

ERE MESSENGER

Environmental Resources Engineering

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Ali Moradi, Sintana Vergara, and Margarita Otero-Diaz Join ERE Department

by

*Ali Moradi, ERE Assistant Professor**Sintana Vergara, ERE Assistant Professor**Margarita Otero-Diaz, ERE Assistant Professor*

Introduction by

Beth Eschenbach, ERE Chair and Professor

ERE hit the jackpot with new faculty this year! We were able to convert a difficult situation into a very positive outcome. We were on track to hire one new faculty member for Fall 2017, when we learned that two of our existing faculty (ERE

Assistant Professors Andrea Achilli and Kerri Hickenbottom) were leaving HSU to take positions at the University of Arizona. Fortunately, we were able to replace them as well, and we hired three new tenure-track faculty members for Fall 2017. I will intro-

duce these new assistant professors in the order they were hired.

- Dr. Ali Moradi received his Ph.D. from the Colorado School of Mines, and completed his postdoctoral research there as well. This semester he is teaching Statics and Transport Phenomena for us. Dr. Moradi has a long-standing interest in teaching, and his research expertise involves storing renewable energy in soil.

- Dr. Sintana Vergara earned her Ph.D. at U.C. Berkeley, and she worked with the World Bank, sharing her expertise in composting and solid waste management. This semester she is teaching Introduction to Environmental Resources Engineering, and she is also working with the Klamath Connection place-based learning community.

- Dr. Margarita Otero-Diaz received her Ph.D. from the University of Michigan, where she explored the ways ethanol spills can change the transport and fate of pesticides. This semester she is team teaching Introduction to Water Quality with Professor Eileen Cashman and Capstone Design with Professor Margaret Lang.

The ERE faculty is thrilled to have these new colleagues! We now have a total of ten tenured or tenure-track

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New Environmental Resources Engineering Department faculty members (left to right) Margarita Otero-Diaz, Ali Moradi, and Sintana Vergara.

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FROM THE EDITORS

Hello from the Messenger staff! We hope you enjoy this Fall 2017 edition.

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“We must create new models for adults who can teach their children not what to learn, but how to learn, and not what to be committed to, but the value of commitment.”



Margaret Meade, Ph.D.,
Cultural anthropologist,
Culture and Commitment,
1970

Alumni Profiles



Greg Stevens

BS ERE 1998

Owner/Principal Engineer
GSE Solutions, LLC; Carlsbad, CA
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I began my academic career at HSU in 1993, and graduated from the ERE program in 1998. Looking back now, attending HSU turned out to be one of the best decisions of my life. I have many great memories about my time there: creating lifelong friendships, fun nights partying on the plaza, endless outdoor fun, and the majestic redwood forest, just to name a few. My education at HSU not only prepared me for a very successful career in engineering, but also offered me many opportunities to grow as a person.

After leaving HSU, I got a job as an “energy” engineer (kind of a new thing at the time) at an energy consulting firm in Southern California. In the years that followed, I also pursued my love of travel throughout the U.S., Europe, and Mexico. One of my fondest memories while traveling through Paris is of standing on the Eiffel Tower and being in awe of this massive engineering feat...and then oddly having a flashback to Professor Al Burrows’ statics lesson on truss forces.

I enjoyed several years of single life, and then decided to settle down, sort of, and I purchased my first home in 2003. And then, several months later, I met the person who made me want to really settle down, my future wife, Jen. We met on a blind date and hit it off right away, and we were pretty much inseparable from that point on. Jen and I were married in September 2005, and looking back now, I can say without a doubt that this was THE best decision of my life. We now live in Carlsbad, California with our two beautiful children – Chloe, 8, and Donovan, 6. Our weekends are filled with the kids’ sports events, which I truly enjoy watching more than anything else. And, my wife and I go out for “date night” whenever we can.

After spending almost 14 years working for someone else, I finally fulfilled a dream that I had imagined many years earlier while I was a student at HSU – being my own boss. In 2011, I started my own energy consulting firm, GSE Solutions, where we help commercial, industrial and institutional utility customers improve their bottom line by reducing energy and maintenance costs at their facilities. Aside from the technical work, what I enjoy most is helping our clients uncover their challenges and then working together to resolve them. In addition to being owner and principal engineer at GSE Solutions, I’m also the managing director of GreenPSF, a software company that has developed an online platform to assist utility customers with making procurement of energy projects faster, easier, and cheaper. Through software, we hope to eliminate the major hurdles preventing customers from implementing more energy projects. I assume, as with any major decision in life, it boils down to minimizing the risk and fear for the decision maker.

