

ERE MESSENGER

Volume 14, Number 2

Spring 2001

ERE Grad Finds Niche in Egypt

by

Jeff Hendrich (ERE 1997)
Environmental Engineer
Harza Environmental Services, Inc.
Fayoum, Egypt

I came to Humboldt in 1988 in pursuit of an engineering degree as a transfer student from the University of Georgia. Having attending a large southern university, I was surprised and refreshed to find the atmosphere at Humboldt to be very personal, open, and easy-going, yet challenging in every respect. I can not say that engineering course work came to me naturally, nor will I attest to having been one of the most disciplined students. Nonetheless, as former ERE professor Mac McKee told me after reviewing my Georgia transcripts, "The fact that you have taken every college mathematics course twice is not a good measure of your mathematical aptitude, but it certainly does demonstrate some tenacity. I think we can make an engineer out of you." Four (and bit more)

years later with the help and dauntless efforts of some special members of the ERE faculty (to which I am eternally grateful), I graduated. Inspiration came to me when I first saw a small constructed wetland gray-water system at CCAT. I thought, "how elegant and effective". After two years of getting in the muck with Dr. Bob, I was convinced and I became a wetland disciple.

My first assignment took my good friend Pietie and me to Mexico as volunteers by invitation. I traveled by bus with Pietie to the southern state of Chiapis to design and construct a small, demonstration wetland treatment system for a technical secondary school. I can say today that it is perhaps the most exciting and rewarding project with which I have been involved. With the generous support

• continued on page 4

Jeff Hendrich (center) and friends.



In This Issue

EREnewal	2
Mike Anderson	
Why is SD 17 Empty?	3
Lynn McIndoo and Sangam Tiwari	
Expanding Your Horizons.....	4
Jillian Gayheart	
Building Big	5
Heidi Gehlhaar	
Alumni Profile	5
Former IDT Student Presents Projects in Honduras	6
Lincoln Balassa	
IDT Student Explores Cuba's Potential	7
Lynn McIndoo and Sangam Tiwari	
Wetland Database Improved for EPA	8
Brad Finney	
SWE Flume Provides Fun for All On Your Marks, Get Wet, Learn!	9
Lynn McIndoo and Sangam Tiwari	
What do YOU Think About the ERE Website?	10
Beth Eschenbach	
What Did ERE Students Do Last Summer?	11
Find Out What Some Graduate Programs Have to Offer YOU! ..	12

EREnewal

by
C. Mike Anderson
ERE Professor and Chair

The HSU ERE program is at a critical point in its history in terms of facilities, equipment, and accreditation. Consequently, over this past year I worked with Rich Corsi (ERE 1983), University of Texas at Austin Professor of Civil Engineering and Director of the Texas Institute for the Indoor Environment, to form the EREnewal Committee and create the EREnewal Fund. Critical assistance was also provided by Mary Wells, HSU Senior Development Officer. The committee is made up of seventeen ERE alumni volunteers and is chaired by Rich Corsi. It intends to raise \$400,000 from ERE students, parents, alumni, employers, and other individuals and corporations to help renew and reinvigorate the ERE Program.

This is a very ambitious undertaking, but we know it will be worth the effort. Donations to the EREnewal Fund are tax deductible as allowed by law, and go entirely to the ERE Department. Funds will be deposited in HSU Foundation trust accounts that are administered by the ERE Chair. The EREnewal Committee will mail support request letters to more than 800 ERE alumni in January 2001, with requests to other potential donors later in the year. Recently, a

member of the EREnewal committee and spouse made the first donation to the fund: \$4,000 cash, plus a \$12,000 employer 3-to-1 matching equipment gift from IBM!

With approximately 200 major students, ERE is the largest and sixth oldest of the 27 (five on the west coast) accredited, undergraduate environmental engineering programs in the U.S. The program's historical success is due in large part to four factors: the number and quality of ERE faculty members, the ERE curriculum, enthusiastic and dedicated ERE students, and the outstanding professional contributions of ERE graduates working productively every day in the real world. But program success is vulnerable to weaknesses associated with these and other factors.

The ERE program has been accredited by the Accreditation Board for Engineering and Technology (ABET) since 1981. ABET Accreditation enhances ERE's academic and professional standing in the community, and increases employment and graduate school opportunities for ERE graduates. However, the past several ABET evaluation reports, spanning more than a decade, have been critical of ERE facilities and equipment, and of university administration financial commitment to the program, especially support for facilities and equipment. The program is significantly short of laboratory space (by about 50%) and does not receive enough annual funding to upgrade and maintain state-of-the-art equipment and instrumentation necessary to sustain its position as the preeminent undergraduate environmental engineering program in the country. Something must be done soon to change this situation, not

merely to maintain minimum accreditation standards, but to continue to offer a truly excellent education to ERE students. While CSU and HSU administrators must increase financial support of the program, it is clear that a world class ERE Program cannot be sustained at HSU by state funds alone. Additional support must be obtained from other sources, including ERE alumni and friends.

Fortunately, there is some good news in all of this. Last summer, we were finally able to upgrade the eight-year-old computers in the ERE Computation Laboratory, and this semester, with the support of the HSU administration and funding from the California Workforce Initiative, the department will regain control of the entire bottom floor of Science-D and add a much-needed ERE Design Studio there. In addition, quality space in a nearby building is being made available for a modern thermodynamics and renewable energy laboratory. However, this is simply a long overdue good start, and much more is required.

To help renew and reinvigorate the ERE Program and provide ERE students with a world-class education, EREnewal funds will be used to:

- Upgrade and maintain ERE facilities. We need to add a second design studio, expand and upgrade our water and air quality lab, add a "dirty" water lab facility, add a space for conducting long-term experiments, and relocate our thermodynamics and energy resources lab. In addition, the main ERE Science-D entrance looks like a loading dock and needs a "face lift" so as to invite people in.

- Locate all ERE facilities in a single geographic area of campus. To encourage and support interaction (advising, group projects, collaborative research, etc.) among and between students and faculty, and to promote convenient and safe travel between facilities around the clock, all ERE facilities must be located in a single geographic area of campus. The ERE Department supports locating all ERE facilities in one or two adjoining or

S T A F F

EDITORS

Lynn McIndoo
Sangam Tiwari

DESIGN AND LAYOUT

Mike Anderson

PRINTING

University Graphic Services

For comments or subscriptions:
ERESA@axe.humboldt.edu

neighboring buildings.

• Upgrade and maintain ERE equipment. Much of ERE's current laboratory and field equipment is old and in need of repair or replacement, and not sufficient in quantity to support individual student work stations.

Additionally, new or replacement computers are needed for ERE labs and faculty offices, and additional software is needed for ERE computers. Student access to appropriate computing facilities outside class hours (for homework, projects, etc.) is a particularly significant problem.

• Design and implement a department-level student recruiting program. Both ERE major enrollment and FTES decreased significantly over the past five years. While both appear to have bottomed out, some new efforts are needed to attract additional quality students. Currently, most recruiting is carried out by the Office of Enrollment Management; we plan a four-pronged recruiting effort that directly involves ERE faculty, students and alumni.

• Maintain ABET accreditation.

For additional information on EREnewal, please contact EREnewal Committee Chair Rich Corsi at <corsi@mail.utexas.edu>, or ERE Chair Mike Anderson at 707-826-3617 <cma2@humboldt.edu>.

