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The following newsletter has been created to engage with those passionate about humanitarian engineering by providing information and resources to our subscribers. This issue highlights key events, projects, and opportunities for involvement all related to humanitarian engineering at Mines and around the world.

HE @ Mines

Projects for People Course - Eagle Gold Mine Project

Ethan Faber, a Mines alumnus and one of the class professors, is currently working for BGC



Engineering, a consulting company working with Victoria Gold on their Eagle Gold project in Yukon, Canada. Ethan recruited this year's students to help him explore the possible ways that Victoria Gold could improve their practices regarding community engagement and environmental sustainability. Ethan was at the mine site for two weeks and in addition to his job, he is tasked with asking questions the

class has developed to stakeholders at the mine. This includes mine employees, First Nations members, local community members and several other groups. With this insight, extensive research and help from both professors Ethan and Elizabeth Reddy, the students of the class were able to develop suggestions to present to BGC Engineering and Victoria Gold that could help them improve their current efforts in creating a respectful and lasting relationship with the local communities.

HE Travel - Clinton Global Initiative University (CGI U) Conference

Three teams of HE students applied and were selected to attend the CGI U conference in Chicago hosted by Bill and Chelsea Clinton from October 19th to the 21st. For the application, each team developed a unique "commitment to action" which involved aspects of HE and they will carry out (or have already started) these plans in the years to come. Commitments needed to be "new, specific, and measurable initiatives that can be small or large, local or global, financial or non-monetary in nature," and these teams hit all the criteria. More information to come about the details of the conference itself. The teams are listed below:

Sustainable Engineering Education Coalition (SEECers): Evelyn Lundeen, Cassidy Grady, and Addy Bateman

Camp STEMpathy:

Dot Walch, Bethel Tessema, Alice Wilbur

Homelessness and Housing:

Kellen Malone, Natalie Haber, and Rachel Chaggaris

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Spotlight on Senior Design - Humanitarian Engineering Project in Peru

Written by: Wolf Reichard, Mines '18 Mechanical Engineering, Humanitarian Engineering, and Shultz Scholar

In the last two weeks of May and the first few days of June, Qhari Enterprises was fortunate enough to send four out of the seven people on the team to a small town outside of Ayaviri, Peru to install the final design. This was, in large part, thanks to a generous contribution from the Shultz Family Fund for Humanitarian Engineering. It is worth noting that everyone on the team graduated, and those who of us who got to travel were actually alumni by the time we walked down the jet-bridge (just five days after graduation).



After a quick two day detour to Machu Picchu, we rode a bus to Ayaviri and spend a half day sourcing materials and getting ready for the 10 days we would spend at nearly 12,000 feet in the community where we were working. We were careful to take many photos of all of the technologies that we saw and worked hard to get a better understanding of local capacities. We were able to confirm quite a few of our assumptions, and began asking many of our questions.

Once we arrived in the community, things were slow to start. Between cultural differences, and miscommunications, we ended up losing two and a half days. Eventually, we got everything sorted out, and we were able to get some work done during our down-time.

We were able to find a local welder who could help us with a chimney. We had not been able to go by a large hardware store and find the materials that we needed, so going with someone who could build us one was the next-best thing. We also spoke to some members of the community and got a chance to look at some of the improved stoves that were already in use. We also took the time to go on a couple great hikes.

A major takeaway from all of this information gathering was that there had been significant NGO presence in the community over the years. We saw countless latrines installed by two different projects, large canals that were apparently dug by an NGO, and several improved cookstoves that were apparently installed by folks who had promised to come back with more, but never did. It was also clear that there had been little to almost no co-creation in these projects. Previously installed power dynamics were strong and needed to be overcome.



When we were finally able to meet with some of the community members and start work, in earnest, we began by sitting down with several of the potential pilot households that we had planned on working with. After a quick interview, we went to each of the families houses and looked around to make sure that the houses were suitable for the prototype that we had created, and get a better idea of their living situation.

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We also took this time to hand out our home improvement and healthy living educational materials, interview community leaders, and speak with an engineer who had worked in this community in the past. We also met a dog. He was a good dog.

We spent the next four days working hard to get our system put together. One of the first things we were made aware of was the fact that the community members were not particularly interested in the cookstove component of the We were installing our first prototype in a community space where we felt our system would be seen by more people and potentially improve chances of implementation. We had built extra time into our schedule, but we still underestimated the amount of time it would take to get everyone on board and organized.