At this stage in my life, I’m looking forward to watching my kids grow

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into caring and productive adults... and going on more dates with my wife. I hope to instill in my children, as my parents did with me, a “growth mindset,” which basically means “with effort and perseverance, you can succeed.” I often relied on this valuable life lesson during my time in the HSU ERE program. Believe me, I had lots of practice, given the many hours of frustration I spent in the FORTRAN lab cursing at my computer after being stuck in an “infinite do loop.” Eventually though, I did succeed. And finally, I want to pass on the love of travel to my kids. It has opened my eyes to many different cultures and experiences that give greater context to what I learned in the classroom.



David Barr

BS ERE 1986

Water Resource Control Engineer
California Regional Water Quality
Control Board – SF Bay Region
Oakland, CA

I went to high school in Eureka, so Humboldt State University was a natural choice for me. I have loved the outdoors, hiking, camping, and backpacking since I was a kid, and the time spent doing these activities instilled in me a great interest in ecology and the environment. I selected Environmental Resources Engineering as a major with

an emphasis in water quality because it sounded interesting and also seemed likely to provide good job opportunities.

After graduating, a fellow ERE graduate and I went to Europe and spent the summer traveling with backpacks and rail passes. We had a great time, and I value that experience very highly. Once back in California, I started looking for a job and received an offer from the California Regional Water Quality Control Board, Santa Ana River Region in Riverside. I accepted the offer without knowing much about Riverside, and figured I could work there for a year or so, and then transfer to another region somewhere in Northern California. However, I liked Riverside’s easy access to the ocean, mountains, and deserts of Southern California, and I ended up spending four years there.

I worked initially in the surface water program, which included municipal wastewater and industrial wastewater treatment plants. One of my first tasks was writing revised National Pollutant Discharge Elimination System permits for municipal wastewater treatment plants, which required them to upgrade from secondary to tertiary treatment. This didn’t make me very popular with the Southern California cities which now needed to upgrade their wastewater treatment facilities. The Santa Ana River had historically been dry in much of the Riverside/San Bernardino Valley area, and there was a large increase in the amount of treated wastewater being discharged to the river and its tributaries. This meant the river was flowing year round as an effluent-dominated stream, wherein 90% of the flow was treated wastewater. Families were visiting the river to play in the water, and it needed to be made suitable for direct contact recreation. There were also issues of nitrates, metals, and other pollutants, as well as their effect on the aquatic environ-

ment. In addition to this, I dealt with dairies, landfills, large septic systems, and erosion control issues at mountain ski resorts while also selecting sites for pollutant analysis of fish and shellfish for the Regional Monitoring Program.

While Southern California was nice, I missed the wetter climate of northern California, and I wanted to be able to visit my family in Eureka more easily. So, I transferred to the San Francisco Bay Regional Board office in Oakland, which has turned out to be a pleasant place to live. The East Bay Regional Park system includes large wildland parks, and the nearest natural redwood forest is only about 3 miles from my house.

I am currently working in the groundwater cleanup program, where we frequently disagree with a discharger’s interpretation of subsurface conditions, as well as the amount of cleanup needed. As a result, we must be able to defend our requirements for the sometimes extensive cleanup of groundwater.

One great thing about the ERE degree is that it provides you with the skills and opportunity to work on whatever “side” of an issue you choose. You might work for a company, agency, or utility that discharges to the environment; or for a regulatory agency, such as the Regional Water Board or Department of Toxic Substances Control, that regulates the discharge; or for a consulting firm doing an investigation and cleanup associated with the discharge.

I have found that working at the Regional Water Board provides me with a good balance between work and my personal life. The Boards have responsibility for many different water quality issues, and there are opportunities to get experience in different areas. If you are motivated to

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take on projects beyond your normal workload, you can develop expertise in something you find interesting and important, and perhaps develop policy on how to deal with that issue.



Glen LaPalme

BS ERE 1997
Principal Engineer
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Ever since I was a kid, I have been interested in nature and mathematics, so Environmental Engineering seemed to be a perfect fit for me. After completing two years in community college, I selected Humboldt State University, in part because it was the Cal State University campus farthest away from my home in Southern California. Fortunately for me, it turned out to be a great choice with a wonderful learning environment. So great, in fact, that through HSU I studied abroad in Mexico, became a certified rescue diver, took Aikido and Latin ballroom dance classes, and was introduced to frisbee golf. As a result of these and other extra-curricular activities, I spent more years than most other ERE students working to complete my degree.

Despite my slow progress through the ERE program, I thoroughly enjoyed

the curriculum. Some of my favorite memories are testing PV panels, learning about wetland design for wastewater treatment, and working on group experiments in fluid mechanics. I will also never forget taking a FORTRAN class from Margaret Lang. She never cut me any slack and always pushed me to do my best, and I can say that I finally got it.

Before receiving my degree in 1997, I worked summers as a draftsman for a civil engineering firm in Southern California performing analyses for land development projects. After graduating, I accepted an offer from Schiller Associates in the Bay Area, where I provided technical support for energy efficiency programs managed by the State's Investor Owned Utilities (IOUs). Little did I know then how much writing (not one of my stellar skills at the time) would be required in this field, and that communicating difficult ideas in simple terms, both in speech and writing, is invaluable in the energy industry.


