highways in the River Environment*, a widely disseminated training and reference manual published by the Federal Highway Administration.

Alumni: We want to hear your news!

E-mail us at civil@engr.colostate.edu with your recent promotions, honors, publications, research, speaking engagements, and photos, so we can keep your classmates informed about important changes in your life.