HUMBOLDT STATE UNIVERSITY

Student Chapter American Society of Civil Engineers

ERE MESSENGER

Environmental Resources Engineering

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VOLUME 21, NUMBER 2 SPRING 2012

Andrea Achilli Joins ERE Faculty

by Andrea Achilli, ERE Assistant Professor

I am very excited to join Humboldt State University and the ERE Department this fall. For the past 6 years, I have been a Ph.D. candidate and postdoctoral researcher in the Department of Civil and Environmental Engineering at the University of Nevada, Reno (UNR). My studies focused on innovative osmotically driven membrane processes for water reuse and power generation. As part of my research, I developed a novel osmotic membrane bioreactor for wastewater treatment and water reuse. I also investigated pressure retarded osmosis and its application in water desalination to produce drinking water with a lower energy requirement than state-of-the-art RO systems. My research and the projects that stem from it are providing graduate students with research opportunities for their thesis and dissertation projects.

As a postdoc, I am actively involved in advising the Ph.D., M.S, and undergraduate students carrying out these projects, as well as others in our program. In addition to conducting research, writing proposals, and mentoring graduate students, I also taught a graduate-level course, Physicochemical Unit Processes, required for all Environmental Engineering graduate students.

Andrea and his soon-to-be wife, Kerri at end of Paris-Brest-Paris 2012 (a long ride!)

Prior to moving to Reno, I lived, studied, and worked in Italy. In 2002, I obtained a "laurea," or degree, in Environmental and Land Planning Engineering from the Universita' degli Studi di Ancona, and then worked as a professional engineer in a civil and environmental engineering firm. My engineering education and industry experience inspired me to find innovative solutions tied to water and wastewater sustainability, and motivated me to pursue a Ph.D.

My future research plan is to build on the fundamentals of transport and attachment phenomena and

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IN THIS ISSUE

FROM THE EDITORS

Hello from the Messenger staff! We hope you enjoy this Spring 2012 edition.

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"Human history becomes more and more a race between education and catastrophe."

H. G. Wells
(1866-1946)

Alumni Profiles

Beth Werner
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In August 2000 I moved to Arcata to study at HSU. Unsure of what degree path to follow, I took a semester off to study at Columbia University's Biosphere 2 Center, a fascinating research facility where individual biomes (desert, rainforest, ocean, savannah, etc.) can be isolated and studied. While at the center, I saw the importance of integrating academic disciplines, from physics, chemistry, and geology, to economics and public policy. Exploring the relationships between disciplines opened my eyes to the possibilities available to me as a student. When I returned to HSU, I decided to study Environmental Resources Engineering. I immediately found that the ERE program was akin to the Biosphere 2 Center because the program integrated students interested in the environment, social issues, planning and science.

Early on the path to my ERE degree I had a summer internship at the Lawrence Berkeley National Laboratory, where I investigated the efficacy of constructed wetlands in treating agricultural waste in the San Joaquin Delta. This internship began my passion for wetland science, and led me to begin working for Dr. Bob Gearheart, an experience that exposed me to local and global environmental problems. Dr. Gearheart instantly became my role model for how to approach unknowns, and it was his 'cowboy engineering' that led me to appreciate the spectrum of solutions available for any given problem.

I worked extremely hard to become an Environmental Resources Engineer, even failing some classes and feeling defeated. But, I persevered. If you are wondering if you can make it through the ERE program, my advice to you is this: assess if ERE is the correct path for you, and if it is, don't let anything stop you. The professional world needs graduates who aren't afraid to fail, learn, and then succeed.

After graduating, I worked for the California Cooperative Fish & Wildlife Research Unit at HSU, on their assessment of federal wetland reserve projects. This position took me around California's Central Valley to collect and analyze biomass and sediment samples, and to survey the volume and area of each wetland in the program. The goal of the project was to assess the ecosystem services provided by the wetlands in the federal program. The environmental degradation I was exposed to in the Central Valley was a direct result of poor policy decisions, which returned me to the importance of integrating policy, science and economics in land-use planning.

While I was working on the Wetland Assessment Project, a staff position became available at Humboldt Baykeeper, an environmental non-profit organization that is part of the international Waterkeeper Alliance. I saw this as an opportunity to incorporate my science background into an advocacy role for appropriate policy decisions. Today, I am the Executive Director of Humboldt Baykeeper, and I use the tools that I learned in the ERE program to discuss science-based policy issues, approach unknowns, and assess trade-offs.

