

## ERE MESSENGER

Environmental Resources Engineering

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FALL 2010

## ENGINEERS WITHOUT BORDERS HELPING ARCATA'S SISTER CITY

by Aaron Parker and Luke Armbruster, ERE Messenger Co-editors

The Camoapa I-Block party was a success. I Street in Arcata between 10th and 11th was cordoned off on Labor Day 2010 to celebrate Arcata's sister city relationship with Camoapa, Nicaragua. Visitors enjoyed live music and food, while learning about some of the issues facing the city. The event was planned to help raise funds for the many environmental projects that are planned to help the people there.

Camoapa, Nicaragua is a hot, tropical, Central American city of about 20,000 people. For the last 23 years, Arcata and Camoapa have exchanged culture and ideas through the Sister City Project. Midwives from Camoapa have come to Arcata to help here, and Arcata dentists have offered their services in Camoapa. Arcata High School students have pen pals in

Camoapa so they can learn about life from a different perspective. Now, the North Coast professional and HSU chapters of Engineers Without Borders (EWB) are offering support to help solve water quality and use problems in Camoapa.

EWB has several ideas for addressing these problems. One is digitizing the city's water distribution system in WaterCad and mapping the central water supply in GIS. They also want to develop alternatives for reducing the sediment loading in the city's drinking water reservoir. Other proposed projects would improve water quality and use by assisting in designing and building hand-powered pumps for wells, taking an inventory of well sites, designing a greywater system, helping raise funds for a broken spring box, and

designing a solar-powered pump for an educational farm's spring. Some of this work would require visiting Camoapa and the outlying areas.

EWB held a "Camoapa Presentation" at HSU on Sept 1. ERE Alumni Carlos Diaz of Winzler & Kelly and Tony Llanos of Michael Love & Associates represented the EWB professional chapter. Attendees from Camoapa included Mayor Jose Plutarco Hernandez, attorney Heberto Mejia and his secretary Ramon Mendoza.

Several proposed projects were presented at the meeting. It was explained that Camoapa's central water supply is a one-loop system that no longer has valves to isolate its parts for repair. Digitally modeling the central system and creating an optimized model for valve placement is expected to address this problem.

*Continued on page 12*



A portion of I St in Arcata was roped off for the 23rd annual I-block party, celebrating Arcata's sister city relationship with Camoapa, Nicaragua.

### IN THIS ISSUE

Alumni Profiles	2
Alumni Survey	4
Undergrad Research	5
Spotlight on Lecturers	6
Study Groups	8
Engr Practice & Advice	9
Envir Civics Engr	10
ERE Clubs Info	11

## FROM THE EDITORS

Hello from the messenger staff!  
We hope you enjoy this Fall 2010 edition.

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*“It has become  
appallingly  
obvious that our  
technology has  
exceeded our  
humanity.”*

—◆—  
*Albert Einstein*  
*(1879-1955)*

## Alumni Profiles

### **Ben Bray, Ph.D**

B.S. ERE 2000

*Assistant Water Resource Specialist  
Oakland, CA*

**bbray@ebmud.com**

Applying for college was an exciting, anxious, difficult decision. Plus, there was the question about what major to choose. One choice was ERE at Humboldt State. The idea of scientifically exploring that interface between the natural and “man made” worlds was very appealing to me. My academic strengths were science and mathematics, so ERE made sense. But, with only a vague concept of this major, did I know what I was getting myself into?

During my first year, while working my way through calculus and chemistry courses, I’m sure I second-guessed the decision I had made once or twice. But, as I began taking the engineering courses, I knew I had made the right decision.

I also started to understand that these courses were building a strong theoretical foundation that I would build into an engineering career: both academic and eventually professional. I was doing well in the engineering courses, but more importantly, I began to find my “groove,” pursuing the areas of the field that interested me most. I’m not sure whether it was listening to good advice, steady determination, motivation, a persistent positive attitude, good luck, or some mix of all these variables, but all my hard work started paying off in ways that I wanted it to, from grades and job opportunities to valuable experience and valued relationships with other peers and professionals.

In fact, when I finally graduated in December 2000, I decided I hadn’t had enough classes. I packed my bags and headed for UCLA, where I had been accepted for graduate school. The

decision to attend graduate school felt natural, but a PhD? Well, I approached my decision about graduate school as I did my decision for undergraduate school: with an open mind! By doing so I was able to learn so much more. I also continued acquiring valuable pearls of wisdom from key mentors along the way.

To get me through my next transition, from the academic to the professional world, I followed my formula: open mind and a reliance on key mentors from both new and established relationships. I’ve been in my current position as a water resource specialist for nearly four years, and I’m approaching that level of performance that will officially classify me as being back in the “groove” once again. I still depend on critical engineering skills and experience that trace their way back to my days in the lecture halls and computer labs on the HSU campus. I find himself working in that grey area between the natural and the ‘man made’ world, defining environmental resource engineering, and looking forward to the day you will join me working here too.

### **Ben Shuman, PE**

B.S. ERE 1993

*Senior Environmental Engineer  
U.S. Department of Agriculture  
Washington, D.C.*

**Ben.Shuman@wdc.usda.gov**

I literally bumped into HSU while driving down the coast in 1988. I entered ERE as a transfer student, and was active in the ASCE Student Chapter, including a stint as President. I passed the FE while a student, and I graduated in 1993 after completing a senior project focused on optimizing the placement of extraction wells to remove benzene from groundwater.

