

NIST AWARDS THE DEPARTMENT

a \$20 Million Center for Excellence

On Feb. 19, 2015, the National Institute of Standards and Technology awarded the \$20 million Center for Excellence for Risk-Based Community Resilience Planning to Colorado State University.

“The tools developed by the center will help to further advance the important goal of disaster resilience from ambitious concept to cost-effective solutions that communities can implement over time,” said NIST Acting Director Willie May during the Feb. 19 announcement in San Diego, Calif.

The Center for Excellence is co-directed by Dr. John W. van de Lindt, George T. Abell Distinguished Professor in Infrastructure, and Dr. Bruce Ellingwood, professor and member of the National Academy of Engineering.

The Center for Excellence is headquartered within the Department of Civil and Environmental Engineering with Professors Hussam Mahmoud and Suren Chen collaborating, along with faculty from CSU’s economics and sociology departments. Collaborators across the U.S. include nine additional universities and the National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign. Partner universities include Cal Poly Pomona, the University of Illinois, the University of Oklahoma, Oregon State University, Rice University, the University of South Alabama, Texas A&M University, Texas A&M-Kingsville, and the University of Washington. Overall, the Center for Excellence is composed of more



Kickoff meeting on April 10, 2015, at the Hilton Fort Collins with the proposal team

than 90 people including faculty, postdoctoral fellows, graduate students, and NIST collaborators.

Community resilience is the ability to prepare for and recover from physical and social disruptions in a timely manner. According to van de Lindt, “The overall goal of the Center for Excellence is to develop the science behind community resilience so that communities can identify the key attributes needed to make them resilient to hazards; it is first a research tool and then will become more mainstream for communities to organize, plan, and become disaster resilient.” This refers to Thrust 1 within the Center for Excellence’s three major thrusts.

Thrust 1 of the Center’s research program is developing the multidisciplinary computational environment with fully integrated supporting databases, known as NIST-CORE (NIST-Community Resilience Modeling Environment), that will enable the factors (and their interrelationships) that determine community resilience to be fully understood. Thrust 2 will produce a standardized data ontology, a robust data architecture, and effective data management tools to support the computational environment developed in Thrust 1 and to permit databases

from stakeholders representing multiple domains of engineering and social sciences to be integrated seamlessly in the decision process. Finally, Thrust 3 will validate the resilience data architecture through a series of testbeds that stress the process of data collection, its integration into the computational modeling environment, and the decision algorithms.

Ultimately, NIST-CORE will be able to answer detailed questions on the lingering effects of natural disasters on communities: job loss and population dislocation, health and well-being of residents, and impacts across the economic spectrum, thereby measuring community resilience and disaster recovery via a suite of resilience metrics. Noted Ellingwood, “Center research products will enable stakeholders to develop strategies for enhancing community resilience through pre-event planning and efficient post-event recovery, thus minimizing the likelihood that such events will cause irreparable harm to the community.”

For more information and to receive the NIST Center for Excellence quarterly newsletter, please visit the Web page at: resilience.colostate.edu or e-mail the center coordinator, Jenny Stein, at jenny.stein@colostate.edu.



CHARLES D. SHACKELFORD

DEAR ALUMNI AND FRIENDS:

Welcome to the latest edition of our department's newsletter. The department once again enjoyed considerable success over the past year.

AS OF THE FALL 2015 CENSUS, OUR UNDERGRADUATE PROGRAM HAD 452 STUDENTS, WITH 319 MAJORING IN CIVIL ENGINEERING AND 133 MAJORING IN ENVIRONMENTAL ENGINEERING. BASED ON PRELIMINARY DATA, WE ARE ANTICIPATING SIGNIFICANT GROWTH WITH RESPECT TO OUR FRESHMAN CLASS IN FALL 2016.

Our graduate programs also remain strong, with 282 graduate students, including 94 Ph.D. students, which is the highest number of Ph.D. students in the College and an increase by 10 over the previous year.

Although the overall number of faculty making up the department is approximately the same as in the recent past, the department is experiencing a rebirth in the composition of our faculty, with three new faculty joining the department this past fall (Page 3), and four new assistant professors set to join the department next academic year (2016-2017). These new faculty bring renewed energy and varied expertise that complements and enhances the vitality, capabilities, and reputation of the department.

On the research front, the department once again exceeded more than \$10 million in research expenditures over this past year, and faculty and research staff of the department continue to perform leading-edge research (Page 4) and to procure significant research funding, as evidenced by the new \$20 million NIST Center for Excellence for Risk-Based Community Resilience Planning described in this newsletter (Page 1). This type of funding not only enhances the research activity within the department, but also brings prestige to our department.

Finally, as documented herein (Pages 6-13), our alumni continue to be successful in their careers, making significant contributions in their professional activities. As always, we appreciate all of your support, and encourage you to stay connected with our department.

ON A PERSONAL NOTE



Big brother Ian and dad, Peter, enjoy newby Adam Dean. Peter Nelson and wife, Laurie, were blessed with the arrival of Adam in June.



Sarah, undergraduate adviser, and Hussam Mahmoud welcomed little Dannah Mahmoud to our world in August.



Charles Shackelford's D-league hockey team, The Stones, won its championship hockey game May 3 with a score of 4-3 in two overtimes. They finished the season 20-2-2, and won their last 19 games in a row. The photo above was taken following the final game.



Rebecca Atadero and Ryan Bailey played hooky one day during finals week in May to help chaperone students to the Denver Zoo on a field trip sponsored by their children's elementary school.

Pictured are: Front row: Owen Atadero, Jane Bailey, Wyatt Elliott, and Carson Gardner. Back row: Rebecca Atadero and Ryan Bailey.

THE DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING AT COLORADO STATE UNIVERSITY WELCOMED NEW FACULTY IN FALL 2015.



