

# ERE MESSENGER

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Fall 2003

## ERE Students Win International Math Modeling Competition

by

Terrence K. Williams and Carlos Diaz, ERE Students

This is a story about three Environmental Resources Engineering (ERE) students at Humboldt State University: Michelle Livesey, Terrence (TK) Williams, and Carlos Diaz. They recently won first place in the 2003 Interdisciplinary Contest in Modeling (ICM), sponsored by the Consortium for Mathematics and its Applications (COMAP). The contest took place February 6-10, 2003.

In 2001, about a year and a half before the competition, there was an article in the fishbowl about a team of HSU engineering students that had won a math modeling contest that year. Intrigued by the topic, a stochastic model describing zebra mussel populations and water quality in the inland waterways of the eastern US, Carlos approached HSU Professor Beth Eschenbach to find out more. He liked what he heard and immediately went to TK and asked him to be on a team.

The contest rules allow for up to three students per team, so they decided to add a third team member. Following a rigorous, secretive interviewing and selection process, TK decided that Michelle Livesey was the ideal person to fill the role. The three students then asked ERE Professor Eileen Cashman to be the their

advisor, and she agreed. Later that semester, Eileen sent out the official email requesting that the team of TK, Carlos, and Michelle represent HSU ERE at the 2003 Interdisciplinary Contest in Modeling.

On Thursday, February 6, 2003, at 5 PM, the team downloaded the 2003 ICM problem statement. Worldwide, 145 other teams downloaded the same problem statement at the very same moment. They would be working around the clock until the Monday 5 PM deadline, four short days later.

The team was expecting an environmental problem, similar to the one that HSU won in the past. To their chagrin, the problem was an Airport Security Operations Research (ASOR) topic dealing with allocation of Explosives Detection Systems (EDS) to two major international airports in the Midwest.

The three were baffled. They headed up to the library to learn what they could about ASOR, but were feeling discouraged to say the least. The weeks leading up to the competition were filled with excited anticipation of conquering a problem in a field they were passionate about. But instead the team was staring at a stack of books whose subjects seemed uninteresting and the team knew little of.

The authors of the problem state-

ment divided the problem into eight tasks and labeled them Task I, Task II, and so on. Tasks one and two were to develop a model to predict the number of EDS machines to deploy to two Midwest international airports. The third task was to develop flight schedules for both airports that would necessitate the deployment of the least number of EDS to each, while still accommodating peak passenger flow

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# Alumni Profiles

## Rebecca Crow

B.S. ERE 1997  
Project Engineer  
Winzler & Kelly  
Eureka, CA  
www.w-and-k.com

It took me about five months after graduation to get my first full time engineering job. It was for the State of Maryland Department of Environment. My original position was an Urban Stormwater Best Management Practices Database Manager, with other miscellaneous duties. After starting, my bosses realized what a hard worker I was and, when looking over the extensive background Humboldt State had given me in hydraulics and water quality, asked me to join their modeling division. Within several months of moving to that division I found myself one of five women doing all the water quality modeling in our administration.

Working with all technical women was an empowering experience I did not expect to find after graduation. Over time our group grew and we did let in a couple of talented men, but the majority still remained women. Although our division had a majority of women, most of our bosses were still men. It always made me want to stay and see how far I could get. I only felt limited by having to wait for others to retire. I always felt that if the opportunity arose, I would be given an equal chance at moving up the chain of

responsibility.

However, after four years with the Maryland Department of the Environment I started to repeat the same types of tasks. I was ready for a new challenge, and wanted to get back to California. I took on a job as a project engineer with Winzler & Kelly in Eureka. Here I am the only woman engineer. But I have found that has not held me back in the company, and in fact I am just as respected and appreciated as the men I work with. I am judged by the quality of the work I produce, and so far I have been nicely rewarded for what I have accomplished. I do get the opportunity to work with other technical women in the office such as a biologist, geologist, and soil scientist.

My experience in engineering with both the State of Maryland and Winzler & Kelly has shown me that, to be successful, all I need to do is the best job I can.

## Adele Militello, PE

B.S. ERE 1990  
Principal  
Coastal and Physical Oceanographer  
Coastal Analysis LLC  
Eureka, CA

In 1990, I graduated with an M.S. from the Environmental Systems program at HSU through the Environmental Resources Engineering Department, where my focus was on hydrodynamics and computational methods. I was hired by Engineering Science, Inc as an Oceanographer to work on municipal ocean outfall diffuser design. This position allowed me to gain experience in the engineering consulting arena and to acquire skills in areas such as diffuser design dam design. In 1992, I returned to school to pursue a Ph.D. in Physical Oceanography at Florida Institute of Technology (FIT). The program at FIT provided an excellent education in coastal hydrodynamics, including courses in coastal engineering.

While at FIT, I began development of a 2D hydrodynamic circulation model that was designed to be

robust, flexible, and efficient. I was asked to demonstrate the model at a small research institute in Texas, which was part of the Texas A&M University system. The director liked the model and invited me to work at the institute while conducting my dissertation research (through FIT). I accepted the offer and was provided with large data sets that could be applied toward my dissertation research.