I was hired by CalTrans in the Hydraulics Branch one summer, and

## Alumni Profiles

many days I would crawl 50 feet into 24-inch diameter culverts under highway 101. I would roll in, face down on a skateboard, with a rope tied around my ankles so the engineers could pull me out quickly without coming in to get me if I were bitten by anything!

After college I worked for the Air Force as a civilian employee at three bases in 5 years! I worked on one project with a proposed construction site on which I discovered acres of protected wetlands that were not known to planners or commanders. I worked with design engineers to revise plans and eliminate wetland impacts by rerouting proposed streets. Revisions were made and construction proceeded without impacts or the need for permits, by redesigning around wetlands. In 1995, I completed my M.S. in Environmental Engineering Management at the Air Force Institute of Technology, on a full Air Force scholarship!

In 1997 I moved to Columbus, Ohio, becoming a Civil Engineer for USDA, Rural Development, to work in the Water program which provides financial assistance to rural areas for design and construction of drinking water and wastewater projects. As the engineer for my agency in that state, I had review responsibility for engineering documents, construction oversight, and environmental review of the same projects. My most important achievement during this time was obtaining my PE in Ohio in 1998. I chose to take the environmental exam.

In 2003 I was promoted in the same agency to Senior Environmental Engineer, a \$1.6 Billion per year program. I moved to USDA Headquarters in Washington, D.C. and now I have oversight, training, and policy development responsibilities. I also act as a team leader for about 65

engineers nationwide. I love my job and I know I owe a great deal to the ERE professors and to HSU.

My recommendation to current students is to pursue professional registration. Your PE is your ticket to a strong resume and makes all the difference. Go after your PE aggressively and do not stop until you have it! Start by taking the FE exam while you are still in college and the material is fresh!

### ***Terry Escarda, PE***

B.S. ERE 1988

*Hazardous Substances Engineer  
Sacramento, CA*

**TEscarda@dtsc.ca.gov**

I'm a second generation HSU grad – my parents met while getting teaching degrees, and my family grew up in Eureka. In fact, my brother Alan (also an ERE graduate) and I were born on campus – the business annex used to be Arcata's Trinity hospital. Thanks to all the professors, especially Mike Anderson for recruiting and Bob Gearhart for advising me!

My emphasis was water quality with some water resources, geotech, and advanced math, but I did my senior project on hazardous waste. My mother was Humboldt County League of Women Voters president in 1984 when the League's focus was hazardous waste. She asked me to join and participate in the study. That generated my senior project: developing a survey of about 400 small quantity generators in Humboldt/Del Norte Counties and helping write the first Humboldt/Del Norte Hazardous Waste Mgt Plan.

That led to a job with Cal-EPA's hazardous waste regulatory agency, the Dept of Toxic Substances Control (DTSC), in 1988. Bill Ross, another

HSU engineering alum, recruited me to help on the Kettleman Hills Hazardous Waste Landfill permit. Later, I moved to DTSC's Alternative Technology Division, which was familiar because that program had overseen the county hazardous waste management plan I had worked on.

It was an exciting and challenging time – hazardous waste was just becoming regulated and California, as now, was leading the nation in recognizing and attacking the problem. We managed hundreds of hazardous waste reduction research grants, developed pollution prevention strategies, evaluated state-of-the-art technologies, and won several prestigious awards for innovation in government. I also got to work on federal task forces developing new ways to manage mixed radioactive/hazardous waste. Now I'm cleaning up military bases and coordinating DTSC's climate change adaptation strategy.

So, I've got lots to thank HSU for – my parents, my education, and my career. And a ton of friends and colleagues, as HSU ERE alums are well represented in the environmental field. But, most of all, today is my 20th wedding anniversary to Christyl Sanzo, a fellow HSU ERE alum! We're blessed with a wonderful son, Matthew, who's now starting college and considering HSU for kinesiology. Best of luck to all of you. I hope your HSU experience is as wonderful as mine was.

*Interact with ERESA via our new Facebook page! Check out upcoming events, see photos of past activities, see what others have to say about current issues, and add your own comments. Join us at:*

*[www.facebook.com/hsu.eres](http://www.facebook.com/hsu.eres)*

# Survey of ERE BS Alumni Graduating 2004-2007

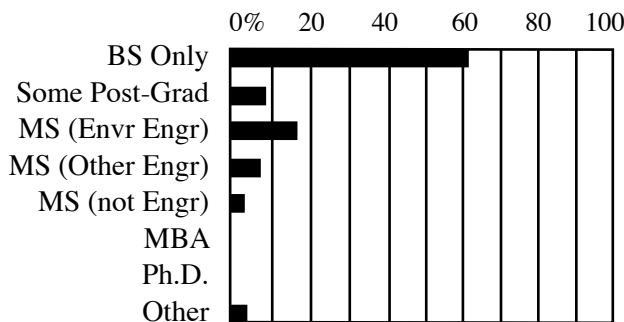
by Mike Anderson, ERE Emeritus Professor

During the period January - April 2010, the HSU Department of Environmental Resources Engineering conducted a survey targeted at ERE alumni who graduated between 2004 and 2007. Ninety-eight ERE students graduated during that period, and 35 of them (35%) responded to the survey. Access to the Google-based online survey was provided to the target group of alumni using our alumni email contact list and

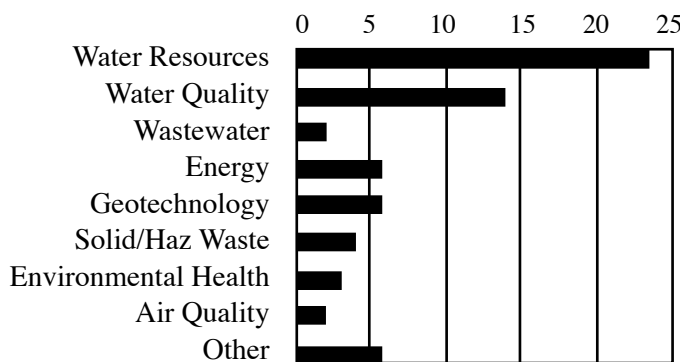
our Linked-In and Facebook groups. Survey results were completely anonymous, with survey entries identified only by a date and time stamp.