DR. ROB ETTEMA

Dr. Rob Ettema joined our faculty as the Harold Short Endowed Chair to further augment the outstanding water and infrastructure program at Colorado State University. Ettema received his undergraduate and graduate education at Auckland University, New Zealand. He has held faculty and administrative positions at the University

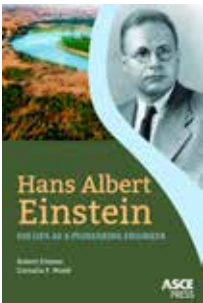
of Iowa and the University of Wyoming prior to joining Colorado State University. His main research and expertise interests involve a range of aspects regarding water engineering, including: hydraulic structures, river mechanics, and cold-regions considerations. He has served as editor of the American Society of Civil Engineers' *Journal of Hydraulic Engineering* and associate editor of ASCE's *Cold Regions Engineering Journal*, and has consulted and written extensively on numerous hydraulics and cold-regions problems. Additionally, he is a Fellow of the Institute of Professional Engineers New Zealand and ASCE.



DR. JOSEPH SCALIA

Dr. Joseph Scalia also joined our faculty this fall. Scalia specializes in geotechnical and geoenvironmental engineering, with a focus on environmental containment systems and the development of innovative barrier systems to protect human health and the environment. These barriers include systems intended to minimize risk resulting from

municipal, mining, energy-production, and hazardous wastes. Scalia has performed research on the use of bentonite clay in hydraulic barriers, development of novel bentonite-polymer barrier materials for containment of extreme wastes, performance of final cover systems, and the hydraulic and unsaturated properties of soils. Scalia earned his B.S. in civil and environmental engineering from Bucknell University in 2007, and M.S. and Ph.D. in geological engineering from the University of Wisconsin-Madison in 2009 and 2012. Prior to joining CSU, he was a senior associate at Exponent in the Environmental and Earth Sciences Practice in Bellevue, Wash., and Natick, Mass. At Exponent, Scalia specialized in the evaluation of the extent, transport, and fate of contamination in saturated and unsaturated soils.



ON ANOTHER NOTE, THE BOOK *HANS ALBERT EINSTEIN: HIS LIFE AS A PIONEERING ENGINEER* BY ETTEMA AND CORNELIA F. MUTEL HAS RECEIVED RAVE REVIEWS.



DR. DANIEL BAKER

Dr. Daniel Baker joined the Department of Civil and Environmental Engineering faculty as a professor of practice this year after serving as a research scientist and instructor in our department from 2012-2015. He had previously completed a postdoctoral fellowship at Johns Hopkins University in Baltimore, Md., and completed his Ph.D.

here at CSU in July 2009. Baker also earned his P.E. in the state of Colorado in 2015. Baker still finds time outside of teaching to research the development of holistic tools to enable better decision-making for and design of stream and river systems. Additionally, he is the co-chair of the Campus Bike Advisory Committee.

This biography, published by ASCE Press in 2014, describes the work of Hans Albert Einstein and his search to understand and unravel the complexities of rivers. The son of Albert Einstein, Hans Albert developed theoretical insights and practical methods that helped lay groundwork for our current understanding of how flowing water transports sediment. The book is a chronological walk through Hans Albert's life and his contributions to our understanding of river behavior.

JOSÉ L. CHÁVEZ RESEARCH

Using Unmanned Aerial Remote Sensing of ET System

A small unmanned aerial vehicle with multispectral remote sensing sensors mounted on the aerial platform is used to collect very high spatial resolution multispectral RS data. The CSU Tempest is a fixed-wing commercially available small UAV. The UAV is operated by an autonomous flight control from launch to recovery. The CSU Tempest UAV is capable of conducting RS missions with an 11-pound payload. Besides the AFL, a manual radio frequency control is available with the system. The CSU Tempest UAV was initially integrated with five sensors designed to collect data over the blue, green, red, near infrared, mid infrared, and thermal wavelengths of the electromagnetic spectrum.

The sensors are controlled through the Tempest autopilot which also collects GPS data.

Remote sensing data from the UAV were used in five ET algorithms: a) a two-source energy balance model, b) a surface aerodynamic temperature

energy balance model, c) a crop water stress index model, d) a reflectance-based NDVI or Normalized Difference Vegetation Index adjusted crop coefficient model, and e) a reflectance-based fractional vegetation cover adjusted crop coefficient model.

RESULTING ACTUAL CROP ET AND SOIL WATER DEFICIT VALUES WERE EVALUATED WITH ET DERIVED FROM A SOIL WATER BALANCE APPROACH.

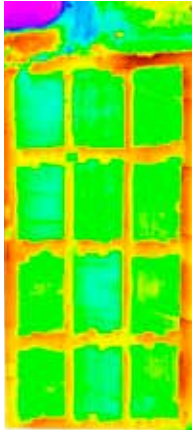
For the SWB, soil water content sensors/instrument (i.e., neutron probe) was used along with rainfall and irrigation amounts.

To the right are examples of the imagery data results.



1

FLIR Tau 2 thermal image acquired on 13 Aug. 2015 at 11:30 a.m. MDT

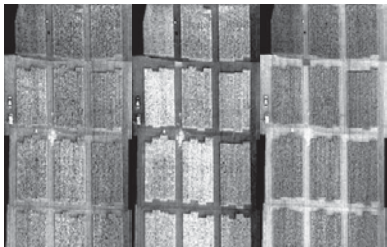


The surface temperatures obtained from the thermal imagery ranged from 14 to 36 °C. The thermal camera spatial resolution was 11.7 cm per pixel for a flight altitude of 121 m AGL.