After 5 years with Schiller Associates, I joined Alternative Energy Systems Consulting as a senior engineer. I continued my work on the IOU programs by providing engineering support for clients such as Pacific Gas & Electric (PG&E), Southern California Edison (SCE) and San Diego Gas & Electric (SDG&E). We helped these clients develop and implement program policies and software tools for evaluating and verifying energy savings.

In 2008, I ventured out with my business partner to open my own energy management consulting firm, PL Energy. Our current clients include PG&E, SCE, SDG&E, and other private companies. We provide energy services in the following areas: Integrated Energy Audits, Energy Efficiency Consulting, Utility Energy Management Services, Retrocommissioning Services, LEED Building Consulting Services, Com-

puter Energy Modeling, Technical Reports, and Technical Training.

I still work closely with five people who went through the ERE program with me, all following each other into the energy industry after graduation. One of the things I took most from the ERE program is that relationships matter as much as the science.

The environmental problems facing us in the years ahead will require the problem solving skills of an engineer, the communication skills of an attorney, and the attention to detail of an accountant. Yet, even these skills will not be sufficient without the integrity to do what is right. Thus, my advice to current ERE students is to develop your skills as a critical thinker.

I loved my stay in Northern California, and if it weren't for the surf, sand, and incredible climate along the Southern California coast, I would probably still be living there. Currently, I live in San Clemente with my wife Katie and our three children. The flexibility of owning my own company allows me time to surf, paddle-board, and coach my kids' sports teams. I will be forever grateful to HSU and the ERE program faculty, and staff for providing me with the experience that brought me to the place I am today. 

“Everyone is entitled to their own opinions, but not their own facts.”

—◆—
Daniel Patrick Moynihan
U.S. Senator (1927-2003)

How I Learned to Stop Worrying and Love the Netherlands

by

Chris Coutinho (BS ERE 2013)

Data Analyst/Researcher

REDstack BV, Sneak, the Netherlands

I am very excited and honored to be writing for the ERE Messenger, as this is a newsletter I read with great interest! After graduating from the ERE program in Fall 2013, I spent Christmas at home with my parents. There, I decided to visit the Netherlands and spend time with extended family before looking for a “real” job. It had been a few years since I had seen my grandmother, aunts, uncles, and cousins, and it seemed like a great way to relax after a busy final semester. I anticipated staying only a few months in Europe before returning to California, but that turned out to be way off the mark.

During a brief trip to England, a friend told me about bike touring, which is essentially backpacking on a bike. I fell in love with the idea of exploring Europe by bicycle, so I decided to try it myself and bought a second-hand mountain bike in the Netherlands (fun fact: there are more bikes in NL than there are people, 19M vs 17M!). I spent three months on the saddle, starting in Venice, Italy. I rode around the Adriatic Sea, through the ex-Yugoslavian countries, followed by Albania, Greece, and Bulgaria, ending in Turkey. By the time I reached the Blue Mosque in Istanbul, I had completely fallen in love with Europe, and I returned to the Netherlands searching for a way to stay for the long term.

Thanks to my mother, I am a Dutch national, so I was able to apply to a Dutch university with relative ease.

With the help of generous letters of recommendation from two of my HSU professors (thanks again!), I was accepted at a technical university, and I intended to earn a masters degree in Sustainable Energy Technology. I thought that this would be a great way to advance my technical credentials in a new country, meet other students my age, as well as get a foot in the door to industry by participating in clubs and student organizations. While looking for an internship, which is a graduation requirement in the Dutch system, I came across Wetsus, an internationally recognized research institute specializing in water-related technology, such as electrochemistry and advanced water treatment. Through the contacts I had made at Wetsus, I came across a job posting for a very inter-

esting researcher/data analyst position at a startup called REDstack that was working on fuel cell development. It looked like an opportunity that might not be around after graduation, and the thought of working for a startup was intriguing. So, even though I was in graduate school for the sustainable energy program, the chance to work at a sustainable energy startup like this seemed more exciting. I applied, got accepted, and put an indefinite pause on my graduate studies. That was in 2014, and I still regard it as one of the best career decisions I have made.