ERE Professor Margaret Lang collected the survey data, analyzed it, and prepared a 28-page draft report of the results. The following is a partial and very brief summary of these results.

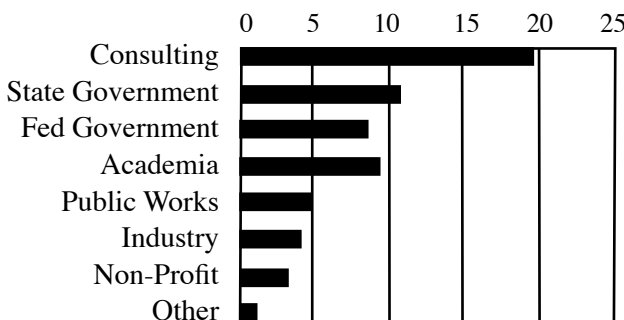
1. What is your highest level of education?



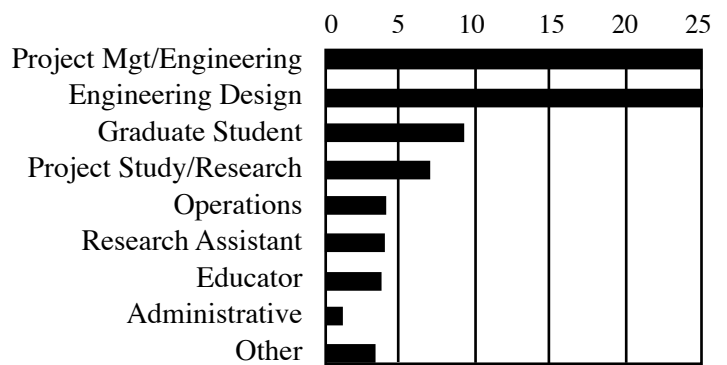
2. What ERE areas have you primarily worked in? Check all that apply. Values are number of responses.



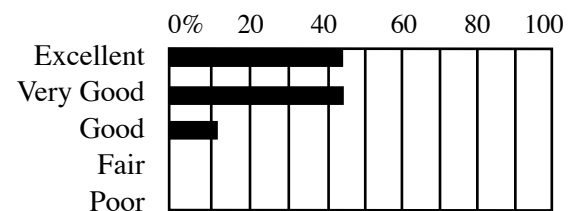
3. What types of organizations have you primarily worked in? Check all that apply. Values are number of responses.



4. What types of positions have you primarily had? Check all that apply. Values are number of responses.



5. How well did the ERE program prepare you to perform the technical skills needed to meet your engineering job responsibilities?



6. How could we have improved your technical skills preparation? (Top 2 responses)

- a. Add more AutoCAD.
- b. Add GIS

7. Does your current position require you to work in teams or multidisciplinary groups?

Yes - 97% No - 3%

8. Rate how well the ERE program prepared you to work in teams.

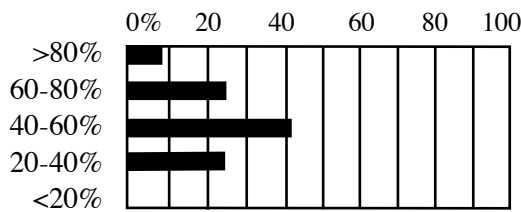


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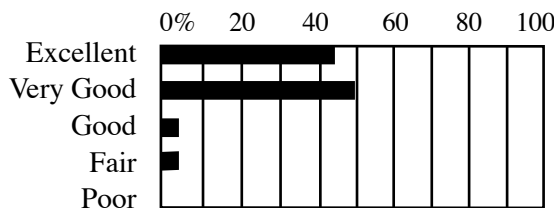
**Alumni Survey**

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9. What percentage of the work effort in your current position is dedicated to technical communications?



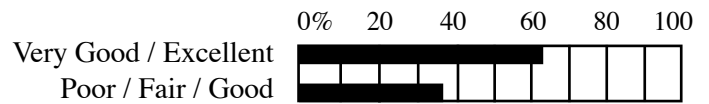
10. Rate how well the ERE program prepared you for technical communication.



11. What was the best aspect of your education in Environmental Resources Engineering? (Top four comments)
- Sense of community/teamwork among ERE students.
  - Positive interactions with ERE faculty and staff.
  - Breadth and quality of ERE courses.
  - Small class sizes.

12. Did you have any pre-professional experiences (engineering summer or part-time job or internship, or conduct undergraduate research)?  
 Yes - 83% No - 17%

13. How much did your pre-professional experiences help you to (be a better student and transition from school to professional work)? Values are percentages averaged over responses to seven specific questions.



# Undergrad Research Experience

*by Cailan Halliday  
ERE Undergraduate*

Last summer I participated in a Research Experience for Undergraduates (REU) program at the University of Minnesota. The research took place at the St. Anthony Falls Laboratory (SAFL) located next to the Mississippi River. I had fun and learned a lot, but the most valuable thing I walked away with was kindling for my imagination.

As engineers we often find ourselves fitting into a variety of roles, some of which can be fairly surprising to the first-year student. Trying research or doing an internship is invaluable because it allows you to imagine the future and find something fulfilling.