The individual shortwave bands, captured with the Tetracam, were combined (stack, NIR first, followed by red and by green bands, in that order) after rectification and calibration to produce a false color 3-band imagery (Figure 2). In the 3-band image (right), the green color of leaves are shown as red, and it is evident from the reflectance image that the four plots on the east side of field 1070 had less red color, which meant less biomass or leaves. This was expected for the drought irrigation treatment located on that side of the field. Therefore, the Tetracam camera was able to capture appropriately the reflectance of the different irrigation treatments.

2

From left to right: green, NIR, red bands, and a resulting 3-band stack false color image

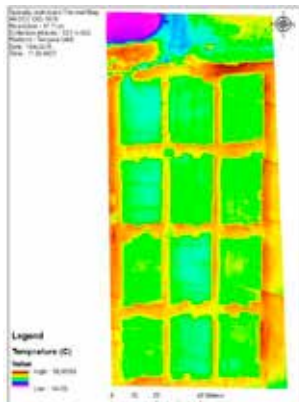


Data acquired on 13 Aug. 2015 over field 1070 at the Agricultural Research, Development, and Education Center.

After obtaining field surface reflectance and temperature imagery and applying the different RS of crop evapotranspiration ET algorithms. Example of ET map in Figure 3.

3

Corn field evapotranspiration map



FACULTY EMERITI



During 2015, Marvin Criswell attended the spring American Concrete Institute Convention in Kansas City and the fall ACI Convention in Denver. Criswell continues to participate on several technical committees and attended and presented a paper

(with Susan Balogh, his last Ph.D. student) at the ASCE Structural Congress held in Portland, Ore., in April. He also participated in the ASCE Geotechnical & Structural Engineering Congress held February 2016 in Phoenix, and plans to attend the American Society for Engineering Education national convention being held in New Orleans in June 2016, along with the Fall 2016 ACI Convention in Philadelphia. When not working, Criswell is enjoying his retirement with travels to visit family across the U.S. and also touring in Europe.



Bob Meroney keeps busy every year with presenting various lectures. 2015 was a moderate year with nine public presentations on a variety of eclectic subjects: codes of conduct, Indian myths, tombstones, corporate logos, earthquakes,

black frontiersmen, scholarships, and atomic bombs. He spoke to Rotary four times, Seratoma, Culture Club, Senior Center, Westerners, and Osher/SSS venues. This was also the 16th year that Meroney chaired the Rotary Scholarship Award committee for which he received the Max Getts 4-Way Test Award from the Fort Collins Rotary Club. To date, he has assisted with more than 160 scholarship awards. Meroney and his wife, Joan, also sponsor an engineering student scholarship at Colorado State University yearly. In addition, Meroney did some CFD consulting, predicting the behavior of stacked tray grit removers for water treatment plants; participated in an NSF review panel on hazards research; and wrote an invited paper for the *Journal of Buildings and Environment*.



Jose Salas continues to be productive in writing and received the prestigious ASCE Norman Medal presented in New York at the ASCE Annual Convention in October. In addition, Salas was awarded Best Technical Paper in the *Journal of Hydrologic Engineering* presented at Austin, Texas.



JERSON KELMAN

Jerson Kelman, Ph.D., civil, '76, took over as president of the company, Sabesp, which is responsible for supplying the city of Sao Paolo with water, a system for more than 20 million people that is now in dire drought conditions. Huge challenges face the company, but Kelman has

hopes of increasing the storage of water through various means, including rerouting small streams, raising water usage fees, and voluntary decreasing of water usage by the people of Sao Paolo.



STEPHEN SMITH

Stephen Smith, M.S., ag, '75; Ph.D., '11, and Donald Sandborn were awarded patent number 9,202,252 by the USPTO. The basis of the patent was Smith's dissertation titled, "Strategies for Limited and Deficit Irrigation to Maximize On-Farm Profit Potential in Colorado's South Platte Basin."

THE PATENT IS FOR A SOFTWARE SYSTEM THAT ENCOURAGES WATER CONSERVATION BY ALLOWING THOSE WHO OWN WATER RIGHTS TO DETERMINE THE FEASIBILITY OF CHANGED FARMING PRACTICES INTENDED TO MAXIMIZE NET RETURNS AND PROFITABILITY OF THEIR OVERALL FARMING OPERATIONS.

Currently, Smith is working as a consulting engineer, head of the U.S. delegation to International Standards Organization task committee TC23/SC18 (Irrigation and Drainage), and vegetable farming with his daughter in Larimer County.



THOMAS TROUT

Thomas Trout, M.S., ag, '75; Ph.D., ag, '79, a member of the CEE Advisory Board, was selected by the ASABE M-111 Gold Medal Award Committee to receive the 2015 John Deere Gold Medal Award. Established in 1937, the John Deere Gold Medal Award recognizes

"Distinguished Achievement in the Application of Science and Art to the Soil," and is sponsored by Deere & Company.



TISSA ILLANGASEKARE

On June 29, 2015, the American Geophysical Union announced that Tissa Illangasekare, Ph.D., civil, '78, received the 2015 Langbein Lecture award. The Walter B. Langbein Lecture is the named lecture of the Hydrology Section, and is one of the AGU Bowie Lectures (honors.agu.org).

It is presented once each year and is awarded "for lifetime contributions to the basic science of hydrology and/or unselfish service promoting cooperation in hydrologic research. Additional considerations may be the candidate's renown as a lecturer and/or as an educator."



During a ceremony in May 2015, **Kent Rominger**, B.S., civil, '78, a space shuttle commander, was inducted by the Astronaut Hall of Fame at the Kennedy Space Center in Florida. The other astronauts also recognized were John Grunsfeld, Rhea Seddon, and Steven Lindsey. The four astronauts, who are the 14th class of shuttle veterans to be added to the hall, brought the total number of members to 91. Combined, Grunsfeld, Lindsey, Rominger, and Seddon flew onboard 18 shuttle missions between 1985 and 2011.