While in school, I did not expect to be in the position I occupy today. Your education is the beginning of a journey filled with unknown destinations, and your engineering degree will open an array of doors for you. As long as you prove you have integrity and will work hard, the sky is the limit.

Alumni Profiles

Kurt Gierlich, PE

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After high school I had no aspirations to go to college. What I needed was some sort of Rite of Passage into adult life. This led me to hitchhike around the Mediterranean Sea for the better part of 1973, followed by half a year in Alaska. I spent most of the next year living in a tree in the woods, meditating on the question of what role I could play in society.

During my 1973 Mediterranean trip, I found myself sleeping in a bomb shelter in Israel in the middle of fighting in the Golan Heights, during the Yom Kippur war. This war fomented the oil embargo of 1973, and influenced Governor Jerry Brown in the mid-1970's to launch the first major alternative energy movement in California. These events gave me the political realization that our country should not continue being an oil-dependent society, and I decided to get involved in the development of alternative energy.

In 1976 I moved to Humboldt to attend College of the Redwoods and HSU. HSU's ERE program gave me a broad engineering background, but by the time I completed my studies in 1984, cheap oil politics had financially disabled the alternative energy movement, and few jobs were available in that field. Fortunately, there were plenty of engineering jobs involving hydraulics, soils, water quality, engineering economics, and other facets of engineering for which HSU had prepared me.

I accepted a job in San Diego at a large civil engineering firm. The firm put me in the field for my first 2 years to give me a reality check on design versus construction, and this was one of the most valuable educational experiences I've ever had. For the next 13 years I enjoyed working in the private sector, designing and constructing a wide range of civil engineering projects, such as reservoirs, pipelines, pump stations, roads, and also doing water system pipe network modeling and HEC-2 analyses for storm runoff. The ERE curriculum gave me the tools to accomplish all of these.

In 1996 I returned to Humboldt to work in the public sector as the City Engineer for Eureka. I work with local consulting firms and contractors, and with our in-house engineers, many of whom are also ERE graduates. The activities required to keep a small town operating optimally involve a diverse range of engineering and management skills, which keeps the work interesting.

Eureka is finally engaging in the growth of alternative energy, by installing electrical vehicle charging stations and photovoltaic arrays on City facilities. Now, it seems, the world is having the same epiphany I had about alternative energy that brought me down from the tree.

Daniel Joseph

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From an early age I had the idea that I could get more from my work than pay and responsibility – I could get satisfaction. I still look back and smile on all my good luck, and I feel good about the hard work I have done.

My first real job started before I could drive. At 5 in the morning I rode my bike to the local bread company to run the ovens. Following high school, I worked for a summer at the town swimming pool. And, as with the bread company, I quickly gained responsibility and was acting as one of the facility managers.

At the age of 21, I had a B.S. in Soil Science. By 22 I had a job at the Department of Natural Resources in the town where I was living, and the job was everything I had hoped for. I was traveling around the state, seeing places I had never seen, marching up and down streams, snorkeling for endangered fish, spelunking, and riding in boats, all in the name of protecting the environment.

Soon, however, I began to see this work differently. My co-workers and I witnessed some egregious forms of environmental destruction, yet felt we had to stand aside and keep quiet. We might be asked to assess the damage, but as researchers working for the state, our hands were tied. We couldn't be caught blowing whistles when we had public funds to raise. We had our data, and we produced our reports, but we could only hope someone else would take our work off the shelf and speak out. I knew that I needed more rewarding work – work that would act directly to protect the environment.

The following year I moved west and enrolled at HSU – the land of opportunity and a highly regarded engineering program, according to a relative living in the area. My plan was to begin the ERE graduate program after completing some of the core classes. Due to my previous degree in Soil Science, I had most of the math and science out of the way.

However, my ERE advisor asked me about my plans, and we discussed my options. What I really wanted was a working knowledge of engineering

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My REU Investigating Tulip Water Filters

by Jeffrey Novoa, ERE Junior

Last summer I conducted research at the University of South Florida, in Tampa, as part of their TIER-REU (Tampa Interdisciplinary Environmental Research-Research Experience for Undergraduates) program. I was provided housing and a stipend for my research, which I performed over a 10-week period during the summer. I worked under Prof James Mihelcic and graduate students Danielle Renzi and Sarah Hayman. The project was entitled "An Assessment of the Tulip Water Filter, a Point-of-Use Water Treatment Technology, and its Performance." My assignment was to help Danielle Renzi in her research on the performance of the filters. One of Danielle's objectives was to determine if there was a relationship between the amount of solids loading and the life of the filter.