EREnewal Committee members:

- Richard Corsi (ERE 1983)
- Mark Dubrow (ERE 1991)
- Sarina Ergas (ERE 1988)
- Michael Garello (ERE 1999)
- Wendy Humphries (ERE 1996)
- Tony Llanos (ERE 1996)
- Daene McKinney (ERE 1983)
- Martha Moore (ERE 1985)
- Karen Murphy (ERE 1983)
- Peggy Olofson (ERE 1992)
- Tony Petrocchio (ERE 1984)
- Eric Polson (ERE 1984)
- Patrick Sullivan (ERE 1996)
- Elizabeth Smith (ERE 1986)
- Todd Thalhammer (ERE 1992)
- Robert Wienke (ERE 1984)
- Suzanne Wienke(Shelton) (ERE 1984)

ERESA

WHY IS SCIENCE D 17 EMPTY?

by
Lynn McIndoo and Sangam Tiwari
ERE students

During the last ABET accreditation visit, it was recommended that the administration increase the size and improve the quality of the ERE laboratory facilities. The response of the administration was to return Science D 17 to the ERE department. SD 17 will be used as a design studio, equipped with 12 to 13 new computers, similar to those in SD 15. The lab will also have a new scanner, plotter, and color laser printer.

The ERE department is still in the process of designing the layout of the room. They want the room to be flexible, allowing for dynamic group work while still providing a setting for more traditional classroom lectures. Student input for the layout is greatly encouraged. Access to the lab

will be available sometime this semester, although specific dates are still pending. **ERESA**

Top Ten Reasons to Date an Engineer

10. The world does revolve around us... we choose the coordinate system.

9. No "couple" enjoys a better "moment".

8. We know how to handle stress and strain in a relationship.

7. We have significant figures.

6. EK301: The motion of rigid bodies.

5. Projectile motion: Do we need to say more?

4. Engineers do it to specification.

3. According to Newton, if two bodies interact, their forces are equal and opposite.

2. We know it's not the length of the vector that counts, but how you apply the force.

And the number one reason to date an engineer:

1. WE KNOW THE RIGHT-HAND RULE!

CALENDAR

Join us and take part in these
Spring 2001 activities.

JANUARY

Spring Tutoring Program Begins

FEBRUARY

MathCOUNTS
ASCE Nat'l Engineering Week
ASCE Design Competition

MARCH

Comedy Night
ASCE Mock Interviews
Expanding Your Horizons

APRIL

ERESA Annual Rafting Trip
ASCE/ERESA Awards Banquet
ASCE Water Treatment Competition

MAY

Good Luck Grads!

Egypt

• continued from page 1

of the local government and the efforts of many young ambitious hands, a small wetland was constructed to show how low cost it can be to use natural systems in order to clean domestic sewage. It became clear that with common support and enthusiasm nearly anything was possible.

My second assignment was of quite another flavor. After returning to Humboldt, I met with an old acquaintance that was involved in refugee relief work in Africa. After being completely intrigued by tales of his experiences, I contacted several relief agencies and was quickly hired as a water and sanitation field engineer. I was shipped out to rural Tanzania where I was posted to construct water and latrine facilities, and implement malaria control programs for the refugees fleeing Rwanda and Burundi. These were trying times for the people of central Africa. I learned many lessons about survival and the will of people. I made many friends. One experiences the best and worst that a person can be in such situations. I realized the significance of clean water and good sanitation. At the completion of my stay in Tanzania I declined a second assignment in Azerbaijan, deciding instead to enter into the private sector. I became involved briefly in a family construction enterprise that took me to Turkey. There I learned to enjoy the many fine aspects of the Middle East that you so rarely see on the nightly news and learned a bit about private international business and the food chain.

Interested in continuing to work internationally, specifically the Middle East, I joined Harza Environmental Services, a division of Harza Engineering Services, in 1998. Harza needed an environmental engineer to work on overseas assignments in "challenging" regions. They took interest in me because of my unique international work experience in the water, sanitation, and construction field. My first assignment with Harza was a potable water loss study in the

Eastern Turkish capital of Diyarbakir. This assignment required intensive daily contact with not only the water authority and local government authorities, but also the people of Diyarbakir. Through my work, I was afforded a unique insight into the lives and homes of the Turkish people, again making many friends. I realized then what water means in a place such as the Middle East. In 1999, I was transferred to Egypt where I served as Environmental Engineer under a USAID Water and Wastewater Master Planning Contract for Middle Egypt. My specific tasks under the project were varied. Highlights included researching wetland applications to treat rural wastewater, contributing to a Water Quality Management Feasibility Study of Lake Qarun, monitoring existing water and wastewater facilities, and conducting village water and wastewater service assessments, and hob-knobbing with some government types. Currently, Harza continues work in Egypt. I am presently based in the Harza/Egypt home office in Cairo ramping up for a construction management contract overseeing water and wastewater infrastructure improvements recommended under the Middle Egypt Master Plan.

This is my story. I hope you enjoyed it. In closing, I offer a few words of advice and incentive as one who hasn't followed a traditional path. I would like to say to all you ERE students who are wondering what it's all about after graduation and considering international careers: Hang in there and if you feel the urge to work and travel as an environmental resources engineer then its "Wide Open". Be inclined to take a few risks, try different things, and be open to new experiences, cultures, and customs but remember that engineering is for people and the environment. Based upon my short experience, communication, observation, and friends are the most important elements to a successful international engineering experience. Also a hobby helps. Cheers! **ERESA**

Expand Your Horizons

by
Jillian Gayheart
ERE Student

Humboldt State University will be hosting the Expanding Your Horizons (EYH) conference for young women on March 31, 2001. Expanding Your Horizons is a conference for 6th - 8th grade girls that is presented every other year. The conference encourages the girls to consider careers that require math and science. The workshops provide fun and exciting, hands-on experience in the math and science fields.

Local women professionals and college students present the workshops. Each girl selects 2 of 50 workshops from 15 different categories. During lunch, the participants attend the science mall where local professionals have informational booths on math and science-related careers and more hands-on activities. Parents and teachers are welcome to attend adult workshops that focus on helping the girls to succeed. The workshops cover college preparation and other useful information.

The upcoming conference will mark the third generation of SWE involvement with EYH. This year, SWE will be developing and facilitating three different workshops. One involves river hydraulics, where the girls design, construct, and test their own flume inserts made of Styrofoam. Another workshop will be related to activities from last semester's Building Big. For example, the participants may design and test their own bridges. The third workshop may allow the girls to build their own simple circuits that are powered with photovoltaic cells.

The Expanding your Horizons conference is expecting anywhere from 300 to 400 young women, coming from all over Northern California. If you would like to participate, please contact swe@humboldt.edu or see the EYH web page at <http://www.humboldt.edu/~eyh>. **ERESA**

Building Big Brings Awareness of Engineering to the Public

by
Heidi Gehlhaar
ERE Student

Last fall, a national project called Building Big was launched to educate the public about civil engineering. Building Big is sponsored by WGBH in Boston, the largest PBS station in the country. WGBH produced a five part miniseries on megastructures and the people who have designed and built them. Five one hour-long programs on Bridges, Domes, Skyscrapers, Dams, and Tunnels aired throughout October.

WGBH also awarded one of ten \$13,000 grants to our local PBS station, KEET-TV of Eureka. KEET formed a model community with partners including the North Coast Branch of ASCE, the Humboldt County Office of Education, and the Boys and Girls Club Eureka Teen Center to educate local children about the world of civil engineering.