MOHAMMED AL-ANI

Mohammed Al-Ani, B.S., civil, '80, reports he went back to Al-Mustansiriya University in 2011 as university of technology vice president for higher studies and research until May 2014, when he retired at age 65. In September 2014, he started teaching

in a nongovernmental college, Al-Mustaqbal (The Future) college, 90 km south Baghdad. He taught a fluid mechanics course for two days a week. The rest of the week, he continued his one- to two-day engineering consultancy for some wastewater treatment plant projects, and other days relaxing as “retired man!” Then, in September 2015, he began teaching in the same college, two days a week, courses in fluid mechanics and sanitary engineering. Al-Ani had surgery in October 2015, and he is currently at home working at on Iraqi code for sewerage networks and wastewater treatment plants.



LEIGHTON COCHRAN



RUSS DERICKSON

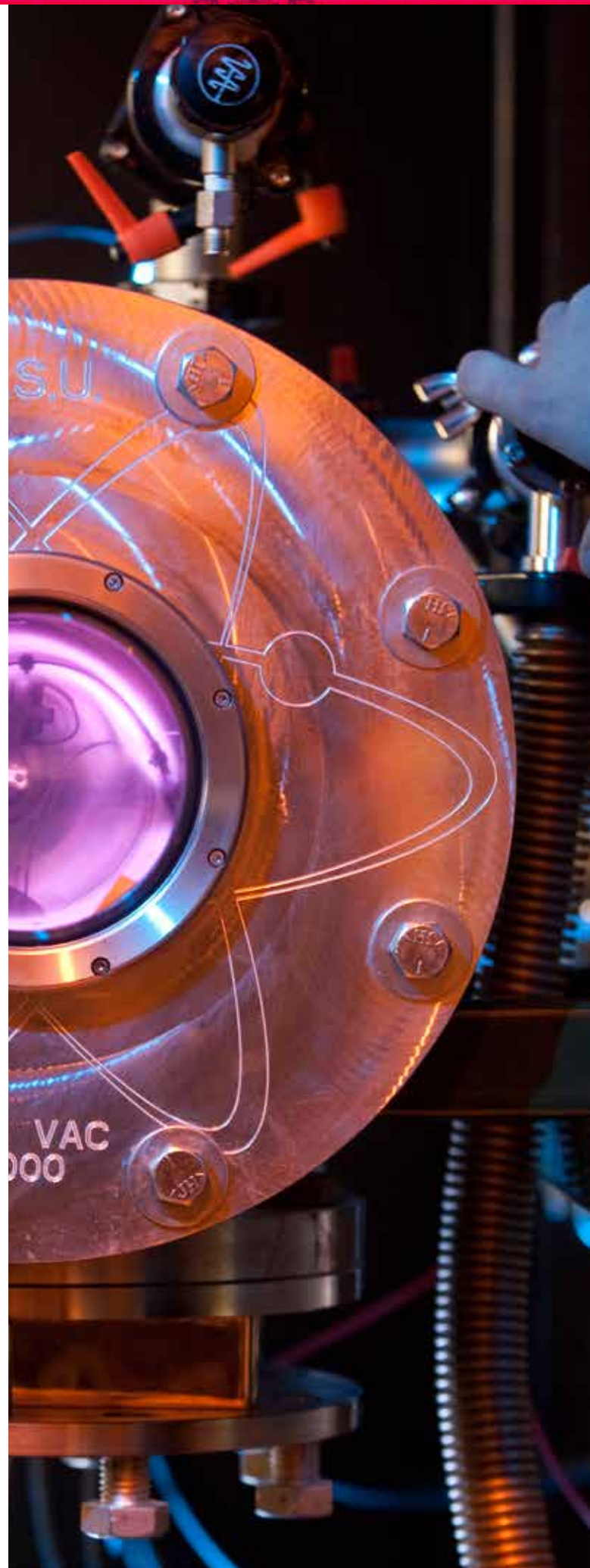
Leighton Cochran, M.S., civil, '86; Ph.D., civil, '92, and Russ Derickson, M.S., civil, '86; Ph.D., civil, '92, were recognized by the American Association for Wind Engineering for their seminal paper titled “A Physical Modeler’s View of Computational Wind Engineering,” as the Best Journal Paper of the year published in the *International Journal of Wind Engineering and Industrial Aerodynamics*.



PAUL FISCHER

Paul Fischer, B.S., civil, '88, president of the Regional Office Group of Burns & McDonnell was appointed to the board of directors. Fischer began with the company in 1988 and was vice president and general manager of the Denver office from 2001 to 2008. He then moved to Kansas City to

be the president of the Regional Office Group.



**JOHN CLARK**

John Clark, Ph.D., civil, '92, and longtime CEE advisory board member, started a love affair with cycling the year of his graduation. Retiring from 40 years of engineering in 2003, he has biked in Croatia, Spain, France, Chile/Argentina, and the United States. He now lives in Boulder with his wife, Sherry.

**ANDY PADDOCK**

Andy pictured with wife, Heather, B.S. civil, '99, son, Andrew, and daughter, Sydney

Andy Paddock, B.S., civil, '99, worked for legacy URS since 2007. He managed the structural engineering group in Colorado Springs, working on federal and municipal vertical structures (buildings), then relocated to Fort Collins in 2014. He currently works part time for AECOM as a senior structural engineer. In addition to this position, Paddock has been involved with providing pro-bono structural engineering

as well as short teaching assignments for Master of Architecture students at the Arkansas University and University of Colorado schools of architecture. In addition to consulting, he has assisted with each school's design-build program, providing hands-on construction experience as well as teaching applied structures to the students, helping them connect the dots from idea conception to design through construction.

Heather (Garman) Paddock, B.S., civil, '99, has been working as a transportation engineer, and after the 2013 floods, she accepted a role with CDOT as their flood recovery manager.