In 1996, the institute director took a position at the U.S. Army Corps of Engineers Coastal & Hydraulics Laboratory (CHL), Waterways Experiment Station. As he was directing my dissertation, I followed and was hired as a Research Oceanographer. My dissertation was conducted on my own time (nights and weekends) and completed in 1998. While at CHL, I was given responsibility for several fairly large projects and also gained significant experience in multiple-scale hydrodynamic modeling. Through projects and research, I was exposed to numerous coastal environments and was involved in a wide range of coastal engineering projects. For example, one study investigated the change in circulation and sediment transport properties for flood-shoal mining as a source of beach-fill material at Shinnecock Inlet, New York. Another project evaluated the feasibility of a reliable Federal navigation channel at the entrance to Willapa Bay, Washington. I was given responsibility for development of a numerical modeling system designed to calculate physical processes (water level, currents, waves, and sediment transport) at inlets, bays, and nearshore areas. This task involved model development and coupling for both hydrodynamics and sediment transport over multiple scales, as well as directing interface development. As part of this effort, the model that I had started while at FIT was adopted and is now being applied and improved by the Corps. Through projects, conferences, and other opportunities while at CHL, I developed a large network of colleagues in various organizations (government,

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universities, private companies), both in the U.S. and overseas. These relationships have proven to be very beneficial for professional development and success.

After more than four years at CHL, I decided to return to consulting, moved to Eureka in 2001, and set up a company called Coastal Analysis. Presently, my largest client is the Army Corps of Engineers, for both coastal engineering projects and model development. The most interesting effort is the continued development of coupled models, now with emphasis on morphology change. Other projects are conducted as part of teams with other consulting firms, and usually involve investigating a range of alternatives for coastal engineering projects. I am also employed with CH2M Hill for coastal projects, and with Dewberry & Davis for storm-surge modeling to support FEMA.

In general, I have had quite positive career experiences. New opportunities arise often and collaboration with quality professionals promotes continued success. **ERESA**

## CALENDAR

Fall 2003 and Spring 2004  
ERESA activities

### NOVEMBER

Thanksgiving Dinner & Follies  
Election of New ERESA Officers

### DECEMBER

Happy Holidays!

### JANUARY

ERESA Spring Tutoring Begins

### FEBRUARY

MathCOUNTS  
ASCE Nat'l Engineering Week  
ASCE Design Contest

### MARCH

Comedy Night  
ASCE Mock Interviews

## Update on the ERE Website

by  
Chris Naylor, ERE Student

**H**ello, my name is Chris Naylor, and I am currently the web weaver for the Environmental Resources Engineering website. As many students may or may not know, the ERE website has been a work in progress for the last year and a half. The development of the current website started in the spring of '02 by the ENGR 480 Web Design class, which consisted of Ted Kulongoski, Greg Mazzeo, Avram Pearlman, department chair, Beth Eschenbach, former faculty member, Derek Baker, and myself.

The structure of the new site, along with Macromedia software (Sci. D17), allows for easy updating of current pages and the creation of new pages. Some of the newest additions to the site are the Equipment and Technical Communication Handbooks located in the Current Students and Academic areas of the ERE website. They give students access to instructions for operating some of the ERE programs and equipment. They also include helpful hints on writing techniques for emails, memos, and lab memos. The ENGR 115 class developed the content of the Equipment Handbook.

Two other new additions to the website are thumbnail pictures of some of the events that occur during the academic year and an interactive map of Sci D. Some of the pictures up now are of '02 graduation and of the retirement party in the spring of '03, with more to come.

I will be continuing to improve the website with some new features, such as an announcement page allowing students to access current events dealing with the ERE Program, and expansion of the Equipment Handbook. Any constructive suggestions or comments would be greatly appreciated and can be sent to [cjn10@humboldt.edu](mailto:cjn10@humboldt.edu). **ERESA**

## ENGINEERS WITHOUT BORDERS

by  
Bryan Jungers  
ERE Student  
EWB President

**V**ery soon, Humboldt engineering students will have a chance to become student members of Engineers Without Borders™ - USA (EWB-USA). EWB-USA is a non-profit organization, established in 2000, to help developing areas worldwide with their engineering needs. A major goal of EWB-USA is to involve and train a new kind of internationally responsible engineering student. Retired ERE faculty members Bob Gearheart and Al Burows and retired ERE secretary Barbara Smith are responsible for bringing EWB-USA to HSU.

EWB-USA projects involve the design and construction of water, waste-water, sanitation, energy, and shelter systems. These projects are initiated by, and completed with, contributions from the host community. The community members are then trained to operate these systems without external assistance. In this way, EWB-USA ensures that its projects are appropriate and self-sustaining. The projects are conducted by groups of students under the supervision of faculty and professional engineers from partnering engineering firms.

By involving students in every step of the EWB-USA process, the program maximizes their learning and awareness of the social, economic, environmental, political, ethical, and cultural impacts of engineering projects. During the summer of 2003, more than 50 students from various US schools were involved in EWB-USA projects in Mauritania, Senegal, Thailand, Haiti, Mali, Belize, Nicaragua, Afghanistan, and Peru.