When I first got to the lab I was a little nervous because I still didn't know what my topic was. On the third day I met my mentor, who announced that I and several other

REU participants would be working on bridge pier scour in a flume on the basement level of SAFL. We would all be running the flume and collecting data. But in addition to this, we each had our own topic to focus on. My task was to train an artificial neural network (ANN) and make scour depth predictions. ANNs are computer learning algorithms.

The theory of neural networks has been around since the late 1950s, but was first put into practice in the 80s. ANNs first started as simple models of the brain, but were quickly adapted to other fields; in 2000 the ASCE put together a document summarizing their applicability to hydrology. In each neural network there are two basic steps: a learning phase and a prediction phase. They take large databases of inputs and outputs and "learn" the relationship between

them. I think of them as more robust non-linear regression models.

The funny thing about researching a new topic is that it makes absolutely no sense until it makes sense. That sounds redundant, but I found myself reading and rereading the literature. The more I read, the more confused I became. Finally, while reading a case study, I understood the bigger picture. This phenomenon has a name: breakthrough. This is why I personally think that research is simultaneously exciting and overwhelmingly frightening. Progress is often subtle or seemingly non-existent, which left me wondering the whole summer if I would ever complete anything. In the end I had results, a paper, and a poster.

Looking back at my experience, I believe that the ERE program prepares us well to succeed. If you are interested in doing something exciting and rewarding next summer, I recommend applying to an REU. I'm sure you will find it enlightening and rewarding. **END**

# Spotlight on ERE Lecturers

by Mike Anderson, ERE Emeritus Professor  
and Tahsa Sturgis, ERE Messenger Co-Editor

Each semester, partly by university policy and partly due to limited financial resources, HSU has fewer tenured and tenure-track faculty members than necessary to teach all of the courses that are offered. The shortfall is covered by a special cadre of teachers called Lecturers. These folks make themselves available, often on short notice and with little confidence that they will be retained the following semester, to help support the department's teaching mission. This semester, we have eight ERE lecturers, and the department could not function adequately without them. Here are brief bios of these folks who make significant contributions to ERE student success.

## Peter Alstone

I am a Research Engineer at the Schatz Energy Research Center (SERC), and I am currently co-teaching ENGR 475 (Renewable Energy Power Systems). I'm looking forward to teaching ENGR 473 (Building Energy Analysis) in the spring.

I received my BS in Chemical Engineering from North Carolina State University, and then came to HSU for a Masters in Environmental Systems. I worked at SERC during my graduate school time and wrote my thesis on the operation of the Schatz Solar Hydrogen Project in Trinidad, CA.

Since graduating I've continued my work at SERC, and am currently managing our technical consulting with the World Bank Group's Lighting Africa project. We work on quality issues in the market for efficient off-grid lighting (like solar-powered LED lamps) for the developing world.

Outside work, my wife Andrea and I spend a lot of our time raising our son,

who had his first birthday this October and is a hoot. I also enjoy riding my bicycle around Humboldt County and taking in the scenery.

## Nir Berezovsky

I completed my ERE degree in 2009, and am in my second semester as a lecturer for the ERE department. I am teaching one lab in ENGR 115 (Intro to ERE) and one lab in ENGR 325 (Computational Methods II).

I hail from northern California, and have always been most at home in the coastal environment. My academic interests are eclectic, and environmental engineering has allowed me the pleasure of blending natural history with applied science and math. My limited professional experience has revolved around physical oceanography and urban watershed management. I am currently working for the Schatz Energy Research Center, investigating ocean wave-energy on the west coast.

My personal experience at HSU has been rewarding, too. I am constantly

impressed by the strength of our community, and I am most happy to be a part of it. I would urge incoming students to do the same!

## Pat DuRant

This is my first semester teaching at HSU, although I have been taking classes at HSU in German, Business, and Technology for some time. I enjoy teaching both ENGR 210 (Statics) and ENGR 330 (Science and Strength of Materials).

I was born in Oak Ridge, Tennessee and went to Georgia Tech and graduated the only woman in physics that year. I received my M.S. in Materials Engineering from Arizona State University, and built some of the early MOS ICs (memory, watches and calculators). At Garrett Corporation, I optimized machining of aerospace materials and I set up FAA testing. I taught engineering and shared in a rotating chair of the Dept at College of San Mateo. Most recently I have been consulting with companies that wish to improve their manufacturing through material control.

I have spent quite a bit of time in Hungary, and was recognized by the Hungarian Government for contributions to the Women's Conference in Beijing. I also danced a



Left to right: Lonny, Pat and Patricia. Not shown: Sheri



Left to right: Sophie, Nir, Peter and Jim

season with a government supported Hungarian dance troupe in Budapest.

Advice for students? Do school at your own pace. Take only the number of classes you can learn well, so you will be able to help “teach” the material to other students next semester.

### **Lonny Grafman**

I have been teaching courses at HSU for seven years, and co-directing or teaching summer abroad programs for most of that time. In these programs and courses, students gain in-depth experience and learning by working on sustainability projects with local and international clients.

In Spring 2011, I will be teaching ENGR 215 (Intro to Design), ENGR 305 (Appropriate Technology), and ENGR 370 (Energy, Technology, and Society). Please consider building a project in ENGR 305 (not counted towards ERE major), and keep an eye out for the Summer 2011 Mexico program at [http://appropedia.org/HSU\\_Chiapas](http://appropedia.org/HSU_Chiapas).