**EMMA AKMALAH**

Emma Akmalah, Ph.D., civil, '10, was appointed as vice dean for academic and student affairs at the Faculty of Civil Engineering and Planning at National Institute of Technology, Bandung, Indonesia, in November 2012. In this position, she is responsible for administrative oversight of the education and student programs.

Major components of these programs include: academic learning support; curriculum development, implementation, and evaluation; study program accreditation; university policies and student conduct code development and enforcement; and promoting students' academic success, development of soft skills, and co-curricular programs.

**JENNIFER REGEL**

Photo courtesy of the United States Army

Jennifer Regel, B.S., civil, '04, a U.S. Army Corps of Engineers Europe District project engineer, is working as the site manager/project engineer in Germany for a new \$100 million DoDDS school building project. She is the only American on the school project site on a daily basis. Regel manages the field engineering operations during construction of this building.

SHE WORKS WITH THE GERMAN GOVERNMENT, GERMAN CONTRACTORS, GERMAN AES, THE U.S. ARMY GARRISON, DEPARTMENT OF DEFENSE SCHOOLS, AND OTHER LOCAL AND NATIONAL AGENCIES.

In March, she spoke with an Army public affairs officer for Engineering in Europe in honor of Women's History Month to discuss her educational background, work experience, and achievements, to encourage girls and young women to explore careers in science, technology, engineering, and math. The article was posted in several military publications, both online and in print.

Erick Wilkins, B.S., civil, '12, joined Coggins and Sons after graduate school in 2014 as a geotechnical engineer E.I.T. His first project was Alexan at Cherry Creek located at 1st Avenue and Cook Street in Denver. The project involved a temporary earth retention for a mixed-use commercial and residential structure with four floors of subgrade parking. Three sides of the site consist of a soldier beam and lagging system with several rows of tiebacks, and the south side is a soldier beam and lagging wall internally braced using a raker system and wale frames at the building corners. The size of the retention is 37- to 41-foot exposed height and 30,000 square feet.





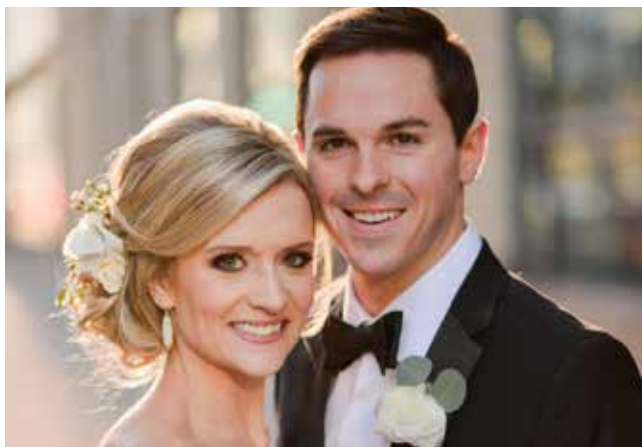
KYLE LEBRASSE

Kyle LeBrasse, B.S., civil, '13, worked as a process piping engineer for Kiewit Offshore Services Ltd. in Corpus Christi, Texas. KOS fabricates the topsides for offshore oil rigs prior to their departure into the Gulf of Mexico. He had the opportunity to work on Anadarko's Lucius Spar Project, as well as Chevron's Bigfoot Tension

Leg Platform Project. LeBrasse is currently working as an infrastructure large diameter pipeline engineer for Lockwood, Andrews & Newnam Inc. in Houston, Texas.

HIS GROUP IS WORKING WITH THE SURFACE WATER TRANSMISSION PROGRAM MANAGER FOR THE CITY OF HOUSTON AND HAS BEEN TASKED WITH HELPING THE CITY CONVERT A LARGE MAJORITY OF GROUND WATER TO SURFACE WATER TO ELIMINATE SUBSIDENCE IN THE AREA. THIS MEANS DESIGNING TRANSMISSION PIPELINES (SOMETIMES IN UPWARDS OF 120 INCHES IN DIAMETER) TO TRANSPORT WATER TO THE OUTREACHES OF HOUSTON.

They also design such systems in California, Michigan, Florida, and Oklahoma, as well as other cities within Texas, and also design canal systems and large-capacity pump stations, and conduct condition assessment/rehabilitation of existing pipelines. LeBrasse plans on taking his PE exam this fall in the hopes of becoming licensed early in the new year as decided by the Texas Board of Professional Engineers. AND, oh, yes, LeBrasse just got married on New Years Day in downtown Denver.



EWRI AND ASCE AWARDS WERE BESTOWED ON SEVERAL CEE ALUMNI IN 2015



2015 Arid Lands Hydraulic Engineering Award

Fred Ogden, B.S., civil, '87; M.S., civil, '89; Ph.D., civil, '92.



Best Technical Note in the *Journal of Hydrologic Engineering*

Alfonso Mejia, M.S., civil, '06



Best Forum Article in the *Journal of Hydrologic Engineering*

Vijay Singh, Ph.D., civil, '74. Singh also received the ASCE Distinguished Member award



Best Technical Paper in the *Journal of Irrigation and Drainage Engineering*

Ayman Alzraiee, M.S., civil, '05; Ph.D., civil, '12.



THOMAS OCHWAT

Thomas Ochwat, B.S., civil, '86, was recently promoted from CIP project engineer to capital improvements program manager with the Department of Water Supply for the county of Maui, Hawaii. His team of a structural engineer, contractor, DWS inspector and himself, received the DWS project Engineering Best Large Project award from the American Society of Civil Engineers Hawaii Chapter for the \$11.8 million Waikamoi Flume replacement project. More recent awards include the Project of the Year for Maui County from the Hawaii Society of Professional Engineers, and the American

Council of Engineers Companies of Hawaii Grand Conceptor Award based on uniqueness, originality, and technical, economic, and social value. This award is a state-level recognition, which qualifies the project for next year's National ACEC competition.