Point of Use (POU) treatment water technologies are becoming widely used in developing countries due to their inexpensive production costs, ability to provide clean water onsite and relatively easy operation. The specific POU treatment I researched was ceramic water filters. My project focused on the Tulip water filter, a small candle type filter that uses siphon pressure to force water through a ceramic filter. The Ceramic is impregnated with colloidal silver to increase removal efficiency of bacteria and other contaminants in the water.

Danielle and I set up seven filters for testing. One filter was a control, and the other six were used in pairs. We spiked the water with silica sand to replicate water conditions in low, medium and high amounts of turbidity, and suspended the water using a mixer. We then put each filter in a bucket to siphon and, over time, clean the water. We determined flow rates each hour. We tested turbidity for every 2 liters of water filtered, and suspended solids for every 8 liters. For every tenth bucket of silica-spiked water tested, I collected water from a local pond on campus and sent it through the filter. For these runs, along with the turbidity, flow rate, and total suspended solids, we also tested for E.coli because the pond water was contaminated with coliforms. We wanted to determine the removal rate and compare it to the manufacturer's specifications.

On the weekends I spent time with my fellow interns. The TIER program set up field trips across Florida for us. We were also given a behind-the-scenes tour of NASA during the week of the final mission for the Space Shuttle Program. On July 8th several of us drove to watch the STS-135 Shuttle launch, and this was one of the highlights of my time in Florida.

At the end of the program there was a poster session for all the REU programs at USF that summer. There were materials/mechanical engineering, TIER, computer science, and physics programs. Approximately 60 TIER-REU students participated in the poster session, where we talked to our peers and professors about our research. Among the TIER posters, I won 3rd place for my poster and received a $200 travel stipend to present my poster at a conference of my chosing.

The experience at USF was very rewarding. I got hands-on experience performing laboratory tests according to Standard Methods, wrote a technical document about my research, gave mid-progress and final presentations, created a poster, and I met wonderful people. Coming back for my fall semester, I was more excited than ever to start school and continue learning. Participating in this research was one of the most rewarding experiences I've had in my studies to become an engineer, and it helped me feel more prepared for the REU I have this summer at Clarkson University in upstate New York. **END**

Jeff at TIER-REU 2011 final oral and poster presentations
University of South Florida, Tampa, Florida

SERC and Humboldt County's Renewable Energy Future

by Richard Engel (ERE 1988), Research Engineer
Schatz Energy Research Center, HSU, Arcata, CA

At HSU's Schatz Energy Research Center, we've been working on clean energy solutions for over two decades. In our earlier years, we focused on what was then a somewhat esoteric technology: using solar energy and electrolysis to make renewable hydrogen fuel, and using fuel cells to put this hydrogen to work in vehicles and stationary power plants. We saw hydrogen as a long-term approach to energy security with global potential.

In the ensuing years, the Schatz engineering team has brought our clean energy mission back home to Humboldt County, where we've become actively involved in local energy planning. Our first big project was writing a background technical report on local energy issues to help the County incorporate an energy element for the first time in its general plan. That effort led to our getting involved in a state-funded study to plan for a future in which Humboldt County will get most of its energy from renewable sources. This study, known as Humboldt Renewable Energy Secure Communities (Humboldt RESCO), is now nearing completion. I became involved in RESCO fairly late in the project, but it's exciting to be working to make real the dream of a fully renewable Humboldt. The soon-to-be-published RESCO Strategic Plan will make for some interesting, and perhaps surprising, reading.

If you ask someone on the street for local examples of renewable energy, they're likely to point out the solar electric systems and hot water collectors on the roofs of many homes and businesses. Solar photovoltaic technology is especially appealing because it works fairly well in most locations, even the foggy Humboldt coast, and it requires almost no maintenance. Humboldt was ahead of its time as one of the pioneering communities in adopting off-grid solar electricity for homes as early as the 1970s. However, solar is unlikely to play a major role in Humboldt's future energy mix. At a county-wide scale, the economics and resource availability associated with some other renewable energy technologies are much more compelling.

The RESCO study focuses on the year 2030, creating scenarios reflecting different levels of commitment to renewable energy. Under the "Business As Usual" scenario, natural gas will continue to be our most important fuel for producing electricity, with biomass-powered plants still playing a key role as they do today. In the "Bold" scenario, biomass provides somewhat more electric power than natural gas does, with wind and hydroelectric power assuming important secondary roles. The most ambitious scenario, called "Peak," has biomass providing almost two-thirds of county electricity, while the remainder of generation is split among wind, hydroelectric, and wave power. Natural gas is relegated to a very minor role. While it would be technically feasible to generate large amounts of power with solar technology, the RESCO analysis shows this is much less economically attractive for Humboldt County than developing these other renewable energy resources.