I love teaching. Working alongside dedicated students on important, interesting and real opportunities, provides me constant learning and inspiration. As part of this inspiration,

I am the President of Appropedia, I consult green businesses, and hold too many other roles such as: Executive Editor of the International Journal for Service Learning in Engineering; Board member of organizations such as Locally Delicious, Humboldt Bay Center for Sustainable Living and the Full Belly Project; and advisory roles to the Waterpod, Campus Center for Appropriate Technology, Thrivable.net, Open Sustainability Network, and the Sustainable Haiti Coalition.

### **Sophie Lagacé, P.E.**

This semester I am teaching ENGR 435 (Solid Waste Management), and in the spring I am scheduled to teach ENGR 410 (Environmental Impact Assessment). I find that teaching and interacting with bright, smart *questioning* young people is good for me!

I received my B. Eng. (Civil) from Ecole Polytechnique de Montréal in 1987, and my M.S. Environmental Systems (IDT) from HSU in 2004. My early engineering work involving landfill construction work got me interested in the impact of engineering and technology decisions on the environment, which lead me to HSU. My Masters work here transformed my way of thinking, and allowed

me to get to the next level in terms of quality of my work product and comprehension of the issues involved. I spent most of the following decade in Seattle, and returned here in 2008.

I am employed full-time with SHN Consulting Engineers Inc. in Eureka. I am a licensed professional engineer, and have worked in the consulting business for most of my career. I love my profession, and I am actively involved with the local chapters of the ASCE and Engineers Without Borders (EWB).

For fun I enjoy photography, camping, art, and reading, as well as role-playing and board games.

### **Patricia Cheng Terry**

I started working at HSU in Spring 2010, teaching in the Oceanography Department. This semester I am teaching ENGR 331 (Thermodynamics) and ENVS 330 (Energy Systems and Technology). Next semester I will be lecturing in Oceanography again, and I hope in ERE as well.

I studied Electrical Engineering and Physics at the University of Michigan, leading to a BSE in Engineering

*Continued on next page*

## Spotlight

*Continued from page 7*

Physics. After an internship with NOAA, I moved to San Diego where I earned my Master's Degree. I began working as an engineer for the Marine Geophysics Lab, and I spent three years there traveling around, including a trip to Antarctica on an icebreaker.

After I got married, I got a job with the California Dept of Fish and Game and moved to Humboldt County. I was the engineer for the CDFG Remotely Operated Vehicle (ROV) project, and I also worked as a scientific diver. I now do work for Marine Applied Research in Oakland and Marine Electronics Consultants in Seattle.

My husband is a firefighter for Cal Fire and Humboldt Fire District. Humboldt County suits us because we both love the outdoors. I am an avid rock climber, whitewater kayaker and SCUBA diver, and I enjoy traveling. I have been to every continent except South America, where I will be traveling later this year.

Teaching has been a rewarding adventure for me. I hope my students keep their minds open and enjoy the process of life and learning as much as I do.

## Sheri Woo, PE

I've been an HSU ERE lecturer for 10 years. I teach the technical writing component of ENGR 326 (Computational Methods III), and I occasionally teach ENGR 410 (Environmental Impact Assessment). I have a BS in Soil Science, and a double MS in Watershed Science and Environmental Engineering, all from UC Berkeley. I had a short stint working for the US Forest Service, and I've been in "consulting" for 20+ years. I've worked in groundwater and soil contamination from gas stations, sawmills, and landfills; and environmental permitting of river restoration projects, hydroelectric systems, gravel mining, and renewable energy (wave, wind, and solar).

The ERE department recognizes the importance of communication, and hired me 10 years ago to stress writing and speaking skills. But I urge you to explore alternative forms of communications too, such as graphics and video (it's really fun, and I wish I had more time for it!). Being an environmental engineer is being a life-long learner. Yes, you will graduate, but you won't stop studying!

## Jim Zoellick

I am an HSU ERE alumnus (B.S. ERE 1990). I am currently teaching ENGR 475 (Renewable Energy Power Systems), and I regularly teach solar electric and solar hot water classes through HSU's Extended Education program.

I came to HSU in 1987 with a passion for renewable energy, and I got a great education. I was challenged, I learned a lot, and I enjoyed myself tremendously.

I worked in the Boston area for 5 years doing energy efficiency consulting work. I then returned to HSU and the Schatz Energy Research Center (SERC), where I've been for 15 years. I've been involved in energy projects involving energy efficiency, hydrogen and fuel cells, and solar, wind, small hydro, wave and biomass energy. Currently, I'm managing a wind and hydro energy feasibility study for the Yurok Tribe, as well as a renewable energy strategic planning study for Humboldt County.

My passions outside of work include gardening, listening to music, backpacking and cycling. My few pieces of advice for ERE students are: 1) Work hard, but don't forget to have fun. 2) Get involved in extracurricular activities related to your education. These will show that you are well-rounded and have some real-world practical experience. 3) Work on your writing and public speaking skills. You will probably find that strong writing and public speaking skills will be critical to your long-term professional success. **END**

# Study Groups

*by Patrick Sullivan, PE (ERE 1996)*

*Project Manager*

*Winzler and Kelly, Eureka, CA*

I regularly do work in hydrology and hydraulics that is just like what I did in the classroom.

I often use my dynamics and fluids skills when designing pipe and pump systems. My statistics textbook frequently comes out when writing reports or summarizing field/monitoring data. I even use my FORTRAN coding skills. However, the one skill that I use every day, and on almost every project, was not learned in any ONE class, but in many. That skill is the ability to work collaboratively in a group, as a member of a team. It is also one of the key skills I look for when interviewing prospective employees.