REDstack is primarily involved in the research and development of Reverse Electrodialysis (RED), a sustainable energy technology that converts the chemical potential stored in a salinity gradient, such as between fresh and salt water, into electricity. Some recent ERE graduates might remember former ERE Professor Andrea Achilli’s research into pressure retarded osmosis (PRO), which is a different but related technology. One thing that continually amazes me about the work we are doing at REDstack is the close partnerships we maintain between industry and academia, mostly through Wetsus and other universities throughout Europe. There are several European-funded projects that combine industry and research to further technological progress across scientific



Chris Coutinho relaxing in Istanbul after three months of biking across Europe.

disciplines. We work alongside other companies and universities on projects related to salinity gradient technology. These include REAPower (a joint research venture aimed at generating electricity from sea water and highly concentrated saline brines) and REvivED (a research initiative focused on electro dialysis, with an attempt to make it more advantageous than reverse osmosis for desalination). These projects give real meaning to the work we are doing at REDstack, and they make the difficulties of working at a startup worth the effort. This year we were presented with the prestigious 'Dutch National Icon' award by the Dutch Ministry of Economic Affairs. This prize is for groundbreaking innovations which provide solutions to global problems.

However rewarding school or your job may be, one difficulty encountered by international students and workers is finding friends and things to do in their new countries. And I think it's tougher for international students in the Netherlands than in many other countries, because there is not much of a university/dorm culture as in the USA, or at least as it was for me at HSU. Here, most local students go

home on the weekends because public transportation is incredible (including being free for citizens...), and the country is quite small geographically, so very little time is needed for travel. For immigrants and expats, and even a majority of working Dutch people, time just seems to disappear when you graduate and start the next phase of your life.

Two things that help when traveling and living in another country are learning the local language and participating in group activities in the communities where you live. When I started working and had free evenings and weekends, I took Dutch language classes for incoming internationals sponsored by the local city government, and I talked to pretty much anyone who would listen. In this way I made some new friends, including my local butcher!

I also started attending salsa classes in the area, and I met some interesting and out-going people. I was surprised in the beginning, as there is an impressive dance culture in Netherlands due to the influence of Dutch colonies, especially a few island countries in the Caribbean. There are classes and

social dance events with highly experienced dancers several times per week across the country. In fact, as I write this I'm planning to go to a salsa festival this weekend!

I haven't lost my appetite for sitting on the saddle, and I use my bike for everything from getting to work to running errands and going to concerts. Keeping busy outside of work has also been instrumental in improving my Dutch language skills, and being fluent in the local language is easily one of the best ways to build friendships with locals and feel like you belong where you live.

Almost four years into my 'Dutch experiment' I can say that the Netherlands is truly beginning to feel like home. Living and starting my post-university life here in Europe has been a real adventure, what with working at a company that is researching and developing sustainable energy and water treatment techniques, as well as having an active social life. Having twice the number of vacation days as my brother in the U.S. and being able to take a flight to almost any major city in Europe for less than €100 doesn't hurt either! 

New Faculty

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faculty members, and six of them are women. Few other undergraduate engineering programs in the country have faculties with more than 50 percent women! Please enjoy learning more about our three new ERE faculty members by reading their introductions below. — eae

ALI MORADI

I grew up in northwest Iran, and I moved to United States in 2011 to pursue higher education in environmental engineering. Primary school was the only part of my education that I attended without any specific direction. I first discovered my interest in physics and mathematics through my studies

in secondary and high school in the National Organization for Development of Exceptional Talents. This is a special school in Iran with a nationwide entrance exam and less than a 5% annual acceptance rate. I received my undergraduate degree from K.N. Toosi University of Technology and my graduate degrees from Iran University of Science and Technology, both in Tehran.

Before coming to the U.S., I worked for a few engineering firms on various projects until I decided to make a change. My interest in environmental engineering was sparked when I took 'Introduction to Environmental Engineering' as an undergraduate. It was through this class that I was introduced to a wide range of environmental issues and problems. During

my first master's degree, I worked on an experimental study to improve a novel and relatively simple remediation technology called electrokinetic remediation which is cheaper than other types that require excavation and transportation of contaminated soil for off-site treatment. This technology utilizes an electrical field that is induced in the soil by applying a direct current between electrodes that are inserted in the soil. As a result of the electrical gradient, contaminant ions or molecules (such as heavy metals) are mobilized and migrate through the soil toward electrodes where they can be collected fairly easily for off-site treatment. In my thesis, I coupled this method with Permeable Reactive Barrier (PRB) and iron nanoparticles to enhance the electrokinetic remediation process.



Ali Moradi in the ERE Water Quality Laboratory.

While working in the lab, I developed an interest in the theory behind environmental processes, and this inspired me to shift my focus, leading me to start my second master's degree at the University of Massachusetts as a research assistant. I was very excited to be part of a research group that was interested in understanding how harmful subsurface vapors can migrate from contaminated groundwater and enter buildings. For my thesis, I performed probabilistic analysis of mathematical models that are used to predict vapor intrusion. Since we face uncertainties in measuring and estimating input parameters for these models, the goal of my study was to identify the critical inputs and their effect on the model prediction. Overall, the research yielded an improved understanding of the factors that are important in vapor intrusion modeling.