To learn more about EWB-USA, visit the EWB-USA website at [www.engineerswithoutborders.org](http://www.engineerswithoutborders.org) or contact Bryan Jungers at [bdj1@humboldt.edu](mailto:bdj1@humboldt.edu). **ERESA**

# Peace Corps Experience Brings IDT Student to HSU

by  
Ted Kulongoski, ERE Student, IDT Graduate Student

In 1990, I graduated with a degree in Biology, and, with no serious commitments (other than repaying my student loans), I headed out to West Africa to try a 2-year stint with the Peace Corps. After the arduous trans-Atlantic flight I was surprised to discover I was only halfway to my final destination, as the remaining trans-Sahara flight would take another eight hours. With my head spinning from jet lag, I distinctly remember the impact of the humidity and smells that assailed my nose as I stepped

African capital city provided me with the first impressions of my new "home," impressions that remain as vivid today as they did that day in September 1990.

The narrow streets were chaotic and crowded with people moving in every direction. Traffic was bumper to bumper and intermixed with mopeds, motorcycles, bicycles, and domesticated livestock. Forward progress was made in sporadic surges with our vehicle accelerating rapidly, careening along the street, and

surreal backdrop that accentuated the barrage of sounds and smells assailing my other senses. Noise emanated from all directions: drivers honked incessantly, music blared from storefronts, and everywhere shouts and cries came from the faceless masses. The smell of wood fire smoke mixed with cooking grease and the smell of rotting trash were carried along by the saltwater breezes blowing in off the ocean.

The trip from the airport to the hotel seemed timeless, an unending deluge of sensory stimulation that imprinted itself onto my memory in full graphic detail. There was a sense of relief upon reaching the hotel, an oasis of calm and quiet situated behind an eight-foot high cement block wall topped with shards of broken glass. Already I had begun the process of sorting things out, trying to understand my new reality. Slowly, over the next two years, I would acclimatize to what seemed initially so intense and shocking, until the smells, noise, and chaos became all too familiar and normal.

The Peace Corps brought me to Togo, West Africa, to work as a rural extension agent, teaching and promoting the benefits of using appropriate technologies. The philosophy guiding the program was simple: for a project to appropriately address a problem, the human element must be considered priority when developing solutions. The philosophy seemed obvious, but everywhere I looked I found decades of past failures to comply with this simple principle. The countryside was littered with projects that had been funded and built with good intentions and success in mind but were now dilapidated and inoperative. These relics were constant reminders of the need for a holistic approach to the complex issues of development and sustainability.

During my two years in Togo, appropriate technology was more than my work; it facilitated integration into my new environment. Learning to live as the only white person in a small, rural village with limited re-



from the air-conditioned airplane cabin onto the stairs leading down to the tarmac. In the distance, I saw a magnificent ball of red receding beyond the horizon. As the mantle of dusk began edging in, I realized, with much excitement, that I had finally arrived at my destination - Togo, West Africa.

After passing through immigration and customs, I was hustled off to an awaiting Toyota mini-van for a wide-eyed, raucous ride through the streets of Togo's capital, Lome. Passing through the streets of this West

then furious braking. Every time the vehicle stopped, a crowd of faces came up to press themselves against our windows, peering in at us - the wide-eyed people staring out.

Lined up along the sides of the streets were handmade tables where both young and old sat dutifully, selling anything imaginable. To advertise, each table possessed a small, flickering flame in a homemade kerosene lantern made from recycled metal cans. The yellow headlights from the traffic and the flickering flames lining the streets created a

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# Where Streets Have No Names

by  
Eric Stikes, ERE Student

I spent much of my summer lying around on large boulders in Africa. One might think that a second year engineering student on a continent full of developing countries, crippled by AIDS, poverty, and a terrible lack, or misuse, of natural resources, could find a great amount of work to be done. So what exactly does taking repose on a rock accomplish for either the meager student or the magnificent continent? It is an necessary endeavor in the Mountain Kingdom of Lesotho where the landscape commands reverence, where constant soliciting from the people force at least this outsider to wander far from the villages in search of sanctuary, and where great consideration must be given as to why I came to Africa in the first place.

I do not wish to imply that the people of Lesotho, the Basotho, are relentlessly covetous. In fact, it was my experience that the Basotho villagers are very kind and generous. I was often invited inside a home or to a meal, though families had little with which to feed their own. Still, many of the Basotho are not free from a desire for a life with modern conveniences, and visitors such as myself from America are often viewed simply as providers of material goods. It would be nice to be recognized for what I might contribute with my own knowledge and skill. Still, I do not blame anyone living in these conditions\* for expecting that I should be able and willing to share a portion of my "first world" fortunes.

So why did I come here to Africa? Was it the dream of an epic

adventure into the motherland; endless golden fields stretching out to meet a blood-red sinking sun and a single, flat crown acacia tree outlining a pair of elephants under the host of Kilimanjaro? Was it the idea of improving the impoverished lives of the indigenous people, shoeless children always shouting and running about? Whatever the motive for coming, seeing the true beauty of Africa and experiencing the realities of life that people here face, quickly brought me from my fantasy down to the solid, red earth where I found a pure joy and contentment living in the settings and working through the struggles of daily life here in Lesotho.

The organization that brought me and eight companions here, Operation Crossroads Africa, had designed a tour of volunteerism. Three or four members of our group would be working in medical clinics, three or four of us would be attending to environmental issues, and nearly all of us would be teaching various subjects at a high school in a small village called Ha Ntlama<sup>§</sup>, where we would be taking up residence.