During September and October, professionals and ERE students from our local engineering community visited 7th and 8th grade classrooms in Humboldt and Del Norte Counties. The classes had an opportunity to do hands-on activities that introduced them to concepts such as tension, compression, and load.

Each class was also given an instructional video describing how to develop a concrete mix and how to create a concrete test cylinder. The cylinders created by local classes were tested in the SHN Consulting Engineers' laboratory to determine their compressive strength. The winning class (Mr. McCullough's class at Loleta School) received T-shirts, an ice cream social, and \$500 for instructional materials.

In addition, a Build-A-Thon was held at the Bayshore Mall on November 11th. The Build-A-Thon was a one-day community event meant to high-

light the profession of civil engineering. Hands-on activities, videos, and the SWE flume were on display. A large number of HSU ERE students and faculty participated. Many thanks to all of you who visited classrooms and assisted at the Build-A-Thon!

The Building Big project culminated on November 14 with the debut of the local television program on engineering wonders. The hour-long special *Engineering Is Everywhere* was hosted by ERE student Heidi Gehlhaar, along with local 7th and 8th graders, and featured ERE professor Robert Gearheart. The program explores the engineering and the history behind Fernbridge, the Humboldt Bay dredging project, the Arcata Marsh and Wildlife Sanctuary, Ruth Dam, and the Crescent City Breakwater. The challenges and triumphs of each engineering wonder are explored, along with their importance to the North Coast community today. *Engineering Is Everywhere* was recently nominated for a local Emmy Award. The program was chosen from among a number of educational programs from the Northern California area, including San Francisco and Sacramento.

Building Big continues into 2001 with an essay contest on local engineering wonders for 7th and 8th grade students. More than 30 entries have been received and are currently being judged. The writers of the top 7th and 8th grade essays will each receive a personal computer. The national Building Big series and the local program, *Engineering is Everywhere*, will be rebroadcast during KEET's pledge drive in March. Local engineers and students plan to help work the KEET phones during the drive.

If you are interested in volunteer-

ing during the KEET pledge drive or would like to get a video copy of *Engineering Is Everywhere*, contact Heidi at <hmg4@humboldt.edu>.

ERESA

Alumni Profile

Jennifer Petrik (ERE 1998)
Engineer
Schiller Associates
Boulder, CO

I work for Schiller Associates, an engineering firm that deals with large-scale energy conservation with utilities in California, Wisconsin, and Texas. We develop and implement monetary incentive programs for the utilities. We have offices in Boulder, Colorado, and Oakland and Long Beach, California. I work in a cubical in front of a computer all day. I check energy savings calculations of Energy Saving Companies (ESCOs) who are applying for incentive dollars in exchange for kW and kWh savings that ultimately show up at the power plant.

I do regression models to find correlations between weather data and Schiller kW usage. I write up my findings and recommendations for approval or rejection for a particular project and send it to the utility company. This is a niche in the energy industry. There are many ESCOs out there that solicit potential sites (grocery stores, hotels, hospitals, etc.) for work. In exchange they guarantee a certain percentage of energy savings that show up in the site's utility bill.

Schiller (www.schiller.com) is currently hiring engineers. Contact me at <jenniferp@schiller.com> for information. **ERESA**

NOTE:

There is the possibility that a two week design course in treatment wetlands may be offered by Dr. Gearheart shortly after the spring semester ends.

Former IDT Student Presents Projects in Honduras

by
Lincoln Balassa

Honduras is by most indices one of the least developed countries in the western hemisphere. It is also a country of majestic beauty and friendly culture. A mountainous terrain, little infrastructure development, and an unstable political environment have had implications on the ability of Honduras to create employment and economic stability, and thereby utilize its natural resources. The opportunity that comes with this crisis is that Honduras is still 50 percent forested and the population is still at 50 percent of its potential. Most families live on a combination of subsistence agriculture, hiring out their labor, and exchanging of goods and services.

Like the rest of the world, urbanization is steadily growing. People are drawn to the cities to gain access to jobs, health care, and educational facilities. What they often find instead is under-employment while living in violent slums without sanitation and traditional safety nets such as family support, community identity, and land on which to grow staple foods.

Health care in Honduras is adequate even by standards for developed countries, but only for the few people who can afford it and live in or near urban centers such as San Pedro Sula and the capital, Tegucigalpa. For most people, health care is limited to illness or injury that is life-threatening. Traditional therapies based upon herbal remedies and indigenous health practices play a significant role in the health care system of Honduras. However, what makes traditional therapies inexpensive and accessible have also lead to practitioners that have had no standardized training at best. Acute injuries and illnesses are

frequently treated improperly because emergency medical services are difficult, if not impossible, to obtain.

This paints a rather harsh picture, but the experiences I have had in Honduras over the last six years have shown me a country rich in scenic beauty, people that are kind and generous, and an opportunity to step outside "normal" life and act with a small measure of heroism. This is not to say international development is about saving the world or sticking a feather in one's cap. The model is not superman. The type of heroism to which I refer is more like a social worker, a person that works very hard to solve intractable problems far beyond their resources for little reward and no recognition. That is what I am talking about. But it feels right and little problems solved sometimes turn into real solutions.

My involvement in Honduras began in 1995 when I helped teach a Wilderness First Responder course to rural health practitioners sponsored by the Central Diocese of the Episcopal Church of North Carolina and Appalachia State University. During this first trip I conducted a water use survey in El Corpus, a village in the southern Department of Choluteca from which five of the workshop participants hailed. Effluent from the sewage collection system was straight-piped into a stream that was a tributary for the water source of a community further down the mountain.

Leaders in El Corpus had been concerned about the untreated effluent for a number of years but could not afford the system analysis required by the government to secure a low interest loan. Over the next year, we collaborated on a design of a bio-

logical sewage treatment facility that would be inexpensive, low maintenance, and use locally available materials and craftsmanship. The system was built the summer of 1996 using a rock filtration tank, a settling tank, and a massive tank for 24 cubic meters of gravel substrate for biological treatment. A small water quality laboratory was set up to collect BOD, nitrate, phosphate, fecal coliform, DO, settleable matter, and clarity data from the treatment facility and natural streams used as potable water sources. In addition to the Episcopal Church and ASU, a grant was secured from the Cern Foundation to assist with chemical supplies, construction materials, and plane fare.

In June of 1998 I drove a diesel truck with humanitarian supplies for the orphanage, Nuestro Pequeno Hermanos (Our Little Brothers and Sisters), and trained a water quality technician to conduct extension work in communities neighboring El Corpus. Subsequent to Hurricane Mitch, I collected medical supplies and helped distribute them into villages that had up to that point, been inaccessible to humanitarian aid.

At the time of writing this article, I am a week from driving a small diesel truck to Honduras to finish up data collection on the sewage treatment facility, buy a 6 hectare farm, and meet with a Honduran non-profit by the name of Los Comunidades Unidas (The United Communities) to jointly plan future projects in Honduras. My intention is to develop a non-profit that incorporates aspects of sustainable agriculture, water quality advocacy, and ecotourism. These are just some of the areas that The United Communities has expressed

• continued on page 10

IDT Student Explores Cuba's Potential

by
Lynn McIndoo and Sangam Tiwari
ERE Students

Rachel Brunhke is currently a graduate student in Environmental Systems with an emphasis in International Development Technology (IDT) program at HSU. Rachel has always felt a connection with Latin America; as an undergraduate at Long Beach State University she studied political science with an emphasis in Latin American studies. She spent her junior year in a study-abroad program in Peru. She was also the Ecuador coordinator for Global Routes, a non-profit educational program providing U.S. college students opportunities to participate in grassroots international development. After these experiences she joined the Peace Corps where she spent three years in Honduras promoting environmental awareness.