The existing flume was built in the 1930s, and later replaced in 1974 and 1975 with new redwood planking. The flume runs from the Haipuena Stream intake approximately 1.1 miles, ending at a collection box at Waikamoi Stream. This project will replace the entire flume and collection box with an aluminum structure and aluminum supports crossing gulches. The project began in December 2012. The completed flume is covered and has a walkway on top with handrails for safety. It follows the same alignment and is the same dimensions as the existing redwood flume. Care was taken to preserve the natural beauty of the Koolau Forest Reserve during construction and to respect the culture of Wao Akua.



OLD FLUME





RICK DENNISON

(Photo courtesy of the Denver Broncos)

Rick Dennison, B.S., civil, '80; M.S., civil, '82, has had an incredible and challenging year this past year as offensive coordinator for the Broncos, culminating in the Broncos winning the world championship for the 50th anniversary of the Super Bowl. In 2016, he enters his second year as offensive coordinator for the Broncos on head coach Gary Kubiak's staff.

The longest-tenured player/coach in Broncos history, Dennison has 27 years of experience with the team, including 11 seasons as a linebacker (1982-90) and 16 as a coach (1995-2009, '15). Born in Kalispell, Mont., Dennison attended Rocky Mountain High School in Fort Collins, where he lettered in football, basketball, and baseball. Dennison entered the NFL with the Broncos as a college free agent from Colorado State University, where he earned three varsity letters and was named a second-team Academic All-American as a senior.

He began his career as a linebacker (1982-90) and played 11 seasons. He participated in three Super Bowls as a player and was the team's recipient of the Ed Block Courage Award in 1989. He then served as a coach for 15 seasons from 1995-2009. From 2001-05, he was the offensive line coach and oversaw a group that was considered among the best in the league. Anchored by center Tom Nalen, the Broncos' line helped the team rank in the top 10 in total offense in each of those five seasons. Dennison then served as offensive coordinator from 2006-08. He spent the 2009 season coaching the offensive line for Denver, guiding second-year tackle Ryan Clady, who was named a first-team All-Pro selection by the Associated Press and earned his first career Pro Bowl honor.

In 2010, Dennison joined Kubiak as the offensive coordinator for the Houston Texans and was there for four years. During his four seasons, Dennison supervised one of the NFL's most balanced offenses. The Texans produced a league-high 29 individual 100-yard rushing performances. Houston's 2012 offense, which finished with a franchise-best 12-4 record and advanced to the AFC Divisional Playoffs, sent seven of its 11 starters to the Pro Bowl.

Then Dennison moved to work with the Baltimore Ravens as quarterback coach in 2014, and Joe Flacco established career highs in passing yards and touchdown passes during his lone season.

COMMENTS FROM RICK DENNISON

What drew you to study civil engineering?

"I like constructing things, building things, and finding answers. I also like things that are black and white. If you have a problem, find an answer for it. When I was growing up, I always liked to find an answer or a solution to things."

Has the engineering education assisted you in your coaching endeavors? If so, in what way?

"In school, I wasn't much for memorizing, so I learned concepts. I guess that's kind of how I teach. That's probably the biggest application. When I learned something in engineering, it wasn't memorizing, it was just conceptualizing how things worked. That's what I try to do around here. I try to show how a play works, why it works, what the concept is, and what it means. If players can draw from that, it just makes things a little easier for them, and they can move a little quicker."

What are your fondest memories of CSU?

"I remember having to use my time wisely. That's what I remember the most. Going to school along with practicing and playing football, I didn't have a lot of time to mess around. I remember using my time wisely, whether it be studying on a plane if we had an away game or just finding ways to get homework done. I wasn't much on staying up late; I was always trying to stay rested for when I was practicing or playing."

How does it feel to be back in Colorado after your time in Houston and Baltimore?

"Especially with this view I have of the Front Range, it's a pretty good deal. I get a chance to travel up to the mountains, either in the winter to ski or in the summer to fish. I grew up here, and it feels like home."

Caroline Draper, B.S., civil, '14, works for Tsiouvaras Simmons Holderness in Greenwood Village, Colo., as a roadway design engineer.

Amanda Poincelot, B.S., civil, '14, is with Sabra Wang & Associates in Columbia, Md., as a highway design engineer.

Wenyuan Tang, B.S., civil, '14, is currently pursuing a master's degree in environmental fluid mechanics and hydrology at Stanford University. He met up with CSU's Lou Swanson and Lee Sommers at the Shanghai airport in October 2015.

Alexandra Heller, B.S., civil, '15, was hired as an Engineer I for ATKINS in Denver.

Samantha Mauzy, B.S., environmental, '15, joined MWH Global as a water resources engineer.

Kevin Petrillo, B.S., civil, '15, was hired by RockSol Consulting Group in Westminster, Colo., as a civil engineering associate.

Paul Ritschard, B.S., civil, '15, entered the U.S. Air Force as second lieutenant.

Erik Sutherland, B.S., civil, '15, is working as a water resources engineer for AECOM in Denver.

Eric Schwem, B.S., civil, '15, is an engineer with Kiewit Bridge & Marine District, working on a \$2 billion design-build project on the world's longest floating bridge that connects Seattle and Bellevue, Wash.

Max Gilliam, B.S., environmental, '15, is an engineer with Tata and Howard Inc., in Waterbury, Conn.

Joel Hettinger, B.S., civil, '15, is a design engineer in the transportation group for KPFF Consulting Engineers in Seattle, Wash.

Vance Leggett, B.S., environmental '15, was hired by General Electric Water and Process Technologies in Boulder, Colo., as an engineering technologist.

Cody Oser, B.S., civil, '15, joined the Peace Corps as a volunteer water resources and environmental engineer.

Elaina Jennings, Ph.D. civil, '15, joined the University of Kansas as assistant professor in structural engineering.