Now, as I recline on the sandstone just outside of Ha Ntlama, I can hear the bells of the head-boy's (eldest son's) cattle overgrazing in the corn fields far below. The laughter and yelling of children as they follow hidden trails past the head-boys, through the poplars on their way home from school, and rhythms of traditional song and percussion are never far off wherever I am. The sun begins to reflect the color of the red sand soil and the air cools to an un-

comfortable temperature. Snow will soon fall in Ha Ntlama. Walking back to our village I think to myself, "It is a burning land over which I now wander."

Firelight becomes the aura of Lesotho as families ready an evening meal of corn maize prepared over ground fire; still out in the fields the head-boys glaze their fighting sticks over open flame and smoke dagga<sup>§</sup>; farmers, under cover of night, illegally set their dry, post-harvested crops ablaze hoping to expedite the rain; and many Basotho, even in this small village, lie dying in their beds. Africa is burning.

Though ceremonies here only take place once a week on Sundays, Ha Ntlama experiences the passing of loved ones, infants to elders, on what seems to be a daily basis. Our team believes the deaths are largely a result of HIV/AIDS. However, Ha Ntlama follows the trend of many other African countries in either denying that AIDS is present in the area or denying that AIDS is even real. It is very real.

We attempted to dispel the idea that AIDS is a witches curse or karmic punishment, but instead is a viral infection largely transmitted by sexual activity. But talk about sex is not easily accepted and talk about viruses is not easily understood. Still, our hope is that our work and the information that we bring from the "developed world" will help to slow the deadly impact of AIDS in Lesotho.

Back on my sandstone outpost, I take the time to reflect on our purpose for coming here. I think of how in the past people came into the "Dark Continent" desiring to create positive change, but at the end of the day caused much more grief for the people here than was previously present. As a whole, the continent of Africa has not responded well to even some of the more fair-intentioned outside influence, and I feel there is some truth to the argument that Africa would be

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\*Lesotho is a mountainous region and the majority of the Basotho have little proper shelter, food or clean water. It has high annual precipitation levels and has developed a network of dams, weirs, and aqueducts in order to sell water to South Africa's Gauteng district, despite the inadequate provision of water for Lesotho's own citizens.

<sup>§</sup>Ha Ntlama could be Humboldt's sister village. Dagga is Sesotho for Cannabis.

# Students Win Peer Award at ASCE Water Quality Competition

by  
Beth Werner, ERE Student

During the spring semester of 2003, fifteen ERE students participated in the ASCE Wastewater Treatment Competition held at Cal Poly with schools from throughout California, Nevada and Oregon. The teams had two months to organize a plan to clean ten gallons

of water contaminated with organic and inorganic matter. In the end, we built a system that incorporated multiple ideas and stages of cleaning. The first stage was a large bucket with a hand-spun centrifuge inside that removed the grass and leaf particles. The water then was drained into a filtration



the community, or purchased by the students. The guidelines detailed a scene in which students were working in a chemistry lab when an earthquake hit, cutting off the power and leaving the students in need of clean water. Using only the materials found in a chemistry lab and in their backpacks, the students set out to clean the water.

First, we researched the items found in our chemistry lab, and then we found reasons for the other items we needed to be in our backpacks. The team reviewed desalination, filtration, distillation and settling.

After many hours of planning, the final module took form. The materials used were either donated from

bottle through a screen made of t-shirts, which filtered out the sand and oil. We burned walnut shells to make carbon and set it on filter paper, lining the bottom of the bottle. This stage would filter boron, copper, fertilizer and lemon juice. Any carbon residue left in the water was then filtered out into a hand suctioned funnel. The clean water was then released into a container for our drinking needs.

The water, once filled with grass, leaves, sand, oil, boron, copper, lemon juice and fertilizer was tested by the competition judges. Of all the schools participating, including UC Davis, UC Berkeley, Cal Poly, University of Nevada, and University of Oregon,

## NEW CNRS LAB FEE WILL HELP ERE PROGRAM

by  
Beth Eschenbach,  
ERE Department Chair

Last spring, HSU students passed the College of Natural Resources and Sciences (CNRS) lab fee initiative by a narrow margin. This fee will be assigned to all courses in the College of Natural Resources and Sciences that have labs. It will start at \$13 per course in spring 2004. It will increase to \$17 in fall 2004, and to \$20 in spring 2005.

This lab fee will bring in needed revenue for ERE program courses. The college's budget for operating expenses has dropped by 50% in just the past four years! The new fees will be used to pay for supplies and expendable materials such as lab supplies and software.

However, the funds will not be allocated to the department automatically. CNRS Dean Jim Howard and a committee of HSU students will determine how the funds are allocated to the departments, based on proposals that are submitted to the college. Our ERE faculty will need to write well justified proposals and our ERE students need to be sure we have a representative on that committee.

The fee increase will stay in place until Academic Year 2007-08, when it will be reviewed by the student fees committee. If you have any questions, please contact me. **ERESA**

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HSU won the Peer Choice Award, which goes to the team chosen by the participants as having the best design.