Staying in academia was not the career path I envisioned initially, but working in such an atmosphere for several years allowed me to benefit from close interactions with faculty and other students. As a result, I developed an interest in teaching and research, and ultimately in becoming a university professor. I decided to apply for a Ph.D. position at the Colorado School of Mines, and I accepted a position working on a project funded by the Na-

tional Science Foundation. I worked on underground structures used to store solar energy in the form of heat inside soil during the summer, which was then extracted for use as a clean energy source to heat homes in the winter. I found this research area well suited to my ambitions of protecting the environment. After graduation I started searching for a university-level teaching and research position because I believe that a good teacher can touch a life forever, as teachers had done for me when I was a student. I was fortunate to receive an email from the ERE department chair about a vacant faculty position here at Humboldt State University, and now I am thrilled to be part of the Environmental Resources Engineering program.

When I am not working, I enjoy poetry and photography. The unique beauty of Colorado inspired me to start landscape photography, and one of my favorite things to do is take pictures of single trees. It is possibly a lonely tree in the middle of a desert, or perhaps one high up on an untouchable rock. I think there is a mysterious meaning to life embedded in their existence. These single trees have adapted and survived to live under environmental conditions that others would not. I see photography as a tool to chronicle the poetic elements of the surrounding

environment. Photography is important to me in the sense that it provides an affordable, yet powerful, tool to capture the moments that I think of as 'fragile moments.' These are moments with an artistic quality that might last for perhaps only a few moments before fading away. No matter what tool we can afford, whether it is a camera or a blank paper and pen, we as human beings are fortunate to be able to express how we feel at the moment and let others know about our unique experience of living in an adventurous and beautiful world.



SINTANA VERGARA

My path to ERE was definitely windy. Perhaps it began in the Amazon Rainforest when I was seven, where my family spent a week floating down a river that looked like an ocean, fishing for our dinners, walking through the woods and learning about plants from a local guide, and sleeping in hammocks. Or, maybe it began before that, when my Colombian parents flipped a coin to choose between job offers in the U.S. and Brazil, and moved to the U.S. with my big brother right before I was born. What I saw in the Amazon – pink dolphins, telephone trees bigger than buildings, sloths with a different concept of time – remains imprinted on my mind as a glorious and vast vision of a world that is not centered around us. I realized there that I was small, and the world was beautifully large, and though trees and water extended as far as my eyes could see, I could always see some smoke on the horizon. Though small, we were impacting the world on a grand scale.

These images, coupled with a love of math and science, propelled me to study environmental engineering in college. I wanted to acquire skills that would allow me to work on our relationship with the planet which sustains us. Two glorious events at Cornell University affected my life trajectory: taking part in a 'Research Experience for Undergraduates' program, and learning about garbage. For the

former, I spent a summer living in a cabin in the Front Range of the Rocky Mountains, researching alpine lake chemistry and ecology, and learning how both were shifting with nitrogen deposition from the city below (Boulder, Colorado). That summer gave me first-hand experience being a scientist and conducting research, and I loved it. I envisioned myself in graduate school, conducting my own research. In my senior year in college, I took a course called ‘Garbage’ (formally called ‘Solid Waste Engineering’) which changed my life. The class changed the way I look at objects, considering the paths they took before me and would take after me. It made me see great opportunities for change within the field of waste management: improving how products are designed, changing cultural norms and behaviors, and treating residual products as resources to be repaired, reused, and recycled.

I was excited and wanted to learn more, so I decided to attend graduate school. At UC Berkeley I had opportunities to participate in many activities that I love. I became deeply involved with Engineers Without Borders, I got to teach my own class, I played a lot of soccer, and I conducted research on solid waste for my Ph.D. My dissertation focused on the climate benefits of reuse strategies. As part of that effort, I spent a year in Colombia on a Fulbright Fellowship, where I quantified the carbon benefits of ‘informal’ recycling (low-income workers pulling valuable items from the waste stream). I found that these informal systems recycled quite a bit of material, but their biggest climate contribution was reuse. By removing useful objects such as clothes, books, and electronics from the waste stream, and repairing and selling them second-hand to others, the workers give new life to these materials, thereby providing important environmental benefits. Inspired by the practice of reuse in developing cities, I worked for the World Bank for three years to help advise developing cities (mostly in Palestine) on their waste management practices.



Sintana Vergara hiking in Yosemite National Park in July 2015.

But I missed science. I returned to UC Berkeley as a Postdoctoral Scientist and studied composting systems, their emissions, and their ability to pull carbon out of the atmosphere (where we don’t want more carbon) and store it in the soil (where we do). While at Berkeley, I was captivated by the ancient simplicity of decomposition, the way it works without interference by humans, and turns old material into new. But, the most important and most joyous part of life in Berkeley was meeting my husband, Joe, who graduated from the same program I did.