The study shows that the energy costs associated with the renewable-oriented scenarios would be moderate: about 5% more costly than Business As Usual under the Bold scenario, while the Peak scenario raises costs about

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SERC's RESCO Project Manager and 1990 ERE Grad Jim Zoellick facilitating a RESCO stakeholder's meeting
Photo 11/18/2010 by Matthew Marshall

Modeling Ground-Surface Water Interactions

by Brian Apple
ERE Senior and Environmental Systems (ERE Option) Graduate Student

The Henry's Fork Watershed Management Project focused on investigating the effects of changing land use and irrigation practices on local ground-surface water interactions, and was headed by Prof Robert Van Kirk of the HSU Mathematics Department. ERE Prof Brad Finney was one of four other faculty researchers involved in the project. One of the project's objectives was to develop quantitative models of ground and surface water flow under historic, current, and anticipated future water/land use scenarios. The study area of the project was the Henry's (North) Fork watershed in southeastern Idaho (near Yellowstone Nat'l Park). The Henry's Fork is the headwaters of the Snake River basin, and a renowned 'blue-ribbon' trout stream.

I had a B.S. in Forestry and Natural Resources from Cal Poly San Luis Obispo, and in the fall of 2008 I came to HSU for a second B.S. (in ERE), as well as an M.S. in Environmental Systems (ERE Option). I needed an M.S. thesis project, and I applied for a graduate research assistantship on the Henry's Fork Project. I was awarded the assistantship, and Professor Brad Finney became my thesis advisor. My task was to develop the groundwater model. At the time, I was only in Computational Methods I, so I didn't have much of a clue about how to create a model. But, the project sounded extremely interesting, and had full funding by the USDA, so the opportunity was too good to pass up.

The study region had historically been agricultural, and had been irrigated by surface water delivered through a high-density network of earthen canals. However, the conversion of agricultural land to developed land for urban and resort uses was occurring in several regions. The surface geology of the area is volcanic and highly conductive to fluid flow, and it was very difficult to accurately model the conductivity.

One of the real perks of the project was spending two summers in southeastern Idaho, specifically in Ashton. The area is beautiful, and both Yellowstone and the Grand Tetons are within a two-hour drive. My first summer was spent in the field, taking stream flow measurements in many of the canals and rivers. The purpose was to determine seepage loss rates which would be used as inputs for the model, as well as to provide assistance in gathering data for the Friends of the Teton River, a collaborating nonprofit agency. During my second summer, unfortunately, I wasn't able to play in the streams every day. Instead, most of my time was spent creating ArcGIS shapefiles (the spatial basis for the features in the model), and talking with local experts in an attempt to gather as much information as possible.

The Modflow-2005 groundwater flow model I used was constructed using the ModelMuse graphical user inter-

Headwaters of the Henry's Fork

face. Both of these are free from the USGS. The model covers roughly 580 sq. miles and almost 400 miles of canals. The canal seepage loss rates are a critical component of the model, and I had to alter the source code in order to match the observed loss rate of 2.7 ft/day. The model calibration period is for water years 1979-2008, during which the primary irrigation method changed from flood to sprinkler.

The development and calibration of the model was by far the most difficult task I have done in my life, and caused me considerable frustration. I was not always in the best of moods during these times, and one of the things I learned from these hardships was how supportive people in our program are. This support is one of the greatest strengths of the ERE community.

After three years, I can finally say the model is as calibrated as can be in its current configuration, which, at least for me, will be its last. I will be making scenario runs to determine the effects on groundwater of various practices, including lining the canals and removing areas under irrigation. Ultimately, I hope this model will be viewed as effective and used as a management tool, or provide the basis for one.

I've had my ups and downs throughout the graduate program, and frustration was a large part of my experience. But, as I mentioned, there always seemed to be faculty or students around to talk to, and that made a huge difference. I'm happy I chose HSU, and I feel the education you get here is top notch. But, even more important are the good friends you make.

For more info, go to the project website: http://www.humboldt.edu/henrysfork/ **END**

Brian measuring streamflows in a spring near Ashton

Continued from page 5

15%. The Bold and Peak scenarios also offer other benefits, including cutting county greenhouse gas emissions by up to 45% and creating up to 300 new local jobs. In the Peak scenario, about 2/3 of all energy consumed, including transportation energy, would be homegrown in Humboldt County.