Although this was not real world experience, it did provide the students with applications of material learned in class. Building the model was both challenging and fun, especially with fifteen members contributing ideas. The competition was a success, and we hope to involve ourselves in more challenges throughout the coming year. **ERESA**

# Surprise! Becoming an EIT /s Possible

by

Adrienne Carter, EIT, ERE Student

**D**ear Adrienne Carter,  
Congratulations!

The envelope was from the California Department of Consumer Affairs, and I remember thinking it was probably another credit card application. I expected the next sentence to follow with "You have been pre-approved for our Platinum Card!" Thank goodness the word "passed" caught my eye before I threw my future into the recycle bin. I had *luckily* passed the Fundamentals of Engineering test, proving that becoming an Engineer-In-Training" (EIT) is indeed possible.

But, I am getting ahead of the story. There we were on that dreary April morning, at CalExpo in Sacramento, armed with our TI- or HP-whatevers and photo IDs, running through the cold Northern California rain with one mission: pass the FE Exam. Passing the FE exam qualifies you as an Engineer-in-Training, the first step necessary to progress to the Professional Engineer (PE) title. EITs must work for four years under at least one licensed professional engineer before they are eligible to take the Principles and Practice of Engineering Exam (PE Exam). As a licensed PE, engineers are responsible for the health and safety of the public and have greater job opportunities, and only licensed PEs can work as engineering consultants.

While I attempted to prepare for this monumental exam, I feared that passing this exam would be impossible. The best preparation for the exam would cover all 13 subjects in the general exam: mathematics, chemistry, statics, dynamics, fluid mechanics, engineering economics,

engineering ethics, mechanics of materials, computers, electrical circuits, materials science, and thermodynamics. (I felt the last two subjects listed were my weakest on the exam, but each student is different.) There are many quality study guides available. I used a borrowed copy of *EIT Review Manual: Rapid Preparation for the Fundamentals of Engineering Exam* by Michael R. Lindeburg, PE. The review guide describes the ideal study schedule as well as all the subjects on the exam. Though I found the questions on the FE exam to be quite different from those in the study guide, I would recommend students obtain a review manual if only for a structured review. Many students, either in addition to or instead of a review guide, purchased or downloaded the *NCEES Fundamentals of Engineering Supplied-Reference Handbook* from the National Council of Examiners for Engineering and Surveying (NCEES). This handbook is an exact replica of the handbook supplied in the exam and therefore an indispensable tool for preparation. To further prepare for the FE exam, HSU students can register for a one unit review class taught by Mike Anderson. Though this most recent group did not take advantage of the class, we were fortunate to have Mike Anderson, Margaret Lang, and Wes Bliven review thermodynamics, dynamics, engineering economics, fluid mechanics, and electronics. These instructors provided a thorough review of the subjects as well as strategies and hints for the test (Thanks again, Profs!).

The test itself is divided into two four-hour sessions with a one-hour lunch break. The morning session consists of 120 questions covering the aforementioned subjects. In the after-

noon session, students can choose to answer 60 questions from either a more specific discipline or a repeat of the material covered in the morning session. Some HSU students have chosen to take the environmental test which can cover many different areas such as soil, air, and water quality. I chose to take the general test composed of more time-intensive questions from the same 13 subjects. Having a watch during the test was very helpful. I was able to more appropriately allot time to the difficult questions and return to the questions previously skipped. One of the most important things to know about the FE Exam is that you are not scored down for incorrect answers, so don't leave any answers blank.

Almost three months after I turned in my scantron and left Sacramento, I received my test results by mail. Humorously, as I said at the beginning, I almost trashed them.

Of the HSU engineering students I've spoken with, at least 77% have passed. According to the NCEES website ([www.ncees.com](http://www.ncees.com)), 82% of the first-time test takers throughout the US passed the general exam. These percentages prove that not only is becoming an EIT possible, it is actually probable.

I feel the most important things to remember while preparing for and taking the FE Exam are to review what you already know (don't try to learn new material), maintain your focus (relaxing helps), go with your instinct but don't forget to check your work, and remember that you really do know this stuff - have confidence. Congratulations to all those who have successfully completed this rite-of-passage and good luck to all of you who will do it in the future! **ERESA**

# Get Valuable Hands-on Experience at the Campus Center for Appropriate Technology

by  
Kendra Cecil and Dustin Jolley,  
ERE Students

You may have noticed during your education here at HSU, classes don't offer opportunity for hands-on learning. Some may have found themselves questioning the ERE major regarding its heavy class load and the lack of inspiration for practical applications. It's easy to get caught up in course work (math, Fortran, physics, etc.) forgetting the big picture of what you actually want to do in the future. Without inspiration for your engineering career, it is hard to find the motivation to continue in this rigorous program.

Many of the ERE students overlook the Campus Center for Appropriate Technology (CCAT) where we can get hands-on experience within our field of study. Twenty-five years ago, CCAT began with a few ERE students who wanted to demonstrate appropriate technologies and sustainable living here on campus. Many of the systems still existing at CCAT were designed and built by engineering students. Through the years, many ERE students have used CCAT as an important part of their learning experiences. Students have furthered their education through designing and building projects, monitoring existing systems and improving the efficiency of others; however, in the last seven years, the ERE students have drifted far away from CCAT. Currently, only a handful of us are still actively involved.

The opportunities available at CCAT can provide invaluable experiences that are applicable to all forms of engineering and daily life. Existing projects that may be of interest to ERE students include: straw-bale shed, cob bench, bamboo structure, greywater marsh, PV grid-intertie system, solar hot water system, passive solar heating, Biodiesel produc-

tion, composting toilet, rainwater catchment systems, pedal power technologies, and solar cooking demonstrations. In addition to these technologies, CCAT demonstrates many other methods of water, energy, and natural resource conservation. All of the systems found at CCAT were designed and built by students.