When an ERE faculty position at HSU was announced, I honestly had no idea that I wanted to be a professor. But the more I read about ERE and HSU, the more excited I became. I was drawn by the potential of being able to encourage students, many the first in their families to attend college, to pursue math and science. As a female engineer/scientist, I was drawn to a department that had such a strong commitment to inclusive teaching. I was also attracted by the opportunity to pursue my own research interests, and find eager students to investigate them with me.

Joe and I have friends who graduated from our program at Berkeley and

joined the HSU faculty, and we were both drawn by the intellectual community here. We were also attracted by the proximity to big trees, wild rivers, mountains, and the coast – we are hikers and backpackers and campers and runners and cyclists and climbers, and Joe is a whitewater kayaker. (We hope to be canoers soon, too!) But the biggest draw for me – what made me realize I wanted to be a professor – was meeting the ERE students here when I came to interview. What an amazing, interesting group of people!

We joyously moved to Arcata, HSU, and ERE. I am so happy to be a new faculty member in this department at this university, and I have been so impressed by the earnest, bright, motivated, and curious students I get to teach in ENGR 115. I am excited to teach and learn from students, to provide cool research opportunities like I had to them, and to hopefully inspire students to see how math and science can be applied to study, understand, and even solve some big environmental problems.

Joe and I are really excited to explore our new home, and to make new friends and colleagues. And, we are already looking forward to the ERE rafting trip in the spring!

MARGARITA OTERO-DIAZ

I am very excited to be part of the ERE community and share my background and experiences. I am from the island of Puerto Rico. With three brothers and no sisters, I grew up playing sports, and I even got to travel to different countries to represent Puerto Rico in bowling tournaments. Through the constant fighting for attention and respect among my brothers, I developed a competitive nature that created in me a drive to succeed and even excel in all of my ventures.

From an early age, I had the desire to serve others. During high school and college, I tutored my friends in math and chemistry. I was also a Girl Scout leader in high school, and I worked with young girls from pre-kindergarten and kindergarten. Watching them develop showed me how rewarding it is to be involved in the development of another human being, and planted in me a desire to be a teacher.

As a graduate student, I was involved with the student group Bridges to Prosperity, and we worked throughout the year to design, fund, and construct pedestrian footbridges in rural communities in Central and South America. Because my background was in Chemical and Environmental Engineering, I served primarily as the safety manager and translator for the group. However, I also learned about and taught masonry techniques. For example, when doing the slump test to determine the workability of concrete mix, the locals thought we were doing some sort of 'voodoo magic trick,' and we ended up teaching them the purpose of the test and how to perform it. Of all these types of experiences, one of my most fulfilling was helping to build a pedestrian bridge in the rural community of Vaquilla, Panama, which gave the locals a way to cross the river and have access to school, work, and resources.

Following my interest in math and chemistry, I pursued a B.S. in Chemical Engineering at the University of

Puerto Rico-Mayagüez. During my junior and senior years there, I was given the opportunity to perform undergraduate research looking at the remediation of water contaminated with organic pollutants using iron nanoparticles and ferrous salt solutions. It was at this time that I discovered how much I loved research, and how both my love for teaching and research could come together through a career as a university professor. This is how a Puerto Rican girl ended up in the cold state of Michigan!

I obtained an M.S.E. (Master of Science in Engineering) and a Ph.D. in Environmental Engineering from the University of Michigan. For my masters' project, I looked at the impact of chlorinated waste solvents from degreasing and dry cleaning on clays in low permeability zones. One of the things that excited me about this project was knowing that, as a consequence of my work, cleanup procedures would be influenced. Prior to our work, the predictive models used to determine cleanup time assumed that the accumulation and release of waste to low permeability zones were dominated by diffusion alone. However, our work demonstrated that contact of the waste with a clay layer causes the clay structure to collapse, resulting in

cracks within the clay layer. Consequently, the waste can accumulate in the cracks, storing more waste in the clay layers than can be accounted for through simple diffusion. With this information, new models can be constructed which will adequately predict the amount of waste stored in the clay layer, and cleanup procedures can be improved.

The topic of my doctoral dissertation was the impact on surface water quality due to the enhanced aqueous concentration of pesticides following an ethanol/ethanol-blend fuel spill. Currently, there are no standard cleanup procedures in place for such spills because ethanol is considered to be biodegradable. This misconception causes people to overlook potential significant negative impacts on the environment. My work showed that the presence of ethanol can increase the aqueous solubility of pesticides by more than three to seven orders of magnitude! Consequently, given the low permissible quantities of pesticides in water, the addition of ethanol potentially increases the concentration of pesticides in the water column enough to threaten ecosystem health. I look forward to applying the core concepts I have learned to my research at HSU. One exciting project I intend to




Margarita Otero-Diaz (bottom left) helping to construct a pedestrian footbridge in the rural community of Vaquilla, Panama, in August 2015. The project was through the student group Bridges to Prosperity.

start involves using plants/trees (phytoremediation) to remove contaminants, such as pesticides and dioxins, from surface and ground water in the presence of ethanol.