More on transportation energy in a moment, but first note that the RESCO study focuses principally on the energy we use in our homes and other buildings. Today, this is mainly electricity and natural gas, with propane an important fuel in outlying areas of the county. It's not too difficult to see how we can gradually make our electricity supply greener by putting more renewable generators on the grid. Eventually, we can even use this renewable electricity to displace natural gas and propane by replacing combustion furnaces, water heaters, and boilers with efficient electric heat pumps. An aggressive energy efficiency strategy for buildings is also a natural part of the RESCO plan: the less energy we demand, the easier it is to supply it with renewable resources.

Greening the transportation sector will be tougher. Notwithstanding small amounts of biodiesel made from local restaurant fats, virtually all our transportation fuel today is barged into Humboldt Bay as refined gasoline and diesel. In the RESCO study, we are looking at ways to substitute renewably generated electricity for these dirty fossil fuels by promoting the use of battery electric vehicles and plug-in hybrid electric vehicles that would get all or most of their energy from the grid. Planners and environmental groups have long argued that we can also reduce transportation fuel demand by making fundamental changes in how we plan our communities and by promoting transportation alternatives such as public transit, cycling, and ride sharing. We agree; however, due to limited time and resources, we chose to focus RESCO on energy technologies and did not include these broader planning strategies in our analysis.

None of this local focus is meant to suggest that the Schatz Lab has walked away from the global energy vision of its early years. On the contrary, our portfolio of current projects includes providing quality assurance for efficient lighting products used in Africa and India, helping the Himalayan country of Bhutan develop its own version of a Smart Grid, and of course continuing to work with hydrogen and fuel cells. But we take special pride in helping our own community get ready for a renewable energy future.

To learn more about the Humboldt RESCO project, see http://redwoodenergy.org/renewables/renewable-energy-secure-communities. The Strategic Plan and other documents reporting on outcomes from the RESCO study will become available on this site in the near future. **END**

Internship at the Eureka Flood Center

by Nanette Nickerson, ERE Senior

The Eureka Flood Center (EFC) operates under the California Department of Water Resources' Department of Flood Management in Sacramento. The EFC was created in response to major flooding that occurred on the North Coast in 1955 and in 1964. In order to increase the state's ability to protect life and property on the North Coast, an extensive telemetering system was put in place in Northern California to serve the function of flood forecasting. The EFC was established in order to maintain that system of 35 forecast points, which generates a combination of precipitation, river stage, and river flow data. Additionally, the EFC was tasked to provide an avenue for developing relationships between the state and local emergency responders. The EFC's North Coast Flood Management Coordinator is 1997 ERE grad Sherry Constancio.

Today, the EFC is co-located with the National Weather Service on Woodley Island in Eureka. These two organizations work together to provide weather and hydrologic forecasting for the North Coast. The EFC monitors weather and river forecasts and provides regular updates to the North Coast river level forecast recording. We maintain, monitor, and report on forecast points that are located along the Smith, Klamath, Trinity, Mad, VanDuzen, Eel, Navarro, and Russian Rivers as well as Redwood Creek. Our area of responsibility extends throughout Del Norte, Humboldt, Mendocino, and Trinity counties. When rivers are forecast to rise above monitor or flood stage, we contact the appropriate local officials to make sure that they are aware of potential impacts to their areas. This forecasting may prompt actions ranging from keeping a closer eye on things, to temporary road closures, to evacuations.

I began my student internship at the EFC in May of 2009. My responsibilities include maintenance of telemetry equipment associated with precipitation data collection, attending Operational Area meetings with the Office of Emergency Services for Humboldt and Del Norte Counties, and working in the Tsunami Education Room at the Humboldt County Fair for a couple of shifts each summer.

Earlier this year, we experienced some of the most intense high water that has occurred over the course of my internship. Both the Smith and Klamath Rivers were forecasted to go above flood stage, Redwood Creek was forecasted to rise higher than it has since the Orick levee system was built, and Del Norte County activated its Emergency Operations Center. While not all of the forecast predictions came to pass, we were busy monitoring the weather and the rivers, notifying local officials of the forecasted river rise, and accumulating information about issues that arose as the weather event proceeded.