Not only does CCAT provide opportunities for applicable engineering experience, it provides inspiration and helps ignite creative thought. Some ERE students may be uncertain about what they actually want to do in the field, and through experience

**CCAT Telephone: 826-3551**  
**Email: [ccat@humboldt.edu](mailto:ccat@humboldt.edu)**  
**URL: [www.humboldt.edu/~ccat](http://www.humboldt.edu/~ccat).**

at CCAT one can develop ideas for future career interests and opportunities. Currently, there are many projects at CCAT that need student help and input. This semester, the following projects are available for student involvement:

- ∑ Analyzing, designing, and rebuilding one of the greywater marshes
- ∑ Finishing construction on the new Biodiesel refinery and opportunity for Biodiesel production
- ∑ Building a rain-water catchment system on the bamboo structure
- ∑ Creating a human-powered water pump for the rain water tank
- ∑ Building a mobile photovoltaic energy trailer
- ∑ Building an addition to the bamboo structure
- ∑ Alternative masonry work

If you are interested in being involved, please contact CCAT for more information. Also, let us know if you have a great project idea that would be of interest to develop at CCAT.

There are other opportunities for involvement at CCAT besides semester projects. CCAT is teaching a one-unit class this semester: *The Sustainable Technologies Seminar*. The Seminar will be a short, two-hour lecture on a specific technology given by a knowledgeable instructor. The class will last for seven weeks (Sept 9-Oct 22, Tuesdays 3-5) and the topics will include: Photovoltaics, Greywater, Alternative Building, Efficient Homes, Permaculture, and Whole Foods (drop-ins are always welcome). CCAT also offers Organic Gardening and Herbalism classes every semester.

Besides classes, there are other ways to get involved with CCAT and learn from the resources available. There is a large library full of appropriate living books from solar energy to alternative building, which everyone is free to check out. All sorts of free workshops are held at CCAT throughout the month. Workshops in September included: parabolic solar cooker making, solar water heating, winter gardening, knitting circles, intro to permaculture, basic photovoltaics, Biodiesel, food canning, and alternative building. To find out about future monthly workshops, come up to CCAT and grab a handout, or look on our web site. CCAT also holds volunteer days where anyone can come and help out on specific tasks.

CCAT is open 9-5 Mon-Fri, and 11-4 on Saturdays. Anyone is free to come and take a self-guided tour of the grounds, look in our library, or just hang out and see what's going on. If you have questions about CCAT or want to get involved, please call or email. Also feel free to talk to Kendra Cecil or Dustin Jolley, as we are often in the engineering building. ERESA

## Math Modeling

• *continued from page 1*

without flight delays. In order to model the bag screening process, the team first needed to understand the flow of passengers and luggage into the airports. Luggage comes with passengers that arrive according to a flight schedule, so near optimal flight schedules were developed using the genetic algorithm (Bill Gates' MS Excel Solver blew up).

On Friday things started to fall into place for the team. By noon they had two near-optimal flight schedules where the objective was to uniformly distribute passenger arrival over the peak hour. This was the beginning of a sleepless weekend of chaos at the Motherhub in TK's living room. Numerical simulation, synthetic data, and memos to the Secretary of Homeland Security were the topics of intense discussion for the next three days. After not sleeping a wink Sunday night, the team was in a panic by 4:30 p.m. Monday when the minutes were counting down to the 5:00 p.m. deadline. The printer was sputtering, a hard drive was crashing, and the Abstract still needed to be written. By the good grace of the green googly guy, our heroes made it to Eileen's office at HSU with literally seconds to spare.

Three weeks later, the team received emails from Eileen exclaiming that they were the outstanding of the outstanding teams, as selected by the Institute for Operations Research and Management Sciences (INFORMS).

The team's paper was recently published in the Summer 2003 edition of the Undergraduate Journal of Mathematics and its Applications.

This accomplishment speaks highly of the ERE Department, students and faculty. It is the third ERE team to be an outstanding winner (the two previous teams were in 1990 and 2001). The team would like to take this time to personally thank the entire faculty for their involvement in our evolution as math modelers and engineers. They are truly outstanding and inspiring mentors. **ERESA**

## Peace Corps

• *continued from page 4*

sources and minimal facilities was only the beginning. The real education of village life was in my relationships with others, which taught me the value of community and the "humanness" that all people share. My favorite African proverb, "I am because of others," articulates clearly that each person, regardless of his or her status, plays a part in the evolution of a community. This human element, I discovered, was a crucial consideration when looking for sustainable solutions to problems but had very limited impact without the availability of adequate technology.

The technology I used in projects as a Peace Corps volunteer did not include computers, electricity or advanced mathematics. The technologies I promoted were grassroots endeavors: inexpensive, straightforward and developed in Togo for specific applications. Primary projects with which I collaborated included: rainwater catchment systems, hand-dug wells, ventilated pit latrines, earthen cookstoves, tree nurseries and reforestation efforts. I was also involved with a secondary project (of personal interest) creating a small-scale poultry business for income generation. I discovered that the greatest gift I had to offer the people of my village was to act as a technology conduit, a bridge linking those who sought a better life, with the information and technology to make it a reality.