I came to HSU after taking a seven-year break from school, and it felt like I had a lot of catching up to do. I was frequently that guy with his hand up asking the "dumb" question (I once had a professor tell me there was no such thing as dumb question – only stupid people who ask them). Getting together with other students to form study groups started out as a way to just get my homework done. It seemed like someone was always giving me that one little secret on how to solve a particular problem. I don't think I would have made it through Statics or Dynamics without studying in a group. I found that I really had to get to know a problem in order to explain it to another team member, and that was much different from just getting the homework done. Sometimes, just listening to someone else explain a problem that I already had completed helped cement the concept. And, really understanding the concepts definitely paid off at exam time.

By the time I was taking Comp Methods and Fluids, I had a group of students that I studied with regularly. Having a regular study group was kind of like having a workout partner;

*Continued on page 9*



# Experience and Advice of a Practicing Engineer

by Summer Bundy (ERE 1998)  
Water Resources Engineer  
CH2M Hill, San Francisco, CA

I can hardly believe I've been working as an engineer for over a decade. I spent the first four years of my career working for the State of California – first for the Colorado River Basin Regional Water Quality Control Board, and then for the Southern District of the Department of Water Resources.

I've been a Water Resources Engineer with CH2M Hill for 8 years. I also serve as Deputy Project Delivery Lead, with project delivery oversight for all Bay Area Water Business Group contracts and proposals. Here is a sampling of some of my projects:

*Pipeline Design:* This project included the design of distribution pipelines for delivery of Central Valley Project (CVP) water to farmers in the Pajaro valley. The Pajaro Valley suffers from groundwater overdraft and saline intrusion to such an extent that the groundwater salinity is damaging to strawberry crops. The project included field work, alignment selection, outreach to farmers, hydraulic modeling, and development of plans and specs.

*California Rice Commission Water Quality Programs:* More than 500,000 acres of rice are cultivated in the Sacramento Valley. In late 2004, new regulatory requirements were adopted for agriculture, including monitoring and implementation of water quality control measures. I support the CRC to develop technically-based water quality monitoring programs to assess the impact of rice farming on surface water quality. The program is now expanding to include groundwater quality, and we are employing GIS analysis to assess geologic risk and contaminant fate and transport.

*Salton Sea:* CH2M Hill was selected to prepare the Programmatic EIR for restoration of the Salton Sea, a hypersaline lake in the Imperial Valley that supports resident and migratory birds while serving as a sump for agricultural return flows and a recreational resource. I spent two years working on alternatives development, water quality analysis, GIS analysis, infrastructure concepts, and project coordination. Unfortunately, the legislature hasn't acted to implement restoration measures and the fate of the Salton Sea is still as uncertain as ever.

*Hydraulics and System Analysis:* For the past few years, I've worked with the SF Public Utility Commission's Systems Engineering Group to evaluate the hydraulics of the Regional Water System, to ensure that the upgraded system will be able to deliver water in accordance with "level of service" goals established by the Commission. Our primary tool for this work is the SYNERGEE hydraulic model. I've worked on development of diurnal demand curves, model calibration/validation, and some complex reports analyzing system hydraulic performance.

*Wastewater:* I currently manage a project to assist the SFPUC engineers with the design of modifications to the Oceanside Wastewater Treatment Plant to convert their digestion process from conventional mesophilic digestion to sequencing batch reactor temperature phased anaerobic digestion, for the purpose of producing Class A biosolids. This is a complex project on which I'm getting to work with world-class wastewater engineers, and which definitely challenges the margins of my technical skills.

A few things I have learned:

- Develop a network of resources, both peers and mentors.
- If an old-school engineer has time to tell you some stories, take the time to listen and ask questions.
- Have one of your peers review your work before sending it off to a senior reviewer.
- The wheels of bureaucracy move slowly, except for when they are moving very, very fast.
- Perform your work as if you will be audited.
- It's better to do it right than to have to explain what went wrong.
- Paper trails matter.
- If it takes more than three email exchanges, pick up the phone.
- Teamwork, teamwork, teamwork! **END**

## Study Groups

*Continued from page 9*

there was no putting off studying when I had a group to work with (and help keep me in line). After spending so much time studying together, I really got to know the folks I was working with. Study sessions became partly social events, and were even fun – well, at least hard classes were a lot more tolerable. At some point, the group started doing more than just studying together. Perhaps it was a celebration after an exam, or some holiday party, but over time it developed into a group of friends who enjoyed doing all kinds of things together, like backpacking and rafting.

The relationships I formed with many of these folks still flourish today. Some of them work at other firms that I compete against, but also sometimes team with on projects. Some are regulators at state agencies who I regularly interact with. Many are colleagues I participate with in community organizations, such as ASCE and EWB. The main point is that working in groups is an essential part of what I do as an engineer. There are many benefits to working in study groups as a student, and many of the teamwork and group dynamics skills I learned as a student have greatly helped me as a professional engineer and manager. **END**

# ENVIRONMENTAL CIVICS ENGINEERING

by Mel Olesen  
EHS Professional

What the hell? This guidance manual from the state says I can't use potable water to wash down the truck barn over at the maintenance yard, because it will go into the stormwater drain. What are they thinking? Potable water is drinking water, and what harm can that do? Those permit writers need to get out in the field and try to make these rules work rather than sit behind a desk!

Sound familiar? It is commonly heard from folks who must actually comply with the seemingly strange and confusing world of permits, regulations and guidance manuals. A fair number of Environmental Health and Safety (EHS) professionals become disenchanted with a system that seems to them to work against the environment, or at least is very costly. So, why the "crazy" rules? Let's look at the players who can make a difference.

