

“Do not go to Mexico to help. Go to listen and learn. Go to find out if the struggles of the people of Chiapas are your struggles. If so, then and only then, we can sit and talk about how we can work together.”

Dr. Gustavo Esteva, a community activist from Chiapas, Mexico, addressing students in Engineering and Sustainable Community Development class

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The Humanitarian Engineering Program Newsletter

Colorado School of Mines

Spring 2013, Issue 1

Greetings from our Director

I am very excited to begin this year an effort to revitalize the Humanitarian Engineering (HE) program through a significant curricular revision and a closer alignment with CSM’s focus areas: Energy, Earth, and Environment. Natural resource extraction, energy generation, water availability, and infrastructure development create amazing challenges for HE to fill a crucial gap in engineering education: engineering education focused on sustainable community development, or SCD. Given the significant impact of CSM’s graduates on local communities around the world, HE presents a great opportunity to ensure that CSM will remain committed to SCD into the future. CSM humanitarian engineers can help achieve SCD by working with communities in the design, construction and implementation of technologies (from gadgets to systems to processes) that enhance communities’ eco-

nommic opportunities and self-determination, reduce use of energy and natural resources, and promote social justice. HE future curricular and project-based opportunities will reflect this commitment to communities wellbeing. HE will also promote our understanding of SCD by working closely with our EWB student chapter, delivering a campus lecture series to highlight specif-

ic examples of engineering for SCD, working with faculty to find innovative ways to connect their scholarly interests to SCD, and developing partnerships with SCD organizations to create internship and design-project opportunities for students. If you are interested in joining HE or in working in its development, feel free to send me an email to jlucena@mines.edu

Juan Lucena



On Reflection: Our Fall 2012 Guest Lecture Series

We started the 2012 /2013 academic year with a guest lecture series filled by lecturers from different focus areas related to humanitarian engineering. Dr. Rebekah Green (Institute for Global and Community Resilience) came in November 2012 to tell the story on disaster relief and engineering mechanisms for prevention of disasters. James Huff, the Assistant Academic Director of EPICS

(Engineering Projects in Community Service) from Purdue University spoke about his experiences in engineering design education with an emphasis on community service. He lectured on educating engineers to bridge technical and social competencies. CSM alum Mike MacCarthy and former VP of BHP Billiton Phil Clark - now chair of the Board of Directors for the Engineers Without Borders (EWB)

Australia, spoke about their insights and personal reflection on field experiences abroad, implementing designs for the community, and lessons learned from their experiences invaluable for students and faculty on campus to hear about. Furthermore, we are excited for the 8 speakers in the Spring 2013 semester (see page 4).

Mirna Mattjik, Program Coordinator



Photo courtesy of EWB

**Interested in
how to assess
humanitarian
projects?
Check out
Engineering &
Sustainable
Community
Development
(LAIS 477)**



Photo courtesy of EWB

**“The passion
driving this force
majeure lies with
the people:
engineers, social
entrepreneurs,
product designers,
business
developers, fund
raisers, community
leaders, local
workers..”**

Engineers Without Borders (EWB) in Nicaragua

by Barbara Anderson

Each rainy season, the community of Los Gomez, Nicaragua is faced with challenging isolation from larger nearby towns as the Rio Ochomogo floods. The community members rely on access to these towns for schools, jobs, markets, and health centers. With an in-country NGO acting as a liaison, the Colorado School of Mines student chapter of EWB began work on designing a footbridge for this community. In January 2012, student members travelled to Los Gomez for a social survey about the project and returned in May to do a site assessment. Most recently, EWB members went to Nicaragua to help the community begin construction on their bridge. The students, along with two professional engineering mentors and several local volunteers laid the foundation on each side of the bridge and completed most of the river-right tower. The students will be returning in March to help the community with the final stages of implementation. On the trip, the cables will be strung and the bridge decking will be laid. As this project nears completion, EWB members are performing

social surveys in neighboring Nicaragua communities and will soon begin work on their next project.