During grad school, I pursued every available opportunity to develop my teaching skills. I spent time studying different teaching and learning styles, and I obtained a teaching certificate.

I gained teaching experience as a graduate student instructor for Environmental Engineering Principles and Fluid Mechanics courses. I taught the laboratory section of Fluid Mechanics three times, and I incorporated interactive learning into the curriculum. I am excited that the faculty in the ERE department incorporate such engaging teaching styles, and I am looking forward to learning new techniques.

I have many interests outside of work. Being active has always been a big part of my life. In addition to playing sports, I especially enjoy hiking, tubing down rivers, and sightseeing natural landmarks. I also enjoy planning group activities (last year I organized a water balloon capture the flag tournament). I am excited to explore the beaches, trails, forests, parks, and rivers in Humboldt County. 

SHPE

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Let's face it. You are in Humboldt and most likely far away (geographically speaking) from nearly everyone and everything you know and love. You probably miss your parents, siblings, and friends from your hometown. Try integrating yourself into the ERE community (family) by attending SHPE events. Be sure to check out SHPE's club update in this edition of the ERE Messenger, and stop by to check out a SHPE meeting to learn more. This Fall semester SHPE meets Fridays at 5 PM in SciD Rm 5.

As a community that is welcoming of others, SHPE understands that students sometimes want to be involved in different activities with other clubs. That is why SHPE encourages students who have that extra time to go out and participate in projects with SWE, ERESA, RESU, and/or EWB. If you learn something meaningful during those experiences, don't be shy! Share with the rest of SHPE during one of their weekly meetings. You may get others on board your project by sharing those experiences!



LEADERSHIP


Okay, so you've been in the ERE program for one or two years now. Ideally, you'll have a handle on your

workload. You've attended some of the events that SHPE hosts and you dig it. If this sounds like you, then consider taking your involvement to another level by becoming a leader in the ERE community. What better way than inspiring the community you've been hanging out with at the SHPE Tutoring Sessions and the other events they host?

I was SHPE president during the 2014-2015 school year, and I gained a lot of confidence in my public-speaking and other "soft" skills which have helped me tremendously in both my academic and professional careers. Soft skills, or interpersonal skills, are personal attributes that help you communicate effectively with your peers and colleagues, and with your audience if you are speaking in front of a crowd. These interpersonal skills include: self-motivation, decision making, team working, etc. These skills are sometimes overlooked in engineering because, as engineers, we tend to emphasize our technical skills. If you are able to successfully develop both your technical skills and soft skills, you'll be well on your way to becoming a well-rounded

engineer. One good way to gain the soft skills is to be a leader in the ERE community.

I'm not implying that you need to jump into a presidential role right away. There are other positions to choose from. If you're an artistic person who loves creating graphics, then you could be in Marketing. If you love interacting with people or are good with social media, you could be a Public Relations Officer. Whatever skills you possess, chances are you can utilize them and hone them as a SHPE officer. Pick what you think you can be good at and remember, "Never try, never know!"

My involvement with SHPE didn't stop when I left HSU. Currently, I'm the Treasurer for the SHPE Professional Chapter in Orange County, CA. The technical and soft skills I gained as an undergrad through ERE and SHPE were especially important to me in obtaining and holding my Staff Engineer position at a premier engineering firm, as well as having the pleasure of representing Orange County's SHPE Professionals. 

SHPE Quick Facts

The Society of Hispanic Professional Engineers was formed at HSU during the 2013-2014 academic year as a Student Chapter of National SHPE.

HSU SHPE currently has 20 active members.

Mission

SHPE changes lives by empowering the Hispanic community to realize its fullest potential and to impact the world through STEM awareness, access, support and development.