Rachel learned about the IDT program at Humboldt from the Peace Corps Newsletter *Hotline*. She says the program is best suited for those who are independent and self-motivated. She believes the IDT program is on the cutting edge of international sustainable development theory. She feels that the focus on the human as well as the technological parameters is the most realistic way of working sustainably and justly in Third World societies.

Rachel's Environmental Systems/IDT thesis involves the study of consciousness-raising in Cuba associated with energy problems and the use of Cuba's educational system to teach about renewable energy. Her two semesters of work at Campus Center of Appropriate Technology (CCAT) greatly influenced her study of alternative energy systems. She

has chosen to focus on Cuba because of the friendliness of the people and fact that they are intent on retaining their independence, both economically and politically. She has visited Cuba on four occasions thus far. On her first visit, she established contact with Cubasolar, a Cuban NGO that deals specifically with renewable

Did you know...

Currently 96% of Cuba is connected to the electrical grid. However, imported petroleum is expensive and the Cuban government is aware that they must search for their own alternative sources of energy, especially as a result of the total U.S. embargo. One step in this direction is their use of the byproduct of sugar cane harvesting, called bagasse. From this product they are able to derive 30% of their energy needs during harvest time. Furthermore, they have recognized the potential for biogas. Another development towards relying on renewable energies is their desire to electrify the remaining 4% of the country with solar panels. The rural electrification projects are often funded by international non-profit agencies and NGOs; however the Cuban government is also providing financial, infrastructure, and logistical support.

energy development and promotion. She received an invitation and returned four months later to make a presentation on HSU's CCAT as a working model of appropriate technology at the "Cubasolar 2000" international conference on renewable energies.

Her presentation of CCAT was very well received and initial contacts were made for collaboration on a "Casa Solar" at the University of Santiago, which will be similar to CCAT. Another success at this conference was that Rachel represented HSU in front of the many other coun-

tries that attended the conference: Italy, France, Germany, Venezuela, and Kazakhstan, to name a few.

In the summer of 2000, Rachel again returned to Cuba to meet with professors at the University of Santiago. She was told that they already have a designated house for the appropriate technology project.

Rachel's last visit to Cuba was from November 8-24, 2000. Four HSU students from various fields of study accompanied her. They spent the first five days participating in the Second World Conference on Solidarity and Friendship with Cuba. More than 4,000 people attended representing 118 different countries; more than

600 Americans attended the conference to defend the sovereignty of Cuba. Rachel and the students then traveled to the colonial city of Santiago de Cuba to meet with students and faculty from the university. They brought a suitcase full of tools and literature on appropriate technology.

Currently, Rachel is looking for those who are interested in joining her for three weeks on her next trip to Cuba this summer. The trip will coincide with the UN celebration of World Environment in Havana on June 5. Anyone interested in sustainable development is encouraged to consider this next trip as she will be re-visiting the University of Santiago de Cuba and working with the engineering students to install

PV panels on the Casa Solar, as well as visiting rural solar-powered villages. The recently returned students are planning to start a Cuba Friendship Club here on campus to raise money and awareness. Finally, Rachel is organizing lectures by a Cuban scientist in the field of renewable energy here on campus some time this spring.

If you are interested in learning more about Cuba, attend one or more of the Cuba talks or events this semester, or contact Rachel at sojournerrb@yahoo.com. **ERESA**

Wetland Database Improved for EPA

by
Brad Finney
ERE Professor

You probably think that a sabbatical leave is equivalent to a vacation for faculty members. Well, I only wish it were true! The following is an overview of one of the projects I worked on for the US EPA during my "vacation". It was an interesting education in SQL database programming, HTML, Javascript, VBScript, ASP (Active Server Pages), Apache Web Servers, Linux, Visual Basic, and of course treatment wetlands. About 10,000 lines of code later, I managed to finish enough of the database and the associated web site to fool the EPA and call it quits. You can visit the final product at <http://firehole.humboldt.edu/wetland/twdb.html>. Now I AM ready for a vacation!

Information concerning the design and operational performance of constructed treatment wetlands has been accumulating, resulting in the development of a rapidly growing body of literature available to individuals who are interested in applying this technology for water quality treatment. Easy access to design and performance characteristics of existing wetlands is critical so that planners, design engineers, and system operators can avoid past mistakes and emulate successes in new systems.

A number of efforts have been undertaken to assess the effectiveness of treatment wetlands, and to summarize information from diverse data sources into a collection of performance descriptions. One of the most comprehensive summarization efforts to date was the development of the North American Wetlands for Water Quality Data Base (NADB), funded by the U.S. Environmental Protection Agency (EPA). A majority of the data came from well-funded projects (i.e., large-scale pilot projects), and the data quality can be considered to be good. However, other NADB data contains question-

able flow rates and constituent concentration values. In most cases, the data are not raw observed measurements, but aggregated monthly and seasonal averages.

The NADB has failed to serve as an effective tool for distributing information on constructed wetland treatment performance, because most of the data contained in the NADB is not readily accessible without additional software and programming experience beyond the reach of most users. In addition, no mechanism is provided to continue to update the database with additional data at existing sites, or to add new sites.

The Treatment Wetland Database (TWDB) was developed to build upon the NADB data while addressing some of the deficiencies of the NADB. The design objectives of the TWDB are to:

- utilize a modern, efficient database structure
- allow easily expandable data tables with no preset limit on the number of water quality parameters, plant types, and similar system descriptors
- include wetland characterization descriptors beyond those in the NADB, including design nutrient loading rates, O/M costs, monthly meteorological data for the site, and photos and drawings of the facility
- incorporate all of the NADB data for constructed and natural wetlands
- allow users to submit new data at existing facilities and to add new facilities
- provide a query tool to identify a wetland that meets search criteria
- export data that can be easily imported into a data analysis tool such as a spreadsheet
- provide access from a web browser

All user access to the TWDB is via a standard web browser. The home page for the site is <http://firehole.humboldt.edu/wetland/>

[twdb.html](http://firehole.humboldt.edu/wetland/twdb.html). Two basic modes of access are available, data query and data upload. The data query mode allows the user to select a wetland that matches a defined set of search criteria. The search criteria used by the query tool include wetland name, state, EPA region, hydraulic flow type, wastewater source, type of pretreatment, and water quality constituent. After a specific wetland is chosen, a detail page is displayed, which provides access to all of the information provided in the wetland overview database table. The user can also view publications, graphics, and multimedia files associated with the wetland. After selecting a sample point and a sample parameter, the user can download operational data. The data are given as comma delimited text for easy importing into a data analysis tool such as a spreadsheet.

The user can also add descriptive and operational data for a wetland that already exists in the database, or add a new wetland to the database. Data entry is from a password protected web page, to insure that only authorized users submit data for any particular wetland. The data receives a simple integrity check prior to being added to the database. Data entry passwords are obtained from the web site administrator upon written request.

The TWDB contains more than 85,000 data entries from more than 350 treatment wetlands in the United States and Canada. With the exception of bio-monitoring data, all of the data contained in the NADB Version II (MS Windows Access engine) are contained in the TWDB. Data from additional wetlands has been entered, and future efforts will be directed at identifying new data sources. Future efforts will also be directed at encouraging individuals responsible for wetlands contained within the TWDB to complete the entry of the descriptive data associated with their wetland, and to begin to submit new operational data on a regular basis.