Kayla Whitehead, B.S., environmental, '15, went to Guatemala on a two-week project design trip during the summer of 2015 with eMi (Engineering Missions International) to design a community center in the impoverished rural town of Cuilapilla. The families there live in old government concrete boxes next to a small schoolhouse where four grades are schooled in one small room with two teachers. There is a stream that runs through the area where the people wash their clothes, and it is polluted from a chicken farm upstream. They have access to potable water for two hours, three days a week. The community center will include four large, two-story classrooms, a covered open-air auditorium for teachers' conferences and other events, a community store, housing for economic orphans, vocational training studios, a soccer field, and a pila (a large pool used to wash clothes).



Design of new community center



Kayla Whitehead with children outside current schoolhouse.

THOMAS NEVER GIVES UP



MATT THOMAS

Matt Thomas, M.S., civil, '15, is definitely a "never give up" kind of person. His story is made up of major successes. Thomas comes from the town of Etna, Calif., with a population of about 900 people. Civil engineering was his choice for a major as he loved math and was interested in designing and building and wanted to work in a profession that offered opportunities to work outdoors. Thomas received his B.S. in civil engineering from the University of Idaho in 2000.

Quite an outdoorsman and athlete, Thomas enjoyed whitewater kayaking, skiing, and mountain biking. In 2009, he was in a mountain biking accident that left him paralyzed from the chest down. Of course, his first priority was to focus on his physical recovery and trying to walk again. He moved to San Diego for spinal cord injury rehabilitation through Strides SCI Functional Fitness. While working on his recovery, he discovered the organization Swim with Mike that gives scholarships to injured athletes. This provided Thomas the opportunity to pursue his master's degree, and he decided to focus on water resource management because of his genuine passion for all things water-related. Thomas chose CSU because of its reputation in water-related studies, and the online degree program allowed him to pursue his degree while continuing with his therapy.

Thomas states that his professors were very understanding of his condition

and easy to work with in regard to logistics with his disability. He is unable to move his fingers, so writing with pen and paper was more than difficult. He devised a way of writing efficiently using an iPad and note-taking app, which made it possible to take class notes and complete tests.

THOMAS SAYS THAT THE ONLINE EXPERIENCE WAS ALSO POSITIVE IN THAT HIS CLASSES WERE CONCURRENT WITH ON-CAMPUS CLASSES, AND OFTEN THE QUESTIONS ASKED BY THE ON-CAMPUS STUDENTS WERE HELPFUL IN UNDERSTANDING THE MATERIAL.

In addition, the flexibility of being able to watch the class on his own schedule was most advantageous to work around his therapy. Thomas hopes to join the workforce in an area that would have a positive impact on the river environment so that he “can give back to the rivers that gave me so much.”



IN MEMORIAM



Marvin Stone, B.S., ag, '73, and M.S., ag., '77, and his wife, Bonnie (also an alumna of CSU in anthropology) were killed instantly when a driver plowed into a crowd of onlookers during the annual homecoming parade at Oklahoma State University on Oct. 24. The Stones moved to St. Louis where he worked for Ralston Purina for two years as a food technologist. They then relocated to Pullman, Wash., where Marvin Stone began work on his doctorate at Washington State University. After completing his Ph.D. in 1982, the Stones relocated to Stillwater, Okla., where they both gained employment at Oklahoma State University. Marvin Stone taught and conducted research in the agricultural engineering department for 24 years, retiring in 2006 as a Regents' Professor. His research expertise was in developing sensors, automatic controls, and communication systems for agricultural equipment. He was a key contributor to the faculty team that developed highly acclaimed GreenSeeker technology for sensor-based variable-rate application of nitrogen fertilizer. Stone was also a prominent figure in international standards work related to communication systems for off-road equipment. He headed the U.S. standards delegation that worked with representatives of many other countries in developing ISO Standard 11783. Stone's technical ability and reputation were at the very top of his profession.



Rick Arber, M.S. civil, '74, had a civil engineering career that spanned more than 48 years. After receiving his M.S., he joined CH2M Hill, Denver, as a project engineer and then advanced to project manager and division manager for seven years. On March 16, 1981, Arber became president and founder of Richard P. Arber Associates Inc., an award-winning professional consulting engineering firm with expertise in water, wastewater, and water reuse. The firm completed projects for communities and agencies throughout the Western U.S. After 29 years, Arber sold the firm to Hatch Mott MacDonald LLC in 2010. Arber had more than 39 years' experience planning and designing water reuse systems throughout the country. He had also been project manager and design engineer for more than 100 water and wastewater treatment projects. He led multidisciplinary teams addressing complex issues associated with a variety of reuse projects, including potable reuse, urban irrigation, and industrial recycling. Arber managed projects to identify reuse water customers, and resolve institutional and regulatory issues to successfully implement water reuse in various settings. He was involved with a number of innovative and state-of-the-art projects, including the Denver Water Potable Reuse Demonstration Project, which was operated during the 1980s and 1990s with the goal of establishing the safety of using reclaimed wastewater for drinking water.



Scott Ellis, B.S., civil, '83, at age 55, passed away while doing what he loved: racing in his 19th Leadville Trail 100 Mountain Bike Race in Leadville, Colo., on Aug. 15, 2015. Ellis began his engineering career with the Colorado Department of Transportation in 1983. He was a project manager for a “huge job,” overseeing the permanent improvements to U.S. 34 up the Big Thompson Canyon after the road was destroyed by the 2013 flood. Ellis had many interests outside cycling, including obtaining his pilot's license, skydiving, skiing, hiking, swimming, and competing in Ironman races, as well as genealogy, traveling, and photography.