Some of my job responsibilities seemed somewhat disconnected when I began working here. However, they all came together as this spring's big storm progressed. The people I exchanged information with were all familiar to me as a result of my attendance at many local meetings. The telemetry equipment I had repaired and calibrated was all working properly and providing quality precipitation data that assisted the California and Nevada River Forecast Center in forecasting the river stages. Data I had gathered informed the Office of Emergency Services coordinator for Del Norte County, guided their recommendation for a voluntary evacuation of the low lying areas in Klamath, and assisted in the decision to shut down schools for a day in anticipation of possible road closures and slides.

What I like most about my job is the opportunity to work within the emergency response community on the North Coast, and informing, protecting, and assisting members of the community. One of the groups that I have the privilege of working with is the Redwood Coast Tsunami Work Group. As a member of this group, I assist a local professional geologist in preparing for and implementing a tsunami evacuation drill for the community of King Salmon. Until recently this community has lacked an official evacuation site.

Last year, PG&E provided funding for a tsunami siren, access to high ground, and improvements to trails leading to the evacuation site. I participated by canvassing the area the week prior to the drill and notifying King Salmon residents of the upcoming drill, and also by providing assistance on the day of the drill. I've found that the most valuable part of this position has been working cooperatively with the local community. I appreciate the opportunity to collaborate with emergency responders on the North Coast. People here know that access into and out of Northern California can easily be severed due to storms or earthquakes. In general, the attitude on the North Coast is one of self sufficiency and cooperation. I have developed a deep admiration for the collaborative spirit that I have witnessed among the people who live and work in this area.

Next semester will be my last at HSU, and the Eureka Flood Center will soon be looking for a new student intern. If you are interested in water resources or emergency response, I highly recommend considering this upcoming position. **END**

My Tale of the F.E. Exam

by Sterling Wallstrum, ERE Senior

On our journey to become a Professional Engineer (P.E.), we engineering students have two major tests to pass beyond those in school. The first is the 8-hour Fundamentals of Engineering (F.E.) Exam. After passing the F.E. Exam and graduating with your B.S. in engineering, you must work under a Professional Engineer (P.E.) for two to four years before being eligible to take the P.E. Exam.

I recently took the F.E. exam and would like to share my experience and advice with future engineers. The first step in surviving this exam, as with any other, is plenty of preparation. Several of us ERE students set up weekly study sessions, and we attempted to cover all the topics presented on the test. The material on the test is covered in the FE-supplied Reference Handbook, a major asset for test preparation. Know the ins and outs of this handbook. A new copy is supplied to you on test day, and it is important that you are able to navigate through the booklet quickly to find concepts and formulas during the exam. It is also important that you are familiar with your FE-approved calculator. I used the TI-36X Pro, and recommend it highly. Be sure to use the handbook and approved calculator during your study sessions so that you are fully prepared on test day.

Our study sessions consisted of topic overviews ranging from general mathematics to thermodynamics. In the weeks approaching test day, we geared our study sessions to practice exams similar to the actual FE Exam. We typically worked together on the practice exams, and I feel this worked well to prepare me for the test.

The 8-hour FE Exam is broken into two sessions. The 4-hour morning session has 120 questions, leaving an average of two minutes per problem. The 4-hour afternoon session has just 60 questions, but they require more thought. Accordingly, the average pace for the afternoon session is four minutes per problem. The afternoon session is also geared toward a specific discipline, which you choose at the time of registration. The majority of us signed up for 'other disciplines' because ERE faculty had suggested it was generally easier for our students than the other choices.

A group of us traveled down together and shared a hotel room just a few blocks from the San Mateo Event Center, the FE exam location. I highly advise a thorough check up of your vehicle prior to travel. Our group was on the verge of not making it to the exam, because the car overheated halfway to Willits. Luckily, we were able to limp in.

Test day began for me with a lot of sudden wake ups, thinking I had missed the check-in time of 7am. Sure enough, multiple alarms sounded at 6 AM to wake us all up. We loaded up on coffee and continental breakfast, packed our lunches and headed to the event center just blocks away. By this time, my anxiety had been supplanted by a strong desire for the test to be over. We arrived at the event center on time and took our seats in the auditorium. The experience was slightly Orwellian, with 500 engineers listening attentively to the strict protocol voiced over the intercom by the head proctor. Test materials were handed out, and permission was granted to begin.