ERESA

SWE FLUME PROJECT FUN FOR ALL:

On Your Marks, Get Wet, Learn!

by
Lynn McIndoo and Sangam Tiwari
ERE Students

As the children played with the flume at the Build-A-Thon at the Bayshore Mall in Eureka, California on Saturday, November 11, 2000, they watched what happened as water flowed past bridge inserts at different flow levels, slammed rubber-duckies against the end of the flume using rapid flows, and watched with awe as eddies and hydraulic jumps developed. What seemed like a lot of fun was really an introduction to fluid mechanics and river hydraulics. This fun way of introducing fundamental engineering applications to children was the goal behind creating the flume.

The Humboldt State University Society of Women Engineers flume is an interactive water physics display that will be donated to the Redwood Discovery Museum, a local children's science museum. The purpose of the flume is to demonstrate basic environmental resources engineering principles to children. In the fall of 1998, under the direction of the SWE club and the Environmental Resources Engineering faculty, HSU fluid mechanics students designed the flume. SWE then raised funds via local donations and a \$3500 grant from SWE National in order to complete the flume project. The flume was built by ERE Technician, Cliff Sorensen. In addition, more than 70 ERE students have completed class projects associated with the flume.

The flume is approximately 8 ft

long, 3 ft wide, and consists of a Plexiglas tank, aluminum siding, and a steel base that serves as the reservoir. It holds 100 gallons and circulates water with a 1.0 HP pump. A single sheet of Plexiglas is used to separate two six-inch wide channels. The channel slope is adjustable using an air jack. The flow rates of each channel may be controlled by opening or closing the sluice gates at the entrance. The outflow is made adjustable using hinged doors that may be lifted or lowered.

In the fall of 2000, the ENGR 448 River Hydraulics class designed and built inserts for the flume. The inserts include a spring-loaded gate, 2 different bridges; (one with multiple piers, the other with a single pier foundation), velocity meters made out of plastic toy water-wheels, a broad-crested weir, and simulations of natural channel bottoms and obstructions. Ping-pong balls and two rubber-duckies also are used.

In addition, thirteen Fall 2000 ENGR 111 students developed web pages and display boards to accompany the flume and the inserts. The ENGR 111 students worked with the ENGR 448 students to learn more about the flume and the inserts. These web pages and boards will be used to explain fluid mechanics topics to students and teachers that are interested in the flume.

This semester, the flume will be used for a minimum of eight different

outreach events in order to educate youth about environmental resources engineering. The goal is to reach a wide range of students including elementary, middle, and high school levels as well as the local Girl Scout chapter, youth residing in the Hoopa Reservation, and the children who receive services from Humboldt Women for Shelter. Meanwhile, the flume will be a permanent learning tool for children of all ages in the Redwood Discovery Museum, which is planning its reopening in Eureka's Old Town District in February, 2001.

The mission of the Society of Women Engineers is to promote diversity in the field of engineering by encouraging young women (and young men) to study math and science. The flume is one of many modes of engineering outreach used to meet this objective. In order to accomplish our goal of presenting the flume, we need your participation! Not only is playing with the flume a good learning experience for engineering students, but playing with children can be rewarding (and really fun!). It is a means to excite them about all of the possibilities in their future and to make them more aware of the physical phenomena surrounding them that may be explained by engineering concepts. Feel free to contact SWE at SWE@humboldt.edu or drop in to any of our weekly meetings. **ERESA**

Many thanks to everyone who donated money last semester for the holiday gifts. We were able to buy eight presents for abused and neglected children between the ages of 3-12 years. The gifts were given to the children through the local non-profit group CASA.

interest in developing, and they are the areas I believe can be of some assistance.

I believe this is a critical moment in the history of Honduras, a moment of pause and then rapid action. The transition was already in progress, but Hurricane Mitch has catapulted Honduras into a sink or swim mode. The macroeconomic and social environments that appear to be heading toward urbanization and internationalization are likely to continue. To the extent that self-sufficiency can be created in the rural areas is the extent to which the process can be slowed. And in slowing there is a chance these communities can learn to control the type of development that occurs.

The International Development Technology curriculum at HSU provided me the flexibility to pursue course work in water quality analysis, management of potable and wastewater systems, microbiology, remote energy supplies such as photovoltaics and hydroelectric generators, and the integration of technologies into areas experiencing economic, cultural, and environmental changes. In addition, I have worked as an RN in Public Health and was the Assistant Education Manager at Claggett Farm, a sustainable agriculture research facility.

Working in international development has created many challenging and wonderful opportunities for me. I would like to extend an invitation to those seeking a connection in Central America to do some academic or pragmatic work to contact me at <adelante@bellsouth.net>. **ERESA**

What Do YOU Think About the ERE Web Site?

by

Beth Eschenbach

ERE Associate Professor

During the first eight weeks of the Fall 2000 semester, a group of ERE students (Brett Bateman, Ben Bray, Melissa Clark, Olivia Magaña, Monica Martin, Tully McCarthy, Tien Tai, and Becky Teasley) and myself met on Thursday evenings at 6 pm in SD 15. We ate pizza and drank soda, but most of all we worked on the redesign of the ERE department web site.

The ERE web pages are being redesigned to update the content and improve the appearance and ease of use of the site. We hope the redesigned site will lead to improved communication between the ERE program and: (1) current and prospective students and their parents, (2) our graduates, and (3) current and prospective employers of our graduates. The redesigned site should be implemented by May 2001, as we will be receiving a visit by an ABET accreditation team in the fall of 2001. The template for the new pages is at: <http://www.humboldt.edu/~eae1/eretemplate.html>. Also, some of the new pages have already been implemented by ERE students, and they can be found at <http://www.humboldt.edu/~ere_dept/re-design>.

original web site in the spring of 1995. The site was implemented in the spring of 1996 by several ERE student volunteers. Over the years, various ERE students have developed new content for the web site: Steven Bradley, Summer Bundy, Caren Coonrod, Carl Fiorica, Mike Garello, Joelle Geppert, Rico Lara, Jeni McGregor, Joe Riess, and Lisa Vossler.

In the summer of 2000, Mike Anderson and I met with an on-campus consultant to get ideas about how to improve the ERE web site. ERE student Monica Martin then took those ideas and developed a template for the site. The URL for the template that Monica developed is listed above.

How to Get Involved

We need your input on how to improve the ERE web site. Or better yet, consider joining our web page development team. You do not need to be a web page expert to help. Ask any of those that have helped with the project. We especially need those that are good at editing images to help us. Our team will meet one evening a week for the first eight weeks of the spring semester. I will provide dinner for those that come to the meeting. Students who work on web pages will be compensated on average \$10 per web page. (Mike Anderson has donated funds to support this project).

If you have ideas of how the web pages can be improved to meet the needs of our current and prospective students, their parents, our alumni or employers, or if you want to help develop the ERE department site, then please send an email to me at <eae1@humboldt.edu>. **ERESA**

History of the ERE Web Site

ENGR III students designed the

You Might Be an Engineering Major...

- If you chuckle whenever anyone says "centrifugal force."
- If you know how to integrate a chicken and can take the derivative of water.
- If you have to bring a jacket with you, in the middle of summer, because there's a wind-chill factor in the lab.
- If you are completely addicted to caffeine.
- If you avoid doing anything because you don't want to contribute to the eventual heat-death of the universe.
- If you consider ANY non-science course "easy".
- If you make a hard copy of this list, and post it on your door.