Spring 2015 Graduation

Front row: Cody Catron, Grigoriy Pertsev, Ahmed Sahab, Jocelyn Bryant, Alyssa Kaspersen, Alexandra Heller, Allison Dagg, Natalya Fedchuk, Kayla Whitehead, Basith Weerasundara, Mohammed Okok, Jinna Liu, Yishu Zhang, Yalin Mao, Lei Fang

Second row: Eric Uhl, Michael Emmendorfer, Alwaleed Alomairah, Cory Arnold, Adam Balsiger, Hannah Smith, Chelsea Sakamoto, Rachel Frisz, Haley Heinemann, Jennifer Rickford, Loranda Herstein, Erik Schnaderbeck, Michael Hiebert, Heath Arnold, Kayla Fochtman, Richard Dockstader, Laurie Alburn, academic adviser, Sarah Youssef, academic adviser, Dr. Neil Grigg

Third row: Chad Baumer, Kristopher Dodge, Scott Kemper, Kyle Nickless, Brian O'Donnell, Kevin Petrillo, Ryan Wordekemper, Erik Sutherland, Andrew Hujill, Max Gilliam, Eric Dement, John Glover, Alex Potvin, Brian Griffith, Henry Poburka, Jake Christensen, Dr. Karan Venayagamoorthy, Dr. Charles Shackelford, Dr. Chris Thornton

Fourth row: Brian Willems, Matt Amidei, Eric Schwem, Marshall Murphy, Brianna Arthur, Chris Hill, April Tamburelli, Travis Bell, Ryan Rohlfing, Brennan Lutkewitte, Kyle Kuhl, Cameron Fritz

Fall 2015 Graduation

Front row: Chris Holmes, Melissa James, Clint Sciacca

Second row: Ryan Barr, Nick Sianta, Samantha Mauzy

Third row: Chris Jarrett, Togi Tampubolon, Josh Wright, Gabrielle Davis

Fourth row: Ellie Troxell, Paul Ritschard, Robert Jacquet

Fifth row: Cody Oser, Laurie Alburn, Adviser, Sarah Youssef, Adviser

Sixth row: Dr. Ryan Bailey, Jeff Doersch, Dr. Charles Shackelford

Back row: Dr. Neil Grigg, Dr. Wade Troxell, Dr. Chris Thornton, Dr. Tom Sanders



Miles Morgan of McCook, Neb., is currently working on his Master of Engineering online at CSU in civil engineering. Morgan was accepted as a member of the Class VI of the Water Leaders Academy. The Academy is sponsored by the Nebraska State Irrigation Association. The Water Leaders Academy holds sessions that feature classroom and field trip experiences presented by experts in leadership and natural resource topics and are held at locations across the state. Morgan is a hydrologic civil engineer with the U.S. Bureau of Reclamation in McCook. He is in charge of the operation of 16 project dams and canal systems in the area and collects data for compact compliance, irrigation and releases, and normal operations.



Team members Mariana Sarnicola, James Mason, Natalie Thompson, Tim Medearis, and Drew Caschette (not pictured) Students proudly display their "Ram Pump" during the team pump competition in CIVE 525.

The building of a pump that would pump water from the floor of the basement of the Engineering Building to the roof (three stories) without an external power source is a required project in the Water Engineering: International Development (CIVE 525) course. The course focuses on the planning and design of small-scale and low-cost drinking water, wastewater, and irrigation systems for rural communities in developing countries. The winning pump had an efficiency of 59 percent which was impressive as all students were limited to using PVC piping.



AMAN VASHISHT



GARRETT BANKS

Aman Vashisht and Garrett Banks were awarded the Irrigation Foundation E3 Learner award to attend the 2015 Irrigation Show & Education Conference from Nov. 9-13, 2015, in Long Beach, Calif., all expenses paid. The conference, Waves of Innovation, is designed to introduce new technologies, best practices and innovative ideas in irrigation. Banks is a master's student and plans to graduate in 2018, and Vashisht is looking forward to completing her master's in 2016.



ALI TASDIGHI

Ali Tasdighi, Ph.D. candidate, took home the College of Engineering All-Stars award at Graduate Student Showcase on Nov. 11. This annual event is a showcase of research and creativity – a one-day conference for students to present their work, connect with industry representatives

and other graduate students and faculty at CSU, learn about other disciplines, and gain conference experience. The Graduate Showcase celebrates interdisciplinary collaboration.



KAYLA MODEN

Kayla Moden, a student ambassador and an environmental engineering undergraduate, was awarded the prestigious Jack and June Richardson Honors Scholarship. The purpose of the scholarship is to provide financial assistance to two or more of the very best full-time undergraduate

students who are in the University Honors Program at Colorado State University with outstanding academic achievement; the potential to make a significant intellectual or humanitarian contribution; and commitment to an undergraduate experience that emphasizes the development of advanced research and communication skills. Moden will be involved in undergraduate research in the geoenvironmental program under Dr. Chris Bareither.

Shahin Ghazi Zadeh, Ph.D. candidate, received a GSI Fellowship grant from the Geosynthetic Institute for his research project, "Evaluation of Long-Term Internal Shear Strength of GCLs for Use in Mining Applications."



Left to right: Jocelyn Bryant, senior, first place, Erin Knibbe, senior, second place, and Carmen Soller, Third Place, were awarded Colorado Section of ASCE Section Student Awards in May 2015. In addition, Bryant and Aliena Debelak were recipients of the Younger Member Group 2015 ASCE scholarships.



Left to right Trevor Kent, Kayla Moden, Rachel Frisz, Max Gilliam

Our CEE student ambassadors participated in the Red Rocks Community College Sustainability Celebration in April at the Lakewood campus. The festivities included a vendor fair, exhibits, lectures, workshops, and other educational activities to expand the community's knowledge about preserving the environment. The event also supported the Girl Scouts as they earned their Junior Journey badges and collected donations for A Little Help, a nonprofit that helps elderly people in need to purchase high-energy light bulbs for their residences.



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