Non-Governmental Organizations (NGOs) such as Green Peace, American Rivers, and Friends of the River have multiple complementary roles. First, they identify a problem and energize a base of citizens for the purpose of solving the problem. This was a truly noble cause in the early days when rivers caught on fire, cars belched lead, and hazardous waste was dumped in unlined landfills. Fortunately, laws such as the Clean Water Act, Clean Air Act, RCRA and CERCLA have helped many of the early causes significantly. Today, the NGO community is broken into several factions: the local hands-on groups attempting to save a creek or stop a development; the world/national groups that save rain forests in Brazil or fight for sustainable fish harvest; and the litigation groups that spend their time in court challenging various laws and regulations. All three types are driven by mixed motives to "do good" and at the same time become more powerful so they can have more impact pursuing

their agendas. In either case, it takes a lot of money – to pull an obstruction out of the creek, to purchase prime rainforest containing endangered species, or to pay for lawyers to ensure that laws are followed as intended.

Business is the counterpoint to the NGO's, where nearly every environmental reform effort is seen as impairing a company's ability to compete. To some extent, the business community views the environmental engineer (you), in the slang of "LEAN," as a non-value added (required) person. This means that the work done by EHS professionals is normally going to be done only to the extent required by law. Remember this, because the most common challenge when you go in with an environmental project budget request is: "Show me the law that makes me do this." It also tends to explain why EHS departments are typically under-resourced and overloaded. Being fair to the business, they are mandated to provide maximum return to their shareholders. The corporate "person" often cares only when there is a law to make them care. This is by no means a universal approach by business; many firms are very involved in protecting the environment, because they recognize that it ultimately helps the "triple bottom line"; especially public image.

That brings us to the "law," which is created by two distinct branches of government: the legislature (Congress), in which laws are created and passed, and the executive (President's EPA / Governor's agency) that convert the laws to rules and ultimately to permits. Money is a big driver for both these governmental entities. Legislators must figure out how any law, including an environmental law, will impact the economy, jobs, taxes, infrastructure, land use, courts and other government functions, as well as their chances of getting re-elected. The agency management has to look at the budgets,

competing demands for resources within an agency, pressure from public groups (those NGO's) and business. The agency also needs to be concerned about the courts, because they can undo years of work in one ruling!

So, are you still wondering about the complaint about the potable water not being allowed in the stormwater drains? Simple. Stormwater is defined under the CWA as only rainfall and snowmelt impacting or running onto the permittee's facility. Potable water out of a hose is neither rainfall nor snowmelt. So, potable water is not covered by the stormwater permit for discharge from a stormwater system. Second, potable water frequently does not meet environmental water quality standards for chemicals such as copper, chlorine and zinc, and therefore cannot be discharged to surface water without a NPDES permit. These chemicals are allowed in much higher levels in the Safe Drinking Water act than in Clean Water Act because humans are more tolerant. In the environment, copper, chlorine and zinc are very toxic to a number of microorganisms that form the basis of the food chain and are protected by CWA standards. So, if you want to wash the building with potable water, you can apply for and obtain an individual NPDES permit, or work to bring about change to the law that ultimately affects your permit.

*Mel Olesen is an EHS Professional with a global company in Chicago, Illinois, and has 20 years experience in environmental issues, including working with legislators on laws, and agencies on rules. These views are his alone, and do not represent those of any other person or organization.* **END**

*"The gods, too, are fond of a joke."*

—  
Aristotle (384-322 B.C.)