ERE Clubs Information Board

Compiled by Kelsey Burrell, ERE Junior

Organization	Fall 2017 Activities	Spring 2018 Planned Activities
<p>ERE Student Association (ERESA)</p> <p>Email: <i>eresas@humboldt.edu</i></p> <p>Temporary Webpage: <i>http://tinyurl.com/HSUERESA</i></p>	<ul style="list-style-type: none"> • Welcome Back Pizza • All clubs meetings • ASCE Pizza with Professionals • New officer elections • Fall Follies (Thurs before Thanksgiving) • Presentations by professionals • Locker raffle 	<ul style="list-style-type: none"> • ASCE Leadership Conference • ASCE Wastewater Treatment Comp • Ice Cream Social / ERE Awards • Mock interviews • Presentations by professionals • ASCE / ERE Awards Banquet • ASCE Order of the Engineer • ERE graduation reception
<p>Engineers Without Borders (EWB)</p> <p>Email: <i>humboldtewb@gmail.com</i></p> <p>Webpage: <i>Updated URL coming soon</i></p>	<ul style="list-style-type: none"> • West Coast and Mountain Region Conference in Las Vegas • Domestic sanitation project with AHHA in Eureka • Hospital well water project in Camoapa, Nicaragua with NCPC • Sanitation project in La Manzanilla, Mexico with NCPC • Build demonstration ram-pump 	<ul style="list-style-type: none"> • Hospital well water project in Camoapa, Nicaragua with NCPC • Domestic sanitation project w/ AHHA • Data collection trip to La Manzanilla, Mexico with NCPC • Assist with NCPC Homebrew Festival fundraiser for projects • Assist with NCPC Jam fundraiser
<p>Renewable Energy Student Union (RESU)</p> <p>Email: <i>resu@humboldt.edu</i></p> <p>Webpage: <i>https://www.facebook.com/HsuRenewableEnergyStudentUnion/</i></p>	<ul style="list-style-type: none"> • Bike blender • Calibrate SoRMS pyranometer • Upgrade SoRMS pyranometer mount • HSU Solar Radiation Monitoring Station (SoRMS) • Rock Creek Ranch projects • Off grid repair workshop • HEIF proposal(s) 	<ul style="list-style-type: none"> • HEIF proposal(s) • Bike blender • New faculty lectures (TBA) • Rock Creek Ranch projects (TBD) • RESU reunion • Off grid repair workshop (TBD) • HSU Solar Radiation Monitoring Station (SoRMS)
<p>Society of Women Engineers (SWE)</p> <p>Email: <i>swe@humboldt.edu</i></p> <p>Webpage: <i>http://hsu.swe.org</i></p>	<ul style="list-style-type: none"> • Local middle school outreach • Engineering Day • Soldering workshop • Resume workshop • Bowling night • SWEshi 	<ul style="list-style-type: none"> • SWE Social • Assist with MATHCOUNTS • Local middle school outreach • Mentoring program with prof SWE • Rita's fundraiser • 2018 SWE Regional Conf in Portland • Regional Leadership Summit • Girl Scout Day
<p>Society of Hispanic Professional Engineers (SHPE)</p> <p>Email: <i>shpe@humboldt.edu</i></p> <p>Webpage: <i>https://www.facebook.com/shpe.hsu/</i></p>	<ul style="list-style-type: none"> • ERE Drop-In Tutoring sessions • 5-year course planning • Alumni video calls • Internship & REU Peer Panel • Baile de Otoño – Fall dance and fundraiser at Los Bagels • Día de Los Muertos alter making & potluck celebration • SHPE National Conference in Kansas 	<ul style="list-style-type: none"> • ERE Drop-In Tutoring sessions • 5-year course planning • Tamale fundraiser • Celebración Latin@ – Cesar Chavez & Dolores Huerta Celebration at Los Bagels • SHPE Regional Conference at CSU Sacramento • ERE Graduation Party

SHPE Society of Hispanic Professional Engineers

Here's Why YOU Should Join!

by

Jairo Luque Villanueva (BS ERE 2015)
Water Engineer, CH2M, Santa Ana, California
Treasurer, Orange County SHPE

Do you want to be a part of one of the most diverse clubs on campus, one that shares with the community and helps you improve your academics? If you are an ERE student, and your answer is "yes," then SHPE may be a good fit for you. Join today and get in on the fun!

Since it was established in 2014, SHPE has worked to create a strong community within the ERE department. Rather than participating in projects and competitions like some other clubs, SHPE focuses on helping students excel personally and academically by supporting each other, celebrating our

various cultures, building a welcoming community for all members, and providing academic support activities.

This is the last in a series of articles about the five student clubs associated with ERE.

I'll expand on why YOU should join SHPE, referring to three categories: 1) Academics, 2) Community, and 3) Leadership. These are pivotal in your development as a young engineer.



SHPE professionals from Orange County and South Bay Los Angeles during a networking event at Strand Brewing Company in Torrance, California.

ACADEMICS

Having gone through the ERE program myself, I recommend giving priority to school because you can't get your dream Environmental Engineering job until you have that degree in hand. However, if you have some extra time, then you should definitely consider joining SHPE. It can help you with your Statics homework or that FORTRAN program you're struggling with at midnight. SHPE, in conjunction with the Learning Center, hires some of the brightest ERE students to tutor other ERE students. How cool is that?

SHPE provides educational resources on a weekly basis. It also hosts Semester Planning Workshops in which upper division ERE students provide academic advice to lower division ERE Students before they meet with their faculty advisor. Weekly educational resources are provided by an academic liaison who presents educational videos, facilitates a safe space for group discussions, and provides tips on how to improve your studying skills, prepare for exams, and deal with test anxiety.

COMMUNITY

I stress the importance of community, especially when you're a student in the ERE program. You will need support, sometimes a little of it and sometimes a lot. SHPE has what you need to be an excellent student and to feel welcomed in the ERE and Humboldt community. SHPE members genuinely care for each other.

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