My assessment on the project

By pairing my HE education with my EWB involvement, I am able to apply the specific criteria for engineering and sustainable community development I have learned to our particular project. Through this assessment, I was able to determine that the bridge improves social justice by giving the community members of Los Gomez more opportunities and eliminating dangerous river-crossing situations. Also, by giving access to employment opportunities and local political representatives, it makes the community somewhat more self-reliant.

They may, however, become more dependent on outside resources, which would make them more reliant on larger nearby towns. The bridge also made the community's local economy less diverse, as with access to outside markets, the community members do not need to rely on their own local services and production of goods.

How to join EWB

As a Humanitarian Engineering student, I have been taught to act as a globally conscious and responsible engineer. The program stresses recognizing the social impacts on communities involved in projects and incorporates them with the technical engineering component. EWB allows community members to request a project that is high priority for them. Community members are working on gathering materials, excavation, and construction during this year's dry season and travelling student members participate in construction during scheduled trips. EWB-USA gives students the valuable opportunity to experience international development, share their engineering expertise in a cross-cultural setting, and to facilitate project ownership in the community by working *with* them to build *their* bridge, just as the HE program advocates. More information about the Colorado School of Mines student chapter of EWB-USA can be found at <http://mines.orgsync.com/org/ewbmines?CMSPAGE=ewb>

iDE & Their Vision: Denver as *the* Hub for International Development

By Mirna Mattjik

iDE has a spectacular vision that brings warmth to any humanitarian engineers' heart: creating a hub for 27 non-governmental organizations (NGOs) that are working on development right here in Denver, including EWB - USA. Through invitation for a luncheon that took place in early December 2012, many HE enthusiasts from CSM had the opportunity to witness success stories of iDE and iDE collaborators' projects in international

development. The passion driving this *force majeure* lies with the people: engineers, social entrepreneurs, product designers, business developers, fund raisers, community leaders, local workers—all of whom are working together creating technologies that are adaptable, transferable and relevant to the community. This dovetails into working opportunities, valuable skill sets and solid stepping stones for the marginalized to move out of poverty and have

economic independence. Former president Bill Clinton was at the luncheon to greet the attendees and gave a very inspirational “pat on the back” for iDE's efforts. The vision is very close with the former president's Clinton Global Initiative (CGI), in commitment to action on a global scale through inspiration, networking, knowledge building and collaboration. For more information on iDE please visit their website: <http://www.ideorg.org>

Engineering and Anthropology, a Marriage for Development

By Nathan Johnson*

Alongside exploring the cosmos, managing the nitrogen cycle, and advancing clean energy, creating sustainable products and services for the growing population in developing countries is an engineering challenge for the next generation. To date, development initiatives have had a mixed record of success, with some studies citing a 90% failure rate within two years of start-up. Project failure commonly originates from an incomplete understanding of user needs and cultural preferences that define

the engineering task. Western engineers are often not trained to understand needs that are far different from their prior work and daily life. Anthropology provides useful tools to understand users and human-technical interactions in diverse cultures. Methods such as participant observation, in-depth interviews, and focus group studies are essential to gather and contextual quantitative data during the engineering design process. Anthropology facilitates engineering design as an interactive process of ques-

tioning that places the user within local life and culture. The intersection between engineering and anthropology also facilitates the discussion of sustainable development by mapping change in technology and society over time.

*Dr. Nathan Johnson (NSF/ASEE Postdoctoral Fellow, HOMER Energy) had a campus lecture on January 30, 2013 titled:

Mapping Energy Needs to Sustainable Solutions in the Developing World

**Interested in
Anthropology?
Check out
Cultural
Anthropology
(LAIS 375)**

Why Choose the HE Minor?