# Get Involved: ERE Clubs Information Board

Compiled by Luke Armbruster, ERE Student

Organization	Fall 2010 Activities	Upcoming Plans
<p><b>Society of Women Engineers (SWE)</b></p> <p><b>Email:</b> swe@humboldt.edu</p> <p><b>Webpage:</b> <a href="http://humboldt.edu/clubs/club_sites/society_of_women_engineers1">http://humboldt.edu/clubs/club_sites/society_of_women_engineers1</a></p>	<ul style="list-style-type: none"> <li>• Held a calculator tutorial session for students on how to use advanced features on their calculators</li> <li>• Organized another successful SWE event where students brought ingredients to make their own sushi and conversed with fellow ERE students</li> <li>• Invited Career Center staff to talk with students about resumé development</li> </ul>	<p>January:</p> <ul style="list-style-type: none"> <li>• Organize Girl Scout engineering day to introduce girls to engineering</li> </ul> <p>February:</p> <ul style="list-style-type: none"> <li>• Attend SWE regional conference in Santa Clara for prof development and networking</li> </ul> <p>March:</p> <ul style="list-style-type: none"> <li>• Design exhibit for Freshwater Science Night for elementary school children</li> </ul> <p>April:</p> <ul style="list-style-type: none"> <li>• Fundraise (need ideas from students)</li> <li>• Organize clubs participation in 2011 ASCE/HSU ERE Awards Banquet</li> </ul>
<p><b>Environmental Resources Engineering Student Association (ERESA)</b></p> <p><b>Email:</b> eres@humboldt.edu</p> <p><b>Webpage:</b> <a href="http://www.facebook.com/hsu.eres">http://www.facebook.com/hsu.eres</a></p>	<ul style="list-style-type: none"> <li>• Hosted ERE Welcome Back BBQ, and Fall Follies to kick-off Thanksgiving</li> <li>• Arranged tour of new Mad River bridge by Caltrans</li> <li>• Organized Laser Tag event for student enjoyment</li> <li>• Facilitating a geotechnical presentation for the Ferdale Wastewater Treatment Plant</li> </ul>	<p>April:</p> <ul style="list-style-type: none"> <li>• Attend ASCE Mid-Pacific Regional Conference in Sacramento</li> <li>• Compete in ASCE wastewater treatment competition</li> <li>• Organize mock interviews to prepare ERE students for real job interviews</li> </ul> <p>May:</p> <ul style="list-style-type: none"> <li>• Host ring ceremony and reception for ERE graduates</li> </ul>
<p><b>Renewable Energy Student Union (RESU)</b></p> <p><b>Email:</b> resu@humboldt.edu</p> <p><b>Webpage:</b> <a href="http://resu.humboldt.edu">http://resu.humboldt.edu</a></p>	<ul style="list-style-type: none"> <li>• Cont'd work with EPA's People, Prosperity, and Planet (P3) projects</li> <li>• Tested efficiency of solar thermal panels for a solar water heating system at Rock Creek Ranch</li> <li>• Showcased in HSU Library</li> </ul>	<p>All semester:</p> <ul style="list-style-type: none"> <li>• Work on P3 projects continues</li> <li>• Continue designing solar water heating system and possibly a greywater system for Rock Creek Ranch</li> <li>• Gather wind speed and direction data from tsunami warning tower at the wastewater treatment plant in Manila</li> </ul>
<p><b>Engineers Without Borders (EWB)</b></p> <p><b>Email:</b> humboldtewb@gmail.com</p> <p><b>Webpage:</b> <a href="http://www.humboldt.edu/ewb">http://www.humboldt.edu/ewb</a></p> <p><b>Donate:</b> <a href="http://www.ewb.usa.org/chapters.php?ID=597">http://www.ewb.usa.org/chapters.php?ID=597</a></p>	<ul style="list-style-type: none"> <li>• Exhibited a rope pump and ramp pump at the 25th annual I-Block Party for Camoapa</li> <li>• Attended West Coast EWB Regional workshop at YouTube in San Bruno, CA</li> <li>• Invited guests from Camoapa and Eureka's professional EWB chapter to propose Camoapa projects to ERE students</li> </ul>	<p>All semester:</p> <ul style="list-style-type: none"> <li>• Develop design alternatives for Camoapa projects</li> </ul> <p>March:</p> <ul style="list-style-type: none"> <li>• Travel to Camoapa</li> </ul> <p>April:</p> <ul style="list-style-type: none"> <li>• Organize 1st annual EWB homebrew festival and fundraiser with good food, live music, microbrews, drawings, contests</li> </ul>

All-clubs Google calendar: <http://tinyurl.com/ERE-Clubs-Calendar>

**EWB Camoapa**

*Continued from page 1*

EWB has begun modeling the central system, and making an optimized model has been proposed as an ERE class project.

Another problem affecting water quality is sediment buildup behind the dam that supplies water for city residents. Satellite imagery should show the volume of sediment buildup and be useful if the city decides to remove the load at a later time. Other options for addressing the problem include clearing around the sluice gate or installing a floating intake.

Presenters also spoke of other smaller projects to consider. One deals with improving the public laundry facilities. In Camoapa, dressing nicely is socially expected, even in the poor conditions, and public laundry facilities are heavily used. Proposed projects at these sites include investigating laundry facility conditions, running water quality tests on water used, and developing greywater fields or banderos to treat the used water before draining into nearby streams. Also, the hand-powered pumps used at the sites are often vandalized or disabled, and a better pump design is needed.

Two other projects are needed in nearby villages. Bijagua has a spring that supplies water through a spring box that was partially broken when a tree fell on it, and funds are needed to replace this box.

In Luceros-Finca, an organic farm that provides youth services grows

food primarily to feed local kids and to help demonstrate more sustainable land management practices than conventional farming. The farm grows great food crops such as cashews, coffee, fruit, and the main staple of the area, beans. To collect water from a nearby spring, the farm needs a remote-operable pump to be designed and built.

One political issue that frustrates Camoapa is that federal money collected on water supplied there is not spent on maintaining the water supply in the city. The funds are redistributed around the country to help other Nicaraguans with their water issues. This type of political situation highlights water issues and the fact that this limited resource continues to generate human conflict.

At the end of the presentation, questions were taken. One attendee asked if the dam that held the water used by the city for drinking could be built any higher. The answer was no. Another question was, has Camoapa considered rainwater catchment? The answer was that water storage was viewed as a non-potable source because it is a potential vector for disease and, frankly, residents prefer the taste of groundwater.

Another question addressed at the presentation was if there had been any education efforts to alleviate social habits that contributed to water pollution and poor water conservation. The response was that residents are a very resource-conscious people, and that public education on

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environmental issues like not putting trash into rivers and other water bodies has improved water quality. This effort has resulted in a reduction in the rate of maternal deaths at birth due to waterborne disease.

EWB-HSU needs your help with projects for Arcata's sister city. The Mayor of Camoapa ended the presentation with a warm welcome to all who are interested in visiting and helping with any of these projects. EWB is now raising money for a trip sometime next year. For more info, the EWB-HSU meets Mondays at 5pm in Science D Rm 23. **END**

**The Results of Departmental (Mis)Communication**

<http://projectcartoon.com>



As Operations requested it



As Engineering designed it



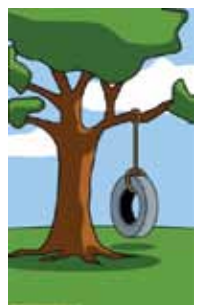
As Construction built it



As Works modified it



How it was documented



What the client wanted