My role as a Peace Corps volunteer was not to save the world. In fact, it did not include saving anyone - though on many occasions I wish it could have, particularly in the case of my adoptive father. As I wrote in an entry of my Peace Corps journal:

The funeral has been going on for three days now. It is the final night of the formal ceremony to bid farewell to Kolani Lare, the patriarch of my host family. The events leading up to the past three days have been an unsettling ending to

my first six months as a Peace Corps volunteer. For the past six months, I have tried to find a remedy for Kolani's condition, examining each alternative but never finding a cure, only a bottle of aspirin and some prenatal vitamins from my Peace Corps medical kit with which to ease his pain. These inadequate medicines are powerless against the baseball-sized tumor in Kolani's jaw. With each passing day I watch helplessly, guilty of my own good health, as Kolani Lare starves to death. By July, six months into my service, Kolani is nothing but a skeleton, his health and life nearly depleted.

The drummers pound out a fast and furious rhythm to appease the living and the dead. The spirit of the deceased is here, among us; presiding over the festivities. The dancers, in a large circle, enclose the drummers in a perimeter of gyrating hips and torsos. To honor the spirit of the dead they must remain dancing until dawn. The dust, unsettled by the dancing, drifts in the hot, humid night air like a fog. People move about everywhere - eating, drinking, and socializing. The kerosene lanterns cast fragments of light into the darkness. I am unable to discern the identity of any of the figures passing by me, their features masked by shadows and the night.

I feel helplessness, rage, guilt and sorrow over his death. How could I have been so powerless to prevent this tragic event? I'm from the United States, the richest and most powerful nation in the world, with the most advanced technology and medical treatments available. There should have been a way to save this man and postpone his death. Now, as the final night of the

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# ERE Students Honored at ASCE/ERE Awards Banquet

by  
Jayne Nordstorm, ERE Student

The Annual ASCE/ERE awards banquet was held in May 2003 at the Plaza Grill, Arcata, CA. Six ERE students were recognized for excellence in student achievement and activities.

Outstanding ERE Graduate award went to Rebecca L. Teasley. The award is given to the graduating student(s) who have demonstrated best academic achievement and best professional potential in Environmental Resources Engineering.

Becky is a native of Humboldt County. She received her Bachelor of Science in ERE from HSU in 2003. She was employed as a drafting technician by HSU Plant Operations while attending school full-time.

Her senior project, "Using Dynamic Programming to Reduce Erosion Risks from Forest Roads in Redwood National Park," was developed and supervised by Dr. Elizabeth Eschenbach and Dr. Mary Ann Madej (USGS). The project included development and writing of a FORTRAN90 code for the dynamic programming portion of the USGS research project. Becky's Water Resources Planning & Management (ENGR 445) design report, "Managing Forest Road Removal Using Dynamic Programming: A Pilot Study," was published in the American Journal of Undergraduate Research (September 2002). She also placed 2<sup>nd</sup> in the Society of Women Engineers (SWE) National Technical Paper Competition (October 2002) for the same paper.

Becky was an active member of both SWE and ERESA. She held the office of Secretary for ERESA and was given the ERESA Service Award (April, 2001) "for outstanding support and selfless service provided to all club events." She was the Student Liaison to ERESA and Co-Editor of the award-winning Region Newsletter for SWE.

Currently Becky is pursuing a Masters Degree at the University of Texas at Austin in Environmental and Water Resources Engineering. She is also a teaching assistant for Dr. Daene McKinney (HSU Alumnus) for an Intro to Numerical Methods for undergraduate Civil Engineering majors.

Becky offers the following advice for current students:

"Don't wait too long to start your 321 project. Don't give up, even when you think you won't make it, don't give up.

"If you are interested in grad school, make sure you contact the school you are interested in and make contact with professors. Make sure professors know your name.

"Take advantage of all the professors at Humboldt have to offer. I have discovered what a wonderful (and hands on) education I received at HSU now that I am attending a University with 53,000 students."

Douglas Saucedo received the Roscoe-Schenler Award. This award is presented to a sophomore or junior ERE student for outstanding potential in Environmental Resources Engineering.

The Homer Arnold award is presented to ERE student(s) who have demonstrated outstanding achievement in applied Environmental Resources Engineering. The 2003 award recipients were Carlos Diaz, Kelly Miess and Andrew Sorter.

The Winzler & Kelly award was presented to Gina Giacone. This award is presented to an ERE student for demonstrated leadership in the ERE department, ASCE student chapter or SWE section activities.

Additional information about ERE awards can be obtained by contacting the ERE Department Chair, Dr. Elizabeth Eschenbach, or ERE department website. **ERESA**

## Streets

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better off left alone. Still, in my heart I believe that in our day of modern globalization, we must try to do what we can to preserve the type of cultural diversity that Africa and other impoverished nations can offer the world. It is also important to prevent the total ruin of these developing countries during the struggle for "first-world" domination in which developing countries see the exploitation of their natural resources. "So, we must be very sensitive in our work," I think to myself as I chew on a stock of sourghum.