Eventually, we were able to complete our first prototype. Due to issues with the chimney, we were forced to take the entire thing apart and rebuild a significant portion of the interior. By the time we realized this, we were forced to start working well past sunset and getting up around 5am to make sure that we had a completed and working prototype in time for a community meeting that we had scheduled for our last full day in the community. We finished work the night before we planned this meeting and were finally able to breathe a sigh of relief.



There were an incredible number of takeaways from this project that I could go into in incredible detail, but there is one that stands out in particular. Between Murphy's Law and the best laid plans of mice and men, you really don't have any idea what's going to happen until it does.

It sounds like our designs have been handed off to students at a local engineering school, and our prototype is continuing to be iterated further.

Meet our New HE Faculty

Elizabeth Reddy



Elizabeth (Beth) started her training in anthropology as an undergraduate and holds a bachelor's degree in cultural anthropology from Reed College. She continued on to earn a master's in social science from the University of Chicago, where Beth began to study technical expertise. She completed her PhD in cultural anthropology the University of California at Irvine. This background has allowed her to work on a variety of problems, including independent publishing, data security, organ transplation, financial inclusion, and (her two favorites) engineering education and earthquake risk mitigation. This means

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she gets to do basic anthropological research and find ways to support her communities along the West Coast of the US and in Mexico.

Beth is currently teaching Projects for People (EDNS 401) right now with her amazing collaborator, Ethan Faber. She is also getting to know Mines and says it's absolutely full of both nerds and people who spend time outside. She loves being around such driven and thoughtful people. Beth spends a lot of her life writing, cycling, reading sci fi, and cooking. Beth and her partner moved from San Diego, California to Colorado in August, and she says they have a lot of exploring to do!

Dean Nieuwma



Dean Nieuwma received a PhD in Science and Technology Studies from Rensselaer Polytechnic Institute and bachelor's degrees in Mechanical Engineering and General Studies from the University of Michigan. After undergraduate studies, he worked as a manufacturing engineering at Ford Motor Co. on the international launch team of the Mondeo/Contour. He joins Mines as Division Director of Engineering, Design, & Society, where he will be teaching courses spanning design, social analysis, and humanitarian engineering.

Outside of work, he enjoys everything DIY, including home renovations and auto repair, and he's already appreciating the outdoors lifestyle Coloradans unanimously promote. His favorite thing about Mines so far is the enthusiasm shared by the whole community—students, faculty, and staff alike. Dean is excited to lead the EDS community in achieving its vision to education the next generation of engineers, including humanitarian engineers, who are all creative, disciplined socio-technical problem solvers.

Ethan Faber



Ethan Faber is a Mines alumnus and adjunct faculty member in the Engineering, Design, & Society Division teaching Projects for People EDSN 401. In this course, students learn to approach engineering problems focused on reducing risk to geological hazards in artisanal small-scale gold mining with a humanitarian engineering (HE) mindset. He holds geological engineering degrees from Colorado School of Mines and Missouri S&T. After his masters at Mines, Ethan worked in Guatemala developing a non-profit project for reducing risk to landslides in precarious urban settlements throughout Guatemala City.

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During the day (between climbing, skiing, biking, and other mountain activities), he works for the engineering consulting firm, BGC Engineering Inc., where he focuses on geologic hazards, dams, and mining projects around North America. In addition, Ethan also works developing his company's philanthropic sector doing pro-bono work for underserved communities. He is excited to be back at Mines and contribute to the HE program, which helped inspire and teach him how to create a career where he can utilize humanitarian engineering to make an impact in industry.

Amy Martin



Amy is the Program Coordinator for the Humanitarian Engineering Program and the Project Administrator for the PIRE Project. Prior to this position, she was the Program Manager for the WE2ST Center and WE2NG Programs on campus. As a Mines alumni, she graduated with a bachelor's degree in Civil Engineering. She worked as a professional engineer in Texas, California, and Hawaii on the planning, design, construction, and rehabilitation of water and wastewater conveyance and treatment infrastructure before returning to Mines.

For Humanitarian Engineering, within the Engineering, Design, and Society Division, Amy coordinates speaker, student, and marketing activities. She also plans and manages budgets, purchasing, events, and coordination with other organizations within and outside of Mines. As an Project administrator, she works alongside the project directors in coordination and management of all activities related to the interdisciplinary, multi-institution, and global research collaboration funded by the US National Science Foundation in order to co-design socially responsible and sustainable mining practices with communities, engineers, and social scientists.

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Upcoming Guest Lectures

Marcello Viega - *Alternatives to mercury