What Did ERE Students do Last Summer?

John Allen

I spent this past summer working for Vector Engineering Inc., an environmental and geotechnical consulting firm located in Grass Valley, California. Vector has offices throughout South America, the Philippines, and in Houston, Texas. I spent my first week at Vector updating construction drawings for a landfill using AutoCAD. I then became the site inspector on the construction of a new liner system at a landfill in Sacramento. Once the liner system was completed I worked along the American River in Sacramento where a slurry was being installed in the levee along the river. At this site I performed all of the soils tests required by the contractor.

If this type of work interests you, I recommend that you apply. I found the notice for this job posted on the fish bowl window. The two things I wish I had before going to work are the ability to speak Spanish and a passport so that I might have had the opportunity to work at one of their overseas offices. I also recommend that you be ready to work a lot - it was not uncommon to work as much as seventeen hours in a day. I would recommend Vector to anyone; the people and the work environment are great and the different jobs provided me with a rewarding, personal challenge.

Katie Bowman

Californians for Alternatives to Toxics (CATs) is a non-profit organization dedicated to reducing the amount of toxic chemicals used in daily activities. CATs primarily focuses on reducing the use of pesticides; therefore, the organization regularly monitors herbicide use by local timber industries as well as by California roadside management agencies, which contribute some of

the highest amounts of pesticides. CATs is one of the key components for reducing the amount of herbicides sprayed along Humboldt and Del Norte counties' roadways. CATs has also been instrumental in banning the use of pesticides in the city of Arcata.

I have interned with CATs for several years, and my regular duties include web site design, assisting the executive director with projects and reports, and responding to information requests, which includes providing the public with information on alternative means of pest control. CATs serves as a clearinghouse for information; therefore, we are constantly researching the effects of new and already existing chemicals, and generating reports to inform the public about how they may be exposed to toxics. Much of the data compiled by CATs as well as many of our reports can be viewed on the CATs web site. www.reninet.com/catz.

Domingo Cordoza

I had a really good experience working for Caltrans last summer. It was the first time I actually worked in the field of my studies, and I was excited and worried about what to expect. I had the fortune to work for a resident engineer who was understanding and who, when the time came, gave me responsibilities that gave me real engineering experience.

I was placed in the construction branch. I worked out of the Hydesville field office. My supervisor began my training by having me spend a week with each of the members of his staff. For the first couple of projects I was basically asking questions and tagging along with the Caltrans inspectors, who always gave me good advice on what to look for and how to deal with contractors. As time went by, they would give me the clipboard and let me "inspect". The key to these inspections, I learned, was simply to follow the state regulations, the plans,

and the special provisions that come with every project. Whenever I had a question about paperwork or legalities, the office staff would gladly show me how to get the answers.

Around the sixth week of work, my supervisor gave me full responsibility of a minor Caltrans project involving the placement of concrete and fish baffles in a concrete culvert. I had to contact the contractor and coordinate the beginning of the construction. Unfortunately, I soon learned that some contractors cut corners and ignore specifications to make the job cheaper. For example, the contract called for cleaning the culvert before pouring any concrete. I reminded the foreman several times of this (there was rust, garbage, and sand from years before). However, when the time came to pour, the foreman simply told me that he will just clean as "we go along". I had to make the difficult decision to turn the concrete truck away and enforce the specifications of the contract. The foreman complained to my boss, but I had his full support.

Dealing with this particular contractor taught me about the role of an inspecting engineer, the scope of his/her authority, and about being careful when dealing with unknown contractors. Overall, last summer was for me a good opportunity to learn and gain valuable experience.

Tully McCarthy

Last summer I worked for the URS Corporation in San Diego. URS is a large engineering and geologic consulting firm. The company has much work and is looking for engineers, (www.urscorp.com). The main projects I worked on included: urban surface water quality, highway litter management, and highway cut/fill slope sediment erosion. In the area of surface water quality, I helped with the company's contracts with the cities and port district of San Diego

County. The project was an on-going (seventh year) NPDES monitoring program that reported to the SD Regional Water Quality Control.

My job was to basically organize and report the results of an insecticide use survey within the county of both homeowners and businesses and their using and selling practices. The primary constituent of interest was Diazinon that is used to kill ants. It is made by Ortho (a subsidiary of Monsanto), and is present in a great number of insecticide products.

Both the litter and sediment erosion projects were completed for contracts with CalTrans. I was in charge of creating databases in MS Access, quality assurance and control (QA/QC) of data and photo records, and assisting in reproduction of both documents and electronic records (on CDs). All of their contracts were completed for litigation and therefore drawing conclusions or reporting information outside of their field of expertise was not done.

I was surprised that the level of difficulty and detail was below what I had come to expect from my years here at HSU. I found that the education provided at HSU more than prepared me for the work there. I learned some important skills of time management, billing procedures, and professional interaction. I would definitely return.

Lynn McIndoo

My experience last summer was not associated with paid work, yet I feel that I learned many invaluable lessons that are seldom taught in a classroom or typical job-like setting. I spent three months in Costa Rica, Nicaragua, Honduras, Guatemala, and Belize with my boyfriend Tom visiting rainforests, tropical beaches where with went scuba diving on the world's second largest reef, active volcanoes, caves, and Mayan ruins. We also spent three weeks in Arcata's sister city-Camoapa, Nicaragua. Each year a group of students and commu-

nity members visit our sister city for a cultural exchange to make new friends, live with local families, and work on projects. Funding is provided by Arcata Sister City project. Furthermore, HSU's Sister City Club also raises money. Last year during Earth Day festivities on campus, we raised enough money to provide one Camoapan student a full year's university tuition, a new fax machine, and new books for the school library.

We lived with a wonderful family and spent the mornings working with Eduardo and his crew constructing a stairway into a steep, rugged hill that led to the entrance of the Adult Education Center, also under construction. I believe it is very easy to overlook the ease at which simple structures such as stairs are made in First World societies. This fact became quite apparent to me as we spent hours digging deep trenches, hand-mixing concrete, pounding and bending re-bar, and carrying endless buckets of concrete, water, or heavy earthen blocks up the hill. I was the only female in the group and thus provided much amusement to the male workers who were not accustomed to watching a woman do "a man's job."

In the afternoons we visited local areas including a waterfall, cloud forest, a sustainable farm and orphanage, a dam project funded by the European Union to provide Camoapans with running water, and previous Sister City projects such as latrines and central washing stations. We also conducted interviews and hung out with the Camoapan university students. Tom and I also spent three days with a local ecologist who walked us through remote countryside teaching us about local flora and fauna, herbal remedies, and telling us about the war in the 1980s. He also took us to visit a number of local families who live in single or two-room thatched huts. These were undoubtedly the warmest people we met, showering us with gifts such as mangoes and flowers. The purpose of the visits was to invite the families

to an ecological workshop to teach them organic, sustainable agriculture techniques-something that has been all too forgotten in the age of chemical dependency and use of monocultures. We attended the workshop and were impressed how open the people were to these ideas. It was a promising sight, and this was just the first of an on-going series of about ten similar workshops.

We all had a number of unforgettable, wonderful memories in Camoapa. If you think you would be interested in being a part of HSU's Sister City Club, the meetings are on Thursday nights at 5 pm in front of the AS office.