I did not take a watch or clock, so I simply tried to answer questions as quickly as possible. When I could not answer a question immediately, I went on to the next. By the fifteen-minute warning to end the morning session, I was hungry, thirsty and a bit light headed. But, I had just enough time to review skipped questions. At the one-minute warning, I frantically guessed my remaining questions and dropped my pencil. The afternoon session was similar, although having fewer (but longer) questions gave a false feeling of not being as rushed. At the end of the day we were all anxious to enjoy a night to remember in San Francisco.

We have yet to receive our results, but I hope this tale will aid you in passing the FE in the future. **END**

"If the only tool you have is a hammer, you tend to see every problem as a nail."

Abraham Maslow

ERE Team is Third at ASCE Wastewater Treatment Competition

by Ben Adams, ERE Junior

On March 24, 2012, a team of eleven ERE students traveled to UC Berkeley to defend HSU's title as A.S.C.E. Mid-Pacific Wastewater Treatment Champions. Twelve teams paticipated from the Mid-Pacific region, which spans the northern half of California, Oregon, Nevada, China, and Canada.

The fierce competition commenced at 6:00 AM and lasted until 4:30 AM. Each team was judged on its design report, design cost, presentation, team spirit and effectiveness of its system via various water quality parameters. Local practicing professionals on the judging panel selected the winners. HSU placed third, behind Sac State and UC Berkeley. **END**

Alumni Profiles

Continued from page 3

concepts, one that I could apply to real world solutions. I soon decided that a second bachelor's degree, this time in ERE, would be my best preparation.

Before graduating I worked a summer at StormwateRx, a small company in Portland, Oregon, building treatment systems for industrial stormwater runoff. When I left Portland at the end of the summer, I had an excellent offer for a full-time job upon finishing school. I returned the following year and have been here since.

Louis White, PE

B.S. ERE 2004
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Although I entered HSU as an ERE major, I really came to HSU for Cross Country, Track and Field, and surfing. However, I soon started to apply and expand my passions for mathematics and physics to solving real-world problems related to the environment. I also learned the valuable lessons of time and stress management, which were essential for maintaining good academic performance and sanity while participating in intercollegiate sports.

During the summers I obtained engineering internships. One summer, I performed staff engineering duties for a construction contractor that was implementing an HSU campus-wide infrastructure upgrade. Another summer, I worked for the Indian Health Service designing water and wastewater systems. I learned about engineering design, surveying, cost estimating, and construction observation, and I got to travel to many beautiful locations all over Humboldt, Del Norte, Trinity, and Siskiyou Counties. Later, I also helped the National Weather Service develop a wave forecast model for predicting extreme wave events at the Humboldt Bay harbor entrance.

I decided to attend graduate school after graduation, and I moved to Newark, Delaware, to start an M.S. degree in Ocean Engineering at the University of Delaware. I was quickly introduced to the Environmental Fluids Laboratory, which became my home base. Although my coursework focused on ocean fluid mechanics, waves, and coastal and estuarine physical processes, my research and thesis topic was atmospheric turbulence and dispersion in and over cities. I conducted experiments in a water tunnel and measured turbulence over model urban canopies. Graduate school was a lot of hard work, but ended up being one of the best times of my life. I was extremely challenged academically, but I also made friends from all over the world.

In 2007 I took a job in San Francisco as a coastal engineer with Philip Williams & Associates (PWA), an environmental hydrology and engineering consulting firm specializing in the restoration of coastal, estuarine, and fluvial ecosystems. What I liked most about PWA was its dedication to a high level of technical standards, as well as its company-wide mission to achieve the protection, enhancement, and restoration of water-dependent ecosystems. In 2010, PWA merged with Environmental Science Associates to become ESA PWA.

My work with ESA PWA comprises all aspects of engineering, including concept planning, technical studies and modeling, engineering design and cost estimating, and construction observation. One of the best feelings you can have as an engineer comes from seeing a project constructed that you designed, and to observe how it evolves over time.

I hope my experience provides some perspective to current students. There are so many opportunities for ERE students to take advantage of: summer internships, professors' office hours, and the vast community of ERE alumni. If you are interested in coastal engineering or ecosystem restoration, feel free to contact me. **END**

Andrea Achilli

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biological processes, and utilize systems engineering to provide innovative solutions for sustainable water and energy production. Water sustainability is essential for meeting our needs for potable use, agriculture, and sanitation in both developing and developed countries. Renewable energy technologies are imperative in deterring dependence on and depletion of fossil fuels. In both cases, high-quality products, strategic decentralization, minimized waste outputs, and efficient energy transfer are key objectives to achieving sustainable energy/water production systems. Membrane technologies are pivotal in meeting these key objectives for desalination and water and wastewater treatment, and have more recently gained merit in energy recovery/power generation.