By Will Kuhlman

Before graduating high school, I decided to find a way to integrate my desire to be an engineer with my passion for social justice. My experiences with Christian ministry in developing areas of the world left me with a heart-felt longing to simply make things better for those oppressed by poverty. I figured that by learning engineering skills and techniques I could surely make a difference, so I chose Mines and the Humanitarian Engineering minor.

While my intentions were altruistic, this program helped me discover that my "big plans" to solve the world's problems needed some critical reflection. I learned the importance of building relationships with the people you are serving while responding to their needs, not your own agenda. The hard, systematic mindset of a typical engineer must be enhanced with the adaptive, flexible occupation of meeting human needs and

working for healthy communities. The Humanitarian Engineering minor brings together the values of sustainable development, social justice, innovation, and the use of an engineer's privilege for good. This is the type of engineer I want to be.

"I learned the importance of building relationships with the people you are serving while responding to their needs, not your own agenda. "

Words of Encouragement from Dean Kevin Moore

It is truly exciting to see the growth of Humanitarian Engineering (HE) at Mines. As Dean of the College of Engineering and Computational Sciences (CECS), I see the interdisciplinary HE minor as the perfect companion to the degree programs in my college. This is particularly true because one of the focus areas in CECS is the development of technologies related to intelligent, sustainable infrastructure, which I believe is a key to developing

improved quality of life for everyone on the planet in the 21st century. If you can bring roads, energy, water and fiber optics to disadvantaged communities, this will promote sanitation, agriculture and business, which in turn will lead to stability and peace, which allows a community to focus on education, which facilitates improved quality of life and a sustainable society. My goal is that all the engineers who

graduate from Mines understand the value their designs can have to improve community in this way. And, I want them to care! The HE minor provides a wonderful vehicle for students to gain exposure to the needs of community and the intersection of these needs with engineering. I look forward to seeing the world become a better place because of Humanitarian Engineering at Mines!

Acknowledgements

This first edition of the HE newsletter is made possible by our collaborators and supporters who had the trust in our news-making and belief in the importance of humanitarian engineering. As we strive to improve the program, we will continue to rely on your ideas, support and a simple “thumbs up” to pave the future forward for better service to our students. There are many people who we would like to thank; however, in part our humble kudos go to students in the Humanitarian Engineering Minor Program; Engineers Without Borders at CSM; Deans Kevin Moore, Ramona Graves, Tony Dean and their respective staff and faculty; and our LAIS Division Director, Dr. Elizabeth Davis.

Our newsletter focuses on: connecting and communicating with the humanitarian engineering community on campus through announcements on past and future events; special topics about issues relevant to our program; and special features on research, field work, and/or career opportunities that support the humanitarian engineering (HE) efforts. We welcome contributors from our community and would like to thank everyone that made this first edition possible. Please contact jlucena@mines.edu or mmattjik@mines.edu for further information about our program and/or the newsletter.

Spring 2013 Guest Lecture Series

Nathan Johnson (HOMER Energy) - mapping energy needs in the developing world

January 30 - HH 202 (4-5 PM)

Travis Hughbanks (Edge of Seven) - earthbag construction in Nepal

February 13 - Boettcher (4-5 PM)

Nathan Canney (CU Boulder) - perceptions of engineers on their contribution to society

February 20 - Ballroom C (4-5 PM)

Matt Hogue (Peace Corps) & discussion panel - rewarding experiences in the Peace Corps

February 27 - Hill Hall 202 (4-5 PM)

Leslie Light (iDE) - personal journey on the humanitarian career path

March 6 - HH 202 (4-5 PM)

Scott Katsaros (Nokero)- experiences in energy poverty

March 21 - Boettcher (12-1 PM)

Andres Valderrama (Institut for Planlægning, Aalborg Universitet) - design for multicultural environments

April 10 - Ballroom B (4 - 5 PM)

Marybeth Lima (LSU AgCenter) - parks design in the aftermath of a disaster area

April 19 - Ballroom E (12-1 PM)