For me, there are few things as rewarding as widening my view of the world through travel. It is a means of appreciating and becoming aware of other lands and cultures, living simply, and where everyday is a new adventure.

Sangam Tiwari

Last summer, I assisted ERE secretary Barbara Smith and professor Bob Gearheart in organizing and planning "A Short Course on the Role of Wetlands in Watershed Management" which was held May 16-17, 2000. The course consisted of various lectures, trips to the Arcata Marsh and the Manila Treatment facilities, and was followed by a conference comprised of a series of lectures given by guest speakers. Some topics covered included methodology and case studies of specific wetland systems, design approaches to constructed wetlands, wetland restoration, and mosquito control.

After the wetland course ended, I worked at the Arcata Marsh, canoeing around each of the four different marshes testing for DO, temperature, salinity, and conductivity. The idea behind the testing was to look for seasonal changes in these parameters.

I enjoyed this work because it has helped me to learn more about my areas of interest. **ERESA**

Find Out What Some Graduate Programs Have to Offer YOU!

University of California, Davis

For the past 30 years Humboldt State graduates have been making contributions to the development of the environmental engineering program at UC Davis. The two programs seem to be a good cultural fit despite the differences in climate. Humboldt-Davis graduates are now on the faculties at Massachusetts and Texas at Austin and making outstanding contributions at major consulting firms and in public agencies. Juana Eweis, the most recent Humboldt graduate to complete a Ph.D. at Davis, became one of the most widely recognized experts on MTBE degradation, was senior author on a textbook, published numerous papers and, with her husband, ERE graduate Eric LaBolle, became the parent of three sons while a student here. We assume that students from Humboldt will thrive at Davis!

The UC Davis program in environmental engineering is housed in the Department of Civil & Environmental Engineering. Participating faculty include approximately 10 members of the department plus faculty in the Departments of Biological and Agricultural, Chemical, and Mechanical engineering and Land, Air, and Water Science. Each student's academic program is developed individually with the guidance of a faculty mentor and the approval of the College Graduate Study Committee. Students are strongly encouraged to emphasize the development of fundamental understanding of physical, chemical, and biological processes in natural and engineered systems through taking advanced courses in mathematics, engineering, and biological science. Three general areas of emphasis exist: water quality, air quality, and environmental quality policy.

In each area there is a focus on improving environmental quality to meet societal needs.

Some current areas of faculty research include atmospheric contaminant transport mechanisms and modeling, sorption and desorption processes in soil systems, subsurface contaminant transport, nutrient removal from water, biological methods of air cleaning, disinfection and reactivation of viruses and bacteria in UV systems, control of combustion product formation, identification of pathogens in urban drainage, biodegradation of xenobiotic compounds such as MTBE and methylene chloride, destratification of lakes, modeling of water quality in lakes, streams and near shore waters, and biological nutrient removal. Research facilities include new laboratories (September 2000) in EU III, pilot facilities at the campus treatment plant, facilities at regional POTWs, boats and equipment for field monitoring and sampling. Program laboratories include equipment for use of molecular biological techniques such as PCR and FISH and analytical tools such as GC/MS, HPLC, LC/MS, particle analysis, and much more. Available campus facilities include CLS, scanning, electron microscopy, and NMR.

We strongly encourage interested students to visit the campus, meet the faculty and students, and learn why graduate program participants work so hard and are so excited about their work.

•• Edward W. Schroeder
Professor of Civil and Environmental Engineering
University of California, Davis

Stanford University

Stanford offers graduate studies in two environmental engineering areas within the Civil &

Environmental Engineering Department. One program, called Environmental Fluid Mechanics and Hydrology, considers the fluid mechanical and hydrological aspects of environmental problems, with a focus on modeling the transport of environmental contaminants in streams, reservoirs, estuaries, groundwater, and the atmosphere.

The other program, called Environmental Engineering and Science, focuses on the chemical and biological processes affecting environmental pollutants and microbial pathogens, with an emphasis on treatment processes, the fate of contaminants in the air, water, and soil environments, molecular environmental biotechnology, and hazardous waste management.

Briefly, our Master of Science degree requires 45 quarter-units of classes (no thesis), and can typically be completed in 3 quarters (9 months) of study. Curricular requirements for both MS programs are quite flexible, allowing for intensive study in a single area, or studies providing a broader background. Two post-MS degrees are offered: the degree of Engineering, which usually takes 1-1/2 to 2 years of additional study (30 qtr-units of classes plus at least 15 qtr-units of research leading to a short thesis); and a Doctor of Philosophy, which typically takes 3 or more years of post-MS study (36 qtr-units of classes plus at least 54 qtr-units of research leading to a substantive thesis), and requires that the student pass a General Qualifying Exam as well as an Oral Thesis Exam.

Graduate students in our environmental programs at Stanford value the tremendous flexibility offered in setting up their curriculum - students do not need to preregister, but rather can "shop around" during the first week of classes before making a decision on which courses to take. They also are pleased by the variety of students our programs attract: non-engineers as well as engineers, some individuals who have gained work experience in a variety of fields (ranging from engineering to the

Peace Corps) before returning to school, and classmates whose career interests range from academia to consulting engineering, the public sector, the business world, and environmental activist groups. And finally, our students enjoy the wealth of extracurricular opportunities available at Stanford: foothills surrounding the campus for hiking and biking; a climate hospitable to outdoor activities year-round, a large number of campus clubs offering activities ranging from sports and music to community service; and convenient access to entertainment and cultural opportunities in San Francisco and San Jose.

For further information on our programs, faculty, resources, and course offerings, please visit our website at: <<http://www-seep-server.stanford.edu/SEEPWeb/ews/EWSBROCH/overview.html>>
•• Lynn Hildemann
Associate Professor, Associate Chair
Civil and Environmental Engineering
Stanford University

University of California, Riverside

The merger and emphasis of an environmental engineering program with a chemical engineering program is the unique feature of the environmental engineering graduate program at the University of California, Riverside. This program is different from the other environmental engineering degrees around the nation that have the environmental engineering aligned with civil or mechanical engineering. The present shift of the focus from the "end-of-pipe" solutions to one on pollution prevention and waste minimization requires knowledge of process and unit operations, i.e. chemical engineering, environmental chemistry, and transport processes.

The ten full time faculty members of the Chemical and Environmental Engineering Department have strong, well-funded, nationally recognized research programs in Bio-

chemical Engineering, Environmental Biotechnology, Air Quality Systems Engineering, Advanced Materials, and Water Quality Systems Engineering.

Biochemical Engineering and Environmental Biotechnology has been a central focus in the department. Remediation of hazardous waste sites, degradation of recalcitrant organic compounds such as pesticides, biosensors, waste gas treatment, fuel production, and organic phase biocatalysis are just a few of the areas where application of environmental biotechnology is being investigated.

In conjunction with the College of Engineering Center for Environmental Research and Technology (CE-CERT), research in the Air Quality Systems Engineering includes a better understanding of atmospheric processes, the chemical and physical characterization of emissions for all sources, the development of technology to minimize or eliminate these emissions, and the development of analytical tools needed to assess the impact of the implementation of this technology.

Advanced Materials research includes synthesis, electronic structure, magnetism, superconductivity of molecules and materials such as fullerenes and carbon nanotubes. Also being explored are potential of mean force between colloidal particles in electrolyte solutions, programmed assembly of colloidal particles for fabrication of photonic-band-gap materials, and design and synthesis of low k zeolite thin films by in-situ crystallization and by evaporation-driven self-assembly of zeolite nanocrystals for next generation computer microprocessors.