The days here in Ha Ntlama are filled with task. It is early rising to collect water from the well, sometimes four in the morning. It takes half a day to cook a meal and a full day to get into town, about an hour drive away. I spend most of my days with the youth at the local primary and high school playing volleyball and teaching something like permaculture and appropriate technology. In the classroom I am constantly asking what the students feel they need to learn as opposed to what I feel they need. They ask questions such as: "What is HIV?" and, "Why are you so hairy?" and, "Why is your skin that color?" I love these kids. Teaching for them has definitely been one of the most fulfilling things that I have done with my life.

It is a hard existence. But life here is also good. There is strong community and charity between people. The lack of technology and material goods creates a comfortable simplicity. Realizing the difference between what are really important in life, such as water and love, and what are not, such as, soda and cell phones, is refreshingly easy. However, I did actually see a girl carrying a bucket of morning water on her head and a cell phone in her back pocket. I remembered those bumper stickers back home and all of a sudden had a money-making scheme for Ha Ntlama. We could start selling tee shirts with the saying, "Hang up and carry water." **ERESA**

# Unbreakable Bonds

by  
Sangam Cardoza-Tiwari  
HSU ERE Graduate

**M**Y grandfather asked to speak to me alone. He is a strict and traditional Indian man, so I didn't know what to expect. He asked me, "Is there something you are hiding from me?" I thought and ..... Domingo. I had feared telling my grandfather about Domingo, because Domingo was not a Brahman (my cast): The only requirement for my husband that had been pounded into my head by both my grandfather and my mother. So, feeling guilty, I told my grandfather, "Yes, you know the American that has come to visit me; well...his name is Domingo. He has come here to ask your permission to marry me." There was an unpleasant silence and I didn't know what to expect. He looked me deep in the eyes and said sincerely,

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## Peace Corps

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funeral celebration abates, I struggle to find meaning as a volunteer here to help.

Kolani's death frustrated me because there were many others like him - others whose afflictions might have been alleviated. To this end, the death of my adoptive father could have made me cynical and apathetic, but in fact it did just the opposite. Even though I could not prevent Kolani's death, it ignited in me a passion to keep trying to make a difference - no matter how small. Since that night it has been nearly 13 years that I have, through work and personal endeavors, continued to find ways to serve others. My work toward my IDT Masters Degree, and a second Bachelors Degree in ERE, are preparing me to make a difference in people's lives overseas. **ERESA**

"Sangam, it is your decision." The most unexpected reply I had thought. I gathered my thoughts and with complete confidence said, "Yes, I want to marry Domingo." Tears built up in his old eyes, and without a pause, he said, "This year that you have spent at home is almost over, you are starting a new life, one far away from your family." With composure I replied, "I will come to visit every year and Domingo and I want to do international work and concentrate our work in India." He gave me his blessings with a few religious chants.

As soon as he was done, I ran out of the room with excitement and told my family and Domingo the great news. From my grandfather's attitude, I knew there are always exceptions, even to the rules written by Hindu Gods. My family fell in love with Domingo and accepted him into the family as if he were their own son.

The astrologer examined our backgrounds and futures and informed us that our match was exceptional. He also chose an auspicious date for our wedding: June 14, 2003. Domingo only had a week left in Nepal/India so my cousins organized an engagement ceremony that evening and my father sent us off to our first honeymoon. We traveled around Nepal until Domingo's departure date. Domingo left in December and everyone looked forward to his safe return for the wedding in June. He returned to school to finish up his second to last semester. While Domingo was in school, I remained in India and continued to revive my father's environmental NGO (non-governmental organization) with the help of the youth in the community.

Domingo returned to Nepal in early June. We were not allowed to see or speak to each other upon his arrival; however, I did manage to sneak out of the house with one of my cousins to go pick him up at the airport at 2 am. He was heartily welcomed by all of my family members, who had traveled from India to attend the marriage ceremonies.

The wedding took 5 long days. The days were filled with emotions,

family values, fun, exotic colors, laughter, and tremendous symbolism. The ceremonies included Domingo becoming a man, both of us being cleansed with turmeric paste massages, blessings from every single family member at the wedding, the reception, and the actual marriage ceremony.

The ceremonies were carried out in a traditional manner. The marriage ceremony consisted of chanting, blessings from all family members, the seven circles symbolizing the marital promises, and countless other symbolic events. The marriage ceremonies lasted all night and well into the morning. After the wedding we went through the *vidai* (where the bride leaves her family to join her husband's family). The sending-off process is extremely moving. At this event everyone cries, as they never know quite when they will see the departing family member again. And, there was more. Due to unforeseen circumstances, Domingo's family was unable to attend, so one of my aunts pretended to represent Domingo's family. So, we were guided through numerous other ceremonies that are typically conducted at the husband's house upon the bride and groom's arrival. After all the ceremonies and without proper sleep for a couple of days, we set out for our second honeymoon.

Finally able to talk and be alone together, we started our lives as a married couple. We thoroughly enjoyed our time in the Himalayan mountain ranges and then before we knew it, it was time for us to head back to America.

So, that brings us to the present. I will be obtaining a masters and PhD at UC Davis, starting this fall. Domingo will be joining me in Davis shortly to look for work. After he obtains his PE, he plans to return to school for a master's degree.

Our ultimate goal is to start an international consulting firm. We look forward to conveying sound ethical advice, sustainable technologies, and humane messages to developing and developed communities. **ERESA**

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