At HSU, I will utilize the University's unique coastal location to develop a research and education program based on hybridized membrane systems for desalination, water reuse, and power generation. I look forward to strategically expanding my research through teaching and collaborating with the respected faculty and dedicated students here at HSU. **END**

ERE Clubs Information Board

Compiled by Tahsa Sturgis, ERE Junior

Organization	Spring 2012 Activities	Fall 2012 Planed Activities
Environmental Resources Engineering Student Assn (ERESA) **Email:** eresa@humboldt.edu **Webpage:** http://www.facebook.com/hsu.eresa	• Coffee Table • Mock Interviews • ERE Rafting Trip • Graduation Reception	• Coffee Table • Welcome Back BBQ • Pizza with Professionals • Fall Follies • Lazer Tag • All Clubs Meeting
Engineers Without Borders (EWB) **Email:** humboldtewb@gmail.com **Webpage:** http://www.humboldt.edu/ewb **Donate:** http://www.ewb.usa.org/chapters.php?ID=597	• With North Coast Professional EWB, continued work on projects in Camoapa, Nicaragua • Collected precipitation data	• Movie Night • Tamale Feed / Sales • Poker Night with 50-50 split of profits going to EWB and the winner • I-Block Party
Renewable Energy Student Union (RESU) **Email:** resu@humboldt.edu **Webpage:** http://resu.humboldt.edu **Mailing List:** renewable_energy_student_union@google.com	• Conducted pressure testes on 3 solar thermal panels • Solar hot tub project • Built a mini micro-hydro system for SERC	• Recruit new memebrs (Join mailing list at left) • Continue solar hot tub project
Society of Women Engineers (SWE) **Email:** swe@humboldt.edu **Webpage:** http://humboldt.edu/clubs/club_sites/society_of _women_engineers1	• Held 2nd annual SWE Social (Local woman engineers provided insight & inspiration) • Sponsored ERE end-of-year BBQ • Girl Scout day in Science D • STEM (Science Technology Engineering and Math) advocacy in local elementary schools	• Annual SWEshi (We make and eat sushi to promote ERE student involvement in SWE)

Get Involved: Learn, Lead, Help, Enjoy

HSU and ERE Awards

Compiled by Mary Jo Sweeters, ERE Admin Support Coordinator

2012 HSU OUTSTANDING STUDENT AWARDS

http://now.humboldt.edu/news/campus-honors-outstanding-students/

CATEGORY: Awards for Excellence in an Academic Discipline - CNRS

• Zach Stanko (ERE Senior)
Academic excellence, leadership, teamwork and fostering community among his fellow students.

CATEGORY: Best Professional Publication (Team Award)

• Rick Bailey (ERE Senior)
• Brenda Howell (ERE Senior)
• Zach Stanko (ERE Senior)
Nominated for their paper in the 2011 Int'l Mathematical Contest in Modeling. One of only 6 of 736 teams to receive the highest award, "Outstanding Winner."
Paper Title: "Electric Cars as a Widespread Means of Transportation"
Publisher: *Journal of Undergraduate Mathematics and its Applications*

AY 2011-12 ERE STUDENT AWARDS

https://www.humboldt.edu/engineering/student-life/awards

Alden Burrows Engineering Scholarship for outstanding leadership and academic excellence in Statics and Dynamics
Honors former ERE Professor Al Burrows
• $1,000 Alisha Sughroue

Homer Arnold Award for outstanding achievement in applied engineering design involving environmental and resource problems
Honors former HSU Civil Engineering Professor Homer Arnold
• $450 Zack Chandler
• $450 Jessica Bruce

Landau Award
Random drawing each semester from ERE students who have successfully completed ENGR 331 "Thermodynamics"
Honors 1984 ERE graduate Jay Bower
• F 2011: $500 Shira Wedemeyer (graduated Fall 2011)
• S 2012: $500 Not known at time of ERE Messenger publication

Roscoe-Schenler Award for outstanding potential in engr scholarship involving environmental and resource problems
Honors former HSU Civil and ERE Professors Jim Roscoe and Bill Schenler
• $750 Ryan Brown
• $750 Lianna Winkler-Prins

Winzler & Kelly Award for demonstrated leadership in Environmental Resources Engineering related activities
Honors local engineering firm GHD | Winzler & Kelly
• $250 Enrique Diaz
• $250 Elisabeth Johnson-Flores

Outstanding ERE Graduate
• Zak Stanko