The Water Quality Systems Engineering research program is oriented towards the analysis and design of water quality systems, both engineered and natural. It is interdisciplinary, comprising aspects of environmental and chemical engineering, as well as environmental toxicology, environmental sciences, and water resources planning and management.

The department is housed in the recently opened \$41 million, 105,000 square-foot modern engineering complex, Bourns Hall. Currently, we occupy 2,000 square feet of teaching lab space, 8,500 square feet of research lab space, and 1,600 square feet of computing lab space.

Financial supports are available in the forms of teaching assistantships, fellowships, or graduate student researchers. Support is more than adequate and is typically around \$17,000 per calendar year, and is accompanied by a waiver of nonresident tuition. Fellowships and scholarships at substantially higher levels are available for outstanding students.

For additional information please visit our website at www.engr.ucr.edu/chemical/
•• Ashok Mulchandani
Professor and Chair
Department of Chemical and Environmental Engineering
University of California, Riverside

The University of Texas at Austin

Just add Water... ERE to EWRE

As a graduate of the Environmental Resources Engineering (ERE) program (class of '83), I am familiar with the personal and high quality education that students in the program receive. I am also familiar with the well-rounded education and technical skills centered on fundamental engineering and science you receive. As such, I appreciate the opportunity to encourage qualified ERE students to consider graduate studies in the Environmental and Water Resources Engineering (EWRE) program at The University of Texas at Austin (UT). I have listed below several reasons why those ERE students who are interested in continuing their education should consider the EWRE program at UT:

High Quality Faculty: The EWRE program is comprised of a large group (15) of high quality faculty. Many

EWRE faculty members have been honored as recipients of university and college-wide teaching and research awards, and have also received national and international awards for excellence in research and general contributions to the greater environmental community.

High Quality and Environmentally Conscious Students: There is great similarity between EWRE graduate students and ERE undergraduate students in terms of both quality and environmental awareness. We attract exceptional students from universities across the United States and the world. The fact that we draw students with diverse educational backgrounds and social and professional experiences lends greatly to the quality of the EWRE program and graduate experience for EWRE students. Many of our students have been or currently are very active in environmental causes, including those that allow them opportunities for traveling abroad and helping those who are less privileged.

Students and Faculty as a Family: One of the greatest strengths of the EWRE program is also a strength of the ERE program, the student/faculty rapport. While our 100+ graduate students actively engage in many professional and social activities, including hiking and backpacking trips, river rafting, and music festivals, EWRE faculty are often by their side. Similar to the crab feeds and spaghetti feeds that I fondly remember as a student in the ERE program, EWRE faculty and students exist as a family that goes well beyond interaction in the classroom.

Breadth of Education: Because of the large size of the EWRE faculty, we offer a wide range of courses to choose from, research areas to work within, and opportunities for employment after graduation. Students in the EWRE program have tremendous flexibility in the courses that they complete and in course availability. Course topic areas range from water and wastewater treatment to water resources planning and management, hazardous waste management, wa-

ter quality, environmental fluid mechanics, air pollution control, indoor air quality, engineering microbiology, and more. In fact, we offer more than 20 graduate courses on a regular basis just within EWRE. Our students also complete courses in other programs within the Department of Civil Engineering, and other departments at UT. Popular courses outside of EWRE include those related to pollution prevention, radiological risk assessment, environmental policy analysis, and more. Similarly, EWRE students are involved with a tremendous spectrum of research projects. These projects range from the biodegradation of MTBE, natural attenuation of hydrocarbons in soil, treatment of TCE contaminated groundwater, effects of chlorine usage in households, removal of lead from carpet, biological air filtration, pollution prevention in high tech industries, application of geographic information systems (GIS) in hydrological modeling and planning, and many more.

Facilities: The EWRE program has a wide range of analytical, experimental and computational facilities that are used by students for both coursework and research. These include advanced instrumentation for detecting trace levels of a wide range of pollutants in water, air, and soil. EWRE students and faculty use advanced computer facilities for state-of-the-art modeling and application of geographic information systems related to water and air pollution transport, and experimental facilities that include pilot-scale sewer systems, meandering river channels, and more.

Rankings: The EWRE program is consistently rated in the top 3 to 7 Environmental Engineering programs in the U.S. as published by U.S. News and World Report.

Opportunities Beyond Graduate Schools: Because of our national reputation, EWRE graduates are normally faced with a large number of opportunities once they have graduated. Many opt to stay in Austin. Others move on to just about every corner

of the United States and beyond. Our students often accept employment with environmental consulting firms ranging in size from large (CH2M-Hill, Malcolm Pirnie, Camp Dresser McKee) to small. Others accept positions in industry or opt for positions with government agencies.

A Wonderful Living Experience: As a native Californian, I would not be telling the truth if I said that I was a bit apprehensive about moving to Texas. Let's face it, growing up in California one learns that Texas is basically a bunch of dust, oil, tumbleweeds, and Colt 45s. Right? Wrong. In fact, painting such a picture of Texas is like painting California as (*fill in this blank with a part of California you do not like*). When my wife Regina and I first visited Austin we fell in love with the city. Austin is green (both physically and consciously). It is a city of trees, water, hiking trails, and a citizenry that takes great pride in environmental protection and awareness. Outdoor activities range from hiking to biking, spelunking (some very impressive natural caverns), and even whitewater rafting and kayaking. Austin is also a city for young people. It is known for its incredible music scene and dozens of live music venues. There is NEVER a shortage of fun things to do in Austin.

I encourage all interested ERE students to consider adding a "W" to your future. You can learn more about the EWRE program by visiting our web-site at www.ce.utexas.edu/dept/area/ewre/welcome.html. And don't hesitate to contact me at corsi@mail.utexas.edu if you would like additional information. You might also have an opportunity to speak with me in person this semester, since I will be teaching a Friday morning course on Indoor Air Quality at HSU. I hope to meet many of you then!

•• Richard L. Corsi
Associate Professor
and Leland Barclay Fellow
Environmental and Water Resources
Engineering
The University of Texas at Austin

ERESA

Thanks for Making It Possible...

Winzler & Kelly

CONSULTING ENGINEERS

633 Third Street Eureka, CA 95501-0417
P.O. Box 1345, Eureka, CA 95502-1345

Engineering . . .

A.M. BAIRD

Engineering & Surveying

1100 Main Street
Fortuna, CA 96540
707-725-5182
FAX 707-725-5581

LACO ASSOCIATES

CONSULTING ENGINEERS

21 West 4th Street
Eureka, CA 95501
Phone: 707-443-5054 CE 14398
FAX: 707-443-0553 TE 0037

Yesterday . .

Today . .

Tomorrow . .

Forever.

**SHN Consulting Engineers
& Geologists**

812 West Wabash
Eureka, CA 95501
707-441-8855
FAX 707-441-8877

SE

**SPENCER ENGINEERING &
CONSTRUCTION MGT, INC.**

1933 CENTRAL AVE., SUITE C 707-839-4336
MCKINLEYVILLE, CA 95521 FAX 707-839-4012

**ERE Student Association, ASCE Student Chapter
Department of Environmental Resources Engineering
Humboldt State University
Arcata, CA 95521-8299
eres@axe.humboldt.edu**

NON-PROFIT ORG.

U.S. POSTAGE
PAID

PERMIT No. 78
Arcata, CA 95521



Printed on 100% recycled paper

HSU is an AA/EO institution.