HUMBOLDT STATE UNIVERSITY

ASCE
Student Chapter American Society of Civil Engineers

ERE MESSENGER

Environmental Resources Engineering

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A WORKING PERSPECTIVE
FROM RETIRED ERE GRAD MARTY LAY

by Marty Lay, PE (BS ERE 1973), Sr Environmental/Civil Engineer (Retired)

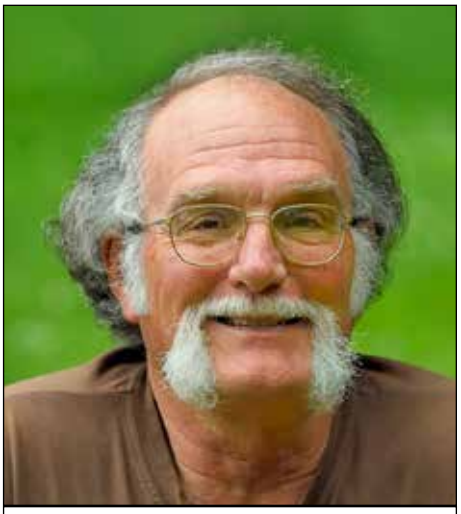
I graduated from the second HSU ERE class in the spring of 1973, and have enjoyed 42 years practicing engineering. I retired in December 2015, and I am still learning! I was asked by my friend, ERE Emeritus Professor Mike Anderson, if I would share with you some thoughts on working in the engineering field and what that entails from my perspective. I will focus mainly on what I did not learn in school, but was necessary for my long and enjoyable career in civil and "environmental" engineering.

My education and other training include an AA degree in Surveying and Mapping Technology from City College of San Francisco and a BS ERE from HSU, with special studies in soils, geology, forest hydrology, and environmental planning. I worked summer jobs in surveying, forest fire fighting, ranch work, painting (my father was a self-employed professional house painter), and general building repair for local landlords. I learned many aspects of teamwork, care to detail, and information gathering/application from those experiences that worked in my favor when I hit the streets to get a "real" job.

"What is an 'Environmental Engineer'?", many prospective employers asked me during my work application process, which was local so I could remain in the area I felt was home. Being 1973, and with the various local issues and derogatory associations with the "environmental" label, I explained that I had education in new ways of approaching traditional engineering concepts, but also had some work experience in the field of surveying and various building trades.

In late June 1973, I was employed by the local firm of Winzler and Kelly Consulting Engineers (now GHD), and my first project was to complete a water resources and land use evaluation for the Hoopa Valley Indian Reservation. The work involved detailed land use evaluations for farming, commercial, residential, and cultural inventory, as well as physically monitoring many of the local streams for potential use in domestic, irrigation, and fisheries demands.

Working with the Hoopa people, tribal operations departments, and associated regulatory agencies (Hoopa Tribal Council, Bureau of Indian Affairs, Indian Health Service, U.S. Forest Service, etc.) greatly expanded my understanding of relationships with people of various cultural backgrounds. It also affected my expectations of completing a work product from conception and construction through operation and maintenance (i.e., sustainability). I had to learn to adjust my and my employers' design process to keep projects technically current in the layout of water tanks, diversion structure design and placement, and



Marty Lay, PE

transmission and service piping networks. I learned and did most of my own hand drafting (no CAD) and calculations on project elements, while relying on input from the many team members I assembled in disciplines of hydrology, agriculture, fisheries, forestry, cultural impacts, and road building. I became the construction resident engineer for many of the projects I designed, and was able to see what worked and what needed to be changed, given site physical and regulatory constraints, political and

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FROM THE EDITORS

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

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"Nature uses only the longest threads to weave her patterns, so that each small piece of her fabric reveals the organization of the entire tapestry."

Richard P. Feynman
1918-1988

Nobel Prize in Physics
Quantum Electrodynamics

Alumni Profiles

Clayton Guiraud, PLS, PE

BS ERE 1999
Land Records Section Chief
Geodetic Branch
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Sacramento, California

Yes, it is generally true that the shortest distance between two points is a straight line. However, when finding your livelihood, traveling a straight line is nearly impossible. When I reflect back to my childhood, to my tenure at Humboldt, and to my different positions at my current employer, my path has not been either linear or direct (although, perhaps a bit circular). However, I was prepared with the proper skills and the confidence to excel, and that got me to this point. This is what the ERE degree has to offer.

In high school, I was a builder. I designed model cars, planes, and boats from scratch, always thinking about how I could build something better. So, an engineering degree was fitting, but which one? At the HSU Career Center, I learned about Environmental Engineering. It was a new discipline, sounded exciting, and with the future in mind, I liked the idea of being out in front of something new. During my final semester in 1999, the California Department of Water Resources (DWR) came to HSU to conduct job interviews with interested students. I signed up without thinking much about it, mainly for the experience. Before I left, though, they offered me an engineering job (score!). However, my first work assignment wasn't design and build; it was running a GIS database for keeping track of entry permits for the environmental scientists doing field studies. It didn't take me long to interview with DWR again and rehire at the headquarter office in Sacramento, this time with the Division of Engineering. After a couple years designing water flow control structures for the DWR in the San Joaquin Delta, I successfully passed all three tests for the PE exam in one try. My success with the PE exam is attributable to the faculty at HSU. Although the curriculum covered many civil engineering topics, it didn't cover all of them. HSU honed my ability to learn.

In 2003, I moved to the Geodetic Branch of DWR, working in the Photogrammetry Unit (measuring with photos). This was a challenging move because I knew nothing about land surveying when I started. However, three years later, I passed both surveying tests and became a licensed land surveyor as well. After 8 wonderful years in Photogrammetry, I joined the Property Management and Land Records section. My job here is twofold. First, I manage information about all the land DWR has an interest in. I'm focused on the land rights and the boundary of those rights. Whether it is along our 850-mile California Aqueduct or with our 1600 miles of levees, these systems are complex, and land rights span nearly 100 years. Second, I am creating a GIS database of all this information. This system will make identifying these rights easy and efficient.

Bottom line: the ERE program taught me how to learn. Who had any idea

Alumni Profiles

what Calculus III, Fluid Mechanics, or Transport Phenomena meant when we started the program? Working today, knowing you can learn anything you put your mind to, translates to confidence in interviews – a powerful quality to have. What's next for me? JD?

Meg Harper, EIT

BS ERE 2012
MS Environmental Systems 2013
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I came to the Energy, Technology and Policy (ETAP) program at HSU with the desire to focus on the development of renewable energy technologies, energy efficiency, and sound energy policy as ways to address our carbon emissions. After looking at all of the engineering design courses I wanted to take (and all the pre-requisites I would need to be able to take them!), I was inspired to simultaneously gain a strong technical background by pursuing a second bachelor's degree in the ERE program.

At HSU I worked on a myriad of group projects, both in the classroom and through my experience with campus groups such as the Renewable Energy Student Union (RESU) and the Humboldt Energy Independence Fund (HEIF). Additionally, I applied for and received a research fellowship with the Schatz Energy Research Center (SERC), which enabled me to work on topics ranging from energy efficiency policy to hydrogen infrastructure. All of these projects gave me a chance to work with some of my amazing fellow students in the ERE program, and staff at SERC let me put what I learned in the classroom into action.

My interest in renewable energy encouraged me to spend my summers pursuing a complimentary passion: working on appropriate technology design projects throughout the world. One key experience was attending the International Development Design Summit (IDDS) in Kumasi, Ghana. This month-long summit brought together people from all over the world, all sharing a desire to create technologies that address the needs of communities in the poorest regions of the world. (Several IDDS summits are hosted in different countries each summer; you can apply on the IDIN website: www.idin.org/idds).

These international experiences and my classroom studies provided me with the skills necessary to work with a team of engineering students and advisors on the development and field testing of a load-sharing technology for micro-hydroelectric mini-grids in Bhutan. This student-run effort grew out of a RESU design project which won funding through the US EPA's People, Prosperity and the Planet (P3) student design competition (www.epa.gov/P3). While the project revolved around improving the reliability of a single mini-grid in Bhutan, the experience reinforced my desire to help improve people's access to renewable electricity.

After graduation, I was offered the chance to continue working at SERC on issues related to off-grid energy access. In addition to conducting research into mini-grids, my work over the past four years has largely involved supporting Lighting Global, a World Bank Group program designed to advance the off-grid solar market. Since 2009, SERC has developed and managed the quality assurance program for Lighting Global. As part of this effort we have designed test methods and tested hundreds of LED lights and solar home system kits, managed a network of test labs across the world, and conducted research on consumer preference, after-sales service, and market presence of solar products in Kenya, Tanzania, and India. This effort has not only allowed me to work with an incredible team here at SERC, but also provided me the opportunity to travel and engage with people all over the world.

No matter what your interests, I highly recommend getting involved in campus groups and seeking internships or relevant job opportunities to help enhance your experience at HSU and help you put the information you learn in the classroom into context. And, if you are interested in renewable energy, keep your eyes out for SERC announcements about student job opportunities and docent positions. We'll post them around campus, or you can check the SERC website here: www.schatzlab.org/news/category/positions/
Photo credit: Maia Cheli-Colando

"Knowledge is real knowledge only when it is acquired by the efforts of your intellect, not by memory."

Leo Tolstoy
A Calendar of Wisdom

Alumni Profiles

Greg Gearheart, PE

BS ERE 1992
Deputy Director for Information Management and Analysis
California State Water Resources Control Board
Sacramento, California

I graduated from HSU's ERE program in 1992. I have worked my entire career after HSU for the California State Water Resources Control Board, where I am currently the Deputy Director for Information Management and Analysis.

I am also the son of retired ERE Professor Bob Gearheart, so I grew up in Arcata, and attended local schools. After two years at UC Davis, I returned to HSU to enroll in ERE and complete my education. I got a summer job for the following four summers working for the County of Humboldt's material testing laboratory. This was a fantastic way to learn about environmental engineering, not to mention the back roads of Humboldt County.

HSU provided me with access to the hills, rivers, and ocean, and my experience from an early age of the power of raw nature and the outdoors, combined with being instilled with environmental protection values, and topped off with technical skills aimed at protecting and enhancing water quality, prepared me nicely for my interview with the State of California's recruiters who were looking for water resource control engineers.

After graduating from HSU, I took an engineer position with the San Diego Regional Water Quality Control Board (RWQCB) working on contaminated soils, stormwater and watershed regulatory programs. One of my favorite memories was cruising the San Diego Bay with a colleague in a rented skiff, collecting samples from the south end of the bay, where power plant cooling waters created a year-round habitat for sea turtles and seahorses. We almost got blown into the path of an aircraft carrier and almost ran out of gas, but in the end we got our data!

After seven years, I moved to the San Francisco Bay RWQCB to enhance my experience of working on watershed-based regulatory approaches. The Santa Clara Watershed Management Initiative is one of the longest running, most innovative and effective watershed management forums in the country. I worked closely with many ERE alumni on that project, and really learned a lot. After a year and a half, I took a position with the State Water Board in Sacramento, where I have worked since 2000. The opportunity to work toward the protection of California's waters is a rewarding profession, one that hooked me from Day 1. It's hard to imagine being happy working anywhere else, because the mission of the Water Boards – protecting the beneficial uses of water for all Californians – is powerful and well-supported by management.

My current role is the best one yet. I direct the statewide Surface Water Ambient Monitoring Program (SWAMP), which aims to check the health of our surface waters, and inform regulatory decisions. I serve as the "Chief Data Liberator" (not my real title!) for the organization, which is really ten distinct "boards," with approximately 2,000 staff led by 68 governor-appointed board members. The Water Boards manage more than twenty enterprise applications that serve as "databases" of all types, and some house environmental data (surface water quality, ground water quality, habitat, etc.), while others house programmatic data (facilities regulated, type of regulation/permit, inspection results, enforcement, etc.). All of this data must be turned into information, then knowledge, and eventually wisdom to better do our jobs. My office of 27 scientists, engineers and "data scientists" is charged with the task of strategically helping data, of known and acceptable quality, flow toward users.

An example of a project to help do this is a partnership between the State of California and the White House Council on Environmental Quality (CEQ) to host a "Water Data Challenge." The 2016 California Water Data Challenge was a first-of-its-kind collaboration between the CEQ and a State agency. It challenged participants to leverage open source technology and available water information to support decisions around water reliability and resource sustainability in California. Inspired by President Obama's commitment to improving open data and government, the Challenge demonstrated the potential for collaboration, transparency, and innovation to address water management issues.

I love my job at the Water Boards, and the combination of my synergistic roles – get the data on health, and free the data for decision makers – really feels like a capstone to all the experience I have received working here. All of this was driven by the outstanding foundation of knowledge and education I received at HSU, and growing up in Arcata. My motto has always been, "Be the Change." Ω

Dakota Access Pipeline: Environmental Considerations

by Jordan Ludtke, ERE Senior

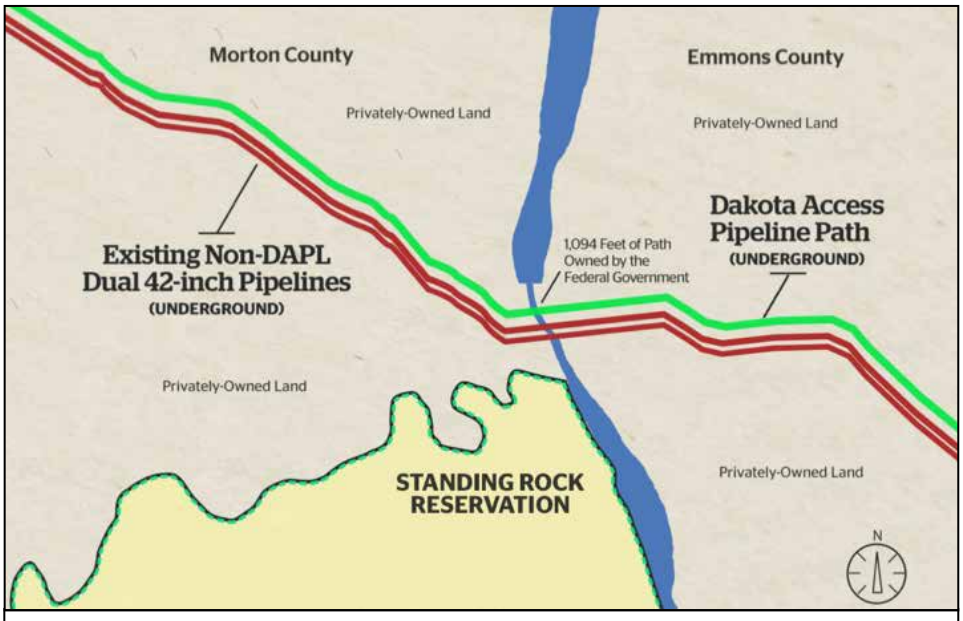
As part of the Fall 2016 ENGR 410 Environmental Impact Assessment class, my classmates and I investigated the permitting process and lifecycle impacts of the Dakota Access Pipeline Project (DAPL). As it was a highly controversial project, our class tried to take an objective approach to assessing how well Dakota Access, LLC underwent the National Environmental Policy Act (NEPA) processes and assessed the environmental impacts.

NEPA PROCESS

When proposing a new project, an organization must complete the NEPA process in order to get their project approved. First, the organization must complete an Environmental Assessment (EA) to determine whether the proposed project will have a significant adverse affect on the environment or to the public. The EA covers many topics, including geology and soils, water resources, wildlife resources, land use, and Native American consultations, among others. Once impacts are identified, the organization must start the Environmental Impact Statement (EIS) process, which includes: filing a Notice of Intent, performing thorough scoping, doing a complete environmental analysis of the project, either explaining the impact or explaining why there is no impact for each environmental category, addressing all public comments, and then filing for EPA approval. If, however, no significant impacts can be reasonably expected from the EA, or all impacts can be mitigated, the organization can file for a Finding of No Significant Impact (FONSI) or a Mitigated FONSI, and the EPA can then approve the project without performing an EIS.

DAKOTA ACCESS EA

Rather than completing an Environmental Assessment for the entire 1100 miles of pipeline, Dakota Access broke the length into several segments, for which they submitted individual EAs. While this makes sense on geographic terms (since different segments of the pipeline have different baseline environments, and different types of construction/drilling are occurring in different places), it evaded potential problems that might have been discovered by addressing the impacts of the pipeline as a whole. It also posed a problem due to the fact that while some segments may not cause an environmental threat, if even a single segment does, then the pipeline project as a whole does. This is exactly the problem that arose.



Route of the Dakota Access Pipeline (DAPL) section near the Standing Rock Reservation. Source: https://daplpipelinefacts.com/

Dakota Access's EA for the section that passes near the Standing Rock Sioux Reservation argues that with mitigation, the pipeline would not have a significant adverse impact on the environment. This EA addresses the length of pipeline that would be located on lands owned by the US Army Corps of Engineers (the Corps) and Federal flowage easements, which includes the section that flows below Oahe Lake (about one mile North of Standing Rock). For this reason, the Corps is responsible for approving the project and takes responsibility for the EA on Dakota Access's behalf.

An Environmental Assessment requires that the impacts of the proposed project and all alternatives are discussed in comparison to the "no action" alternative. However, rather than defining their no action alternative as the "business as usual" case, or the current system implementation, the Corps defined it as the case where the current oil transportation methods would be used to transport the total increase in volume that the pipeline would be able to transport. The Corps was consequently able to claim that the no-action alternative would include a large increase in trucking and railway transport to meet the oil demand. They therefore stated that the no-action alternative's environmental

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The Engineering Design Process of Utility Solar: An Overview

by
Rowan Beckensten (BS ERE 2013), Performance Engineer
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The engineering design of a utility-scale PV system is a detailed process that requires teamwork and objective decision-making. Throughout the design process, decisions are made by both the system owner and the engineer to optimize cost while meeting project objectives. The engineer must balance these decisions with safety and performance requirements when making specifications about how the PV system looks and functions. This article explores key stages of the engineering process and some core concepts of electrical design.

There are typically four submittal stages in the engineering design process:
- Preliminary Design Submittal (50%)
- Detailed Design Submittal (80%)
- Permitting Submittal (90%)
- Construction Submittal (100%)

By the time a design-level engineer is introduced to the project, it has arrived at some minimum level of detail, which we call 30% design. The percentages assigned to each submittal change per project based on client convention. For utility-scale ground-mount solar systems, 30% design suggests that a plot of land has been acquired and approved for development; major pieces of equipment (PV modules, DC/AC inverters, module mounting system) have been selected; and the details for system interconnection to the utility grid have been defined.

20MW West Antelope Solar Farm, Lancaster, California (2014).

Between the 30% and 50% design levels, the engineer develops the major "building blocks" of the PV system, which include: site plan, array layout, and single line diagram.

The site plan defines the area available for construction, and takes into account required property easements, equipment clearances, and topography. Access roads are defined, and major equipment locations are specified.

The array layout shows the locations and spacing of solar modules on site. The engineer must work iteratively to find a repeatable pattern of modules that minimizes conductor distances and energy losses throughout the system, while accounting for site constraints such as shading, topography and drainage.

The single line diagram (SLD) is a simplified schematic of the PV system that represents the major electrical equipment and power circuitry. It is important for defining electrical equipment types, ratings, operating conditions, and functionality. The SLD is ultimately what the electrical contractor refers to when procuring equipment and wiring it together in the field.

Together, the site plan, array plan, and single line diagram make up the 50% design deliverable. At this stage in the process, the most critical aspects of the PV system have been identified. The client reviews the plan set and provides comments that typically consist of ideas for cost savings, or "value engineering." The engineer, as the party who ultimately has legal responsibility for the design, must negotiate a balance with the client between savings, system performance, and aesthetics on the one hand, while adhering strictly to applicable safety codes on the other.

From 50% to 80% design, the engineer incorporates client comments into the plans, and provides specifications on more detailed aspects of the system, including: equipment elevations, wire types and sizes, electrical grounding details, and safety labels.

The 80% design deliverable is a complete engineering plan set. Another round of client comments is provided at this stage before submitting the plans for permit with the local planning agency, referred to as the Authority Having Jurisdiction (AHJ). Plans submitted for permitting are considered to be at the 90% design level.

Permitting review through the AHJ is an iterative process that can take up to several weeks. The AHJ may provide comments that need to be incorporated into the plans before a building permit is granted. Often there are multiple departments within the AHJ that review the plans for different project requirements. The engineer is responsible for addressing all AHJ comments in a timely manner to avoid impacting the project schedule. Permitting is a critical stage from a project management point of view, where any schedule delays can have significant cost implications.

After all permitting reviews have been completed, the AHJ grants a permit, and the plan set is considered to be at the 100%, Issue For Construction (IFC) level. The plans are then stamped and signed by the Engineer of Record, before being sent to the job site where the construction management foreman will use them to build the project.

Following delivery of the IFC plan set, and once the project is under construction, it is typical for the engineering firm of record to provide construction support. This support includes working with the contractor to answer technical questions that might come up during construction, reviewing and approving equipment submittals prior to purchasing, and acting as the backstop for review of any design changes needed in the field. The system owner may request that the engineer travel to the project site for inspection and verification that the system is built per design. The construction support process may take several months depending on the size and complexity of the PV system.

When construction of the system is complete, the contractor typically provides redline markups on the IFC plans to inform the engineer of minor design changes that occurred in the field. These changes are the responsibility of the contractor only. For record keeping purposes, the engineer will revise the IFC drawings according to the contractor interpretation of the construction changes, and issue final Record Drawings. The engineer does not stamp or sign Record Drawings, but is responsible for issuing them to inform operations and maintenance personnel of field conditions.

The engineering design process is one that changes from project to project. Every project has its own intricacies and challenges that the engineer must thoughtfully navigate in order to provide quality service to the customer. Finding solutions to unique challenges is the engineer's craft, and a certain amount of creativity is required to find efficiency in the process of original problem solving. When the engineer uses this creativity to meet the needs of the project and customer, the design process can be a fulfilling one. Ω

Working Perspective

Continued from page 1

cultural issues, and economics of the various projects (grants, loans, and local money availability).

While doing many of these water resource investigations over the next six years, I was also involved with logging road design and layout, incorporating new ideas for culvert placement and erosion control, surveying, light structural design, soils laboratory operations and testing, construction inspection, and public meeting attendance and speaking. Most of these were new learning experiences that I did not have during my formal education. I had a great amount of mentoring from co-workers and my employers and local construction companies (similar to teamwork in ERE at HSU), and this teamwork kept me going forward, as I wanted to learn more and more.

In 1979, I took time out and worked on my own as a self-employed engineer, with additional work as a contract engineer for other local and non-local engineering firms. I also dabbled in commercial crab and salmon fishing with a fellow engineer friend from HSU. My diving buddies and I had started a light commercial diving business that provided us with diving experience, equipment, fun times, and learning a new world of engineering and scientific instrumentation placement in the Humboldt off-shore area, the Columbia River area near Astoria, Oregon, and underwater pipeline inspections and ocean outfall discharge location inventories. We also did several underwater wood pile inspections for determination of piling integrity and longevity purposes. Again, there was more learning and wanting to know more to keep working in the fascinating field of engineering.

I was then selected to be the assistant resident construction engineer for trouble shooting and rehabilitation of 50 miles of sewer collection pipeline, associated lift stations, and manhole repair in the Russian River area of Northern California. I enjoyed learning and observing many techniques for deep trenching, trench water control, and working in physically and politically tough situations with the construction companies and local residents.

My next great experience was being selected as the resident construction engineer for the Arcata Wastewater Treatment Plant during the early 1980s. I was the counterpart to the construction firm, and had to rely on many engineering, construction, and eco-system trained people to get the project completed. By this time, I

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American Society of Civil Engineers

by Nathan Stevens, PE, M.ASCE (BS ERE 2013)
Vice President, ASCE North Coast Branch

The American Society of Civil Engineers (ASCE) is a professional body that was founded in 1852 to represent members of the civil engineering profession worldwide, and currently represents more than 150,000 members in 177 countries. The mission of ASCE is to "provide essential value to our members and partners, advance civil engineering, and serve the public good." ASCE supports the civil engineering profession and advocates for improved infrastructure nationwide.

Members of ASCE are provided with the most comprehensive communication, networking, and learning resources available in the industry. Among many other services and benefits, ASCE provides access to live webinars and on-demand learning seminars, exam review programs, career development opportunities (including volunteer opportunities and leadership resources), and discounts on technical publications and specialty conferences.

ASCE membership is free for students and provides many benefits, including free resume critique for students transitioning to professional membership, career resources for internships and jobs, discounts on select conferences and technical publications, networking opportunities, eLearning webinars, and scholarships.

Humboldt Bay Municipal Water District (HBMWD) Collector 1 and 1A Rehabilitation Project. Mad River, Arcata, California. Completion 2017.

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

Up next: SHPE

ASCE ORGANIZATION STRUCTURE

ASCE is broken up into Regions, Sections, and at the most local level, Branches. It is comprised of nine regions in North America, and a tenth that includes all members who reside outside North America. Region 9 includes the Los Angeles, Sacramento, San Diego, and San Francisco Sections. The North Coast Branch (NCB or Branch) of ASCE is a part of the San Francisco Section and encompasses Humboldt and Del Norte Counties.

ASCE NORTH COAST BRANCH OVERVIEW

The North Coast Branch is very active in the local engineering community. The Branch consists of seven officers that organize numerous events throughout the year, many of which are coordinated with the HSU Student Chapter. One event that the Branch coordinates is the annual Pizza with Professionals event, where HSU ERE students and local engineering professionals unite over pizza and beer to discuss the profession. The NCB also coordinates annual mock interviews in partnership with ERESA, where students take part in mock interviews with local engineering professionals, after which constructive feedback is given to the students on their resume and interview. These mock interviews provide the students with valuable experience in the interview environment

and sometimes lead to internships with local firms or agencies. Other events that the NCB coordinates include: monthly luncheon presentations on local engineering projects; a commercial during Engineers' Week that recognizes and promotes the importance of the profession; Engineers' Week proclamations at cities and counties in the Branch's territory; an annual awards banquet at which awards are presented by the Branch for Engineer of the Year and Project of the Year, and many other awards are given out by the ERE department and Engineers without Borders; and an annual crab feed that is always well-attended by students and professionals alike, at which a presentation is given on the previous year's Project of the Year. The Branch has also been very active in recent years in moving forward with ASCE's Infrastructure Report Card initiative.

INFRASTRUCTURE REPORT CARD INITIATIVE

ASCE's Infrastructure Report Card effort is an attempt to raise awareness about the importance and needs for local infrastructure, and is a means of providing political influence to increase investment in our nation's infrastructure. The Report Card uses a simple A to F school report card format to examine current infrastructure conditions and needs, assigning grades and making recommendations to raise them.

To date, the NCB has released two separate Report Card reports assessing infrastructure in Humboldt and Del Norte Counties. The first report assessed roads and bridges, and the second assessed water infrastructure. NCB officers, with the guidance and assistance of the ASCE National Infrastructure Initiatives team, worked with teams of local experts, HSU ERE students, and representatives of public agencies to produce the reports. ERE student volunteers provided significant support for this effort in the form of attending meetings; organizing and analyzing data; and formatting, writing, and editing sections of each report. Participating in the Report Card effort is a great opportunity for ERE students to network with local professionals and representatives of public agencies, as well as to gain experience with the function, assessment, and funding of real-world infrastructure systems. The NCB previously formed an Infrastructure Report Card Committee that was led by Yoash Tilles and Cameron Muir, who no longer reside in the area. The NCB is currently attempting to solicit a new person or group of people to take leadership of the Report Card initiative. The next infrastructure categories that the NCB will address in the Report Card effort will likely be wastewater, levee, and dam infrastructure in Humboldt and Del Norte Counties.

PERSONAL GROWTH AND DEVELOPMENT THROUGH ASCE INVOLVEMENT

I became involved with the NCB as an officer in 2013, shortly after graduating from the HSU ERE Program. Being involved with ASCE has provided me with countless opportunities for growth, both professionally and personally. Being a part of ASCE expands my network of contacts on a continual basis, enabling me to

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ERE Student Team is Outstanding Winner at 2017 Math Modeling Contest

by Brad Finney, ERE Professor

A team of three ERE students, Yaad Rana, Marcela Jimenez, and Joshua Martinez, is an "Outstanding Winner" at the 2017 Interdisciplinary Contest in Modeling (ICM). This ranking, the highest possible, was awarded to only 14 of the 8,085 teams competing in the ICM. Yaad, Marcela, and Joshua also received two additional awards. The Rachel Carson Award is presented to a team for excellence in using scientific theory and data in its modeling. It honors the American conservationist, whose book "Silent Spring" initiated the global environmental movement. The Two Sigma Scholarship Award provides a stipend of $3,000 for each of the three team members, and a $1,000 award to the ERE department.

For the past 16 years, ERE student teams have participated in a four-day-long math modeling competition consisting of the Mathematical Modeling Contest (MCM), and Interdisciplinary Contest in Modeling (ICM), which is sponsored by the Consortium for Mathematics and Its Applications. This year, there were nearly 17,000 teams from thousands of universities and many countries. Each team produced a report summarizing their solution to one of six possible problems.

A record six ERE student teams entered the 2017 competition that began on Thursday evening, January 19, and ended on Monday evening, January 23. Four of the six ERE teams were awarded the score of "Honorable Mention," with fewer than 12% of the other teams scoring higher, and approximately 50% of the other teams scoring lower. One team received a ranking of "Meritorious Winners," with fewer than 1% of the teams scoring higher.

In addition to HSU, the 14 ICM "Outstanding Winners" are from Brown University, Harvard University, Harvey Mudd College, North Carolina School of Science and Mathematics, U.S. Military Academy, and schools from China and Hong Kong.

Congratulations to members of the six ERE teams for their high achievement in this event. Ω

Working Perspective

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was working with SHN Consulting Engineers and Geologists and was also doing environmental investigations and cleanup work for various lumber mills, as well as industrial and fuel station clients. The Hazardous Waste Operations (HAZWOPER) work required much learning in the chemical release and effect scenarios to soil, groundwater, and surface water environments. This opened a whole new and exciting world of protecting existing resources, and rehabilitating those that were adversely impacted. Working with local, state, and federal regulatory agencies (and the complexities of varying rules and processes) was and remains very challenging from a learning and implementation point of view.

I did three stints as an interim city engineer for the City of Fortuna, and I worked on many of the City of Eureka waterfront development projects. I learned a whole new concept of engineering and response for the general public/City Council/Planning Commission, as this differed from my work in the private engineering sector. I recommend that you always be ready to try something new and give it your best shot, as you will be rewarded, at least in the sense of knowledge, growth, and accomplishment.

I have been privileged to have had great opportunities, and I made the most out of each one by continuing to work and learn in my chosen field of engineering. I enjoyed mentoring and learning from new and young co-workers, and the many people I have had the good fortune to be associated with during my work career. Good working relationships, teamwork, and having fun at the job are very real characteristics that should be started while you are in school. Enjoy your education and career, and change as you need or wish. Ω

Dakota Access Pipeline

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impacts "would likely be similar to or greater than the DAPL Project" (EA p. 75-76). This affected their evaluation of impacts in all areas analyzed in the EA, as pipelines are one of the safest ways to transport oil.

NATIVE AMERICAN CONSULTATION

In the NEPA process, the responsible party must consult with Native Americans likely to be affected by the proposed project. They shall make a good faith effort to hold meetings, discuss possible impacts, and address all concerns pertinent to the project. In their completed EA, the Corps claimed that they started coordination and consultation with tribes, tribal historic preservation officers, state historic preservation officers, and agencies and interested parties by sending information regarding preliminary testing and data pertinent to the Lake Oahe crossing in October 2014 and then again in July 2015 (EA p. 80). They later claimed that the Sioux tribe was unresponsive to their efforts to consult, stating that the "Tribal leaders ignored requests for comment and canceled meetings multiple times" (InsideSources).

The Sioux Tribe, on the other hand, claimed they were not given a fair opportunity to address their concerns. They argue that the Army Corps of Engineers did the bare minimum to check the required boxes in their EA, and did not put in a good faith effort to fully address the Tribe's concerns. The Tribe further clamied that the Army Corps sent a generic form letter to initiate consultation, didn't give them enough time to respond, and didn't consider all of the areas that could have been affected by construction (Inside Energy).

The Tribe's primary concern was the location of the Oahe crossing, because it was upstream of their water source. If the pipe leaked, it would contaminate their drinking water supply, and they did not believe that the Corps fully addressed this impact. They were also concerned about the path of the pipeline passing through sacred grounds and the subsequent destruction of their cultural resources.

Feeling that the Corps had not taken all legal actions necessary in approving the pipeline, the Tribe began to protest at Standing Rock, and was soon joined by many citizens from across the US. They protested alongside the construction workers, and also began to trespass in order to halt construction until the matter was finally taken to court. The Sioux Tribe sued the Army Corps in July 2016 (NPR).

The matter of how well the Army Corps consulted the Tribe prior to approval is difficult to prove or disprove in a court. Was it the Tribe that failed to respond to the Corps when they were initially contacted? Was it Dakota Access for wanting to install the pipeline in this location? Or was it the US Army Corps for approving a Mitigated FONSI?

From what we learned in the Impact Assessment class, it seems rare for a project with such a large geographic and environmental footprint to be approved with a Mitigated FONSI, and subsequently not be required to perform a complete EIS. If an EIS were required for this project, potential impacts would have been investigated on a much more detailed level, and the Tribes would have had more time and opportunities to discuss their concerns and coordinate with DA on the project specifics.

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ERE Clubs Information Board

Compiled by ERE Messenger Staff

Organization	Spring 2017 Activities	Fall 2017 Planned Activities
ERE Student Association (ERESA) **Email:** *eresa@humboldt.edu* **Temporary Webpage:** *http://tinyurl.com/HSUERESA*	• Project Financing Workshop • "Last Chance Grade" Present (Caltrans) • Surveying Workshop (Lost Coast Engr) • ASCE Leadership Conference • ASCE Wastewater Treatment Comp • Ice Cream Social / ERE Awards • Mock interviews • ERE rafting trip • ASCE / ERE Awards Banquet • ASCE Order of the Engineer • ERE graduation reception	• Welcome Back Pizza • All Clubs meetings • ASCE Pizza with Professionals • New officer elections • Fall Follies (Thurs before Thanksgiving) • Presentations by professionals • Locker raffle • ASCE Report Card
Engineers Without Borders (EWB) **Email:** *humboldtewb@gmail.com* **Webpage:** *Updated URL coming soon*	• Hospital well water project in Camoapa, Nicaragua with NCPC • Domestic sanitation project w/ AHHA • Assessment trip to La Manzanilla, Mexico with NCPC • Assist with the NCPC Homebrew Festival fundraiser for projects • Assist with the NCPC Jam Jam fundraiser	• 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
Renewable Energy Student Union (RESU) **Email:** *resu@humboldt.edu* **Webpage:** *www2.humboldt.edu/resu/*	• RESU Reunion • Race to Net Zero Home Competition • Photovoltaic Panel IV Curve Testing Workshop • HSU Solar Radiation Monitoring Station (SoRMS)	• Build smoothie bike blender • Calibrate SoRMS Pyranometer • Upgrade SoRMS pyranometer mount • Gas to Electric Truck Conversion Project • Rock Creek Ranch Projects (TBD) • Preparation for Race to Zero 2018
Society of Women Engineers (SWE) **Email:** *swe@humboldt.edu* **Webpage:** *hsu.swe.org*	• SWE Social • Mentoring Program with professional SWE members • Rita's Fundraiser • 2017 SWE Regional Conf in San Jose • Regional Leadership Summit • Girl Scout Day	• Internship application/resume building workshop • SWEshi • Societal Conference in Austin, TX • Local Middle School Outreach • Engineering Fest • AutoCad workshop
Society of Hispanic Professional Engineers (SHPE) **Email:** *shpe@humboldt.edu* **Webpage:** *https://www.facebook.com/shpe.hsu/*	• ERE Drop-In Tutoring sessions • 5-year course planning • Celebración Latin@ – Cesar Chavez & Dolores Huerta Celebration at Los Bagels • SHPE Regional Conference at CSU Sacramento • ERE Graduation Party	• ERE Drop-In Tutoring sessions • 5-Year course planning • Celebración de Independencia – Latin independence day celebration at Los Bagels • SHPE National Conference in Kansas • Día de Los Muertos Alter Making & Potluck Celebration

Patricia DuRant: A Tribute

by Eunice Romero, ERE Senior

Patricia (Pat) DuRant will be remembered by many ERE students as a great statics, dynamics, and material science instructor. She brought excitement and practical experience to the classroom. She cultivated a supportive environment that fostered excellence, one in which I and many other students were able to thrive while learning the fundamentals of engineering.

Pat has always had a knack for fixing things, and she has always loved chemistry, so when she completed high school, she enrolled in engineering at Georgia Tech. She found, however, that she was better at theory than at applying concepts, and she switched to Physics.

After receiving her BS in Physics, Pat did semiconductor research for Motorola. She then entered the graduate program in Physics at Arizona State University, where she also taught some classes. Sadly, she found that the Physics Department was "sexist." For this and other reasons, she transferred to the Chemical Engineering Department to complete her degree.

While Pat loves material science, she is passionate about reducing sexual and racial discrimination. So, when she graduated, instead of seeking employment with an engineering firm, she went to work for the National Urban League, the oldest and largest community-based organization in the U.S. that fights against racial discrimination. There, her most memorable project was assisting minority women and men prepare for an exam for construction work. She helped approximately 60 people in two years to obtain jobs in construction. Her experience at the League is one of her most valued because of the impact it made on her community, especially on those who are often discriminated against.

Pat's story sheds light on the expectations she had for herself as an instructor and on her engagement with her students. Based on her own experiences as a student, Pat chose to require her students to design and build projects that would push the boundaries of their understanding through building odd contraptions, such as cardboard furniture, 3D-printed cell phone cases, and water pumps. Projects like these encouraged students to be creative and build things that illustrate the fundamentals of engineering. Her engagement with students made it easy for everyone in the class to ask for help and produce a successful project.

Although Pat has retired from teaching, she still has a strong presence within the ERE community through her involvement with SHPE and SWE. Her ability to evaluate the intersectionality related to success in America allows her to empathize with other peoples' stories. Today, Pat continues to be an inspiration to students that have faced adversities and prejudice throughout their educational career. We will miss you, PAT! Ω

ASCE

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meet and converse with many local engineering professionals and public officials that I would not have met otherwise. In addition to numerous other benefits, networking provides opportunities for jobs, advice on career paths, and of course, friendship. Being involved with ASCE is also fulfilling in that it provides many avenues for giving back to the community, both at a local and national level.

Of course, you don't need to become an ASCE officer to experience the many benefits that the organization has to offer. I encourage you to attend ASCE events and volunteer with ERESA to achieve a sense of fulfillment and expand your network, while also building lasting relationships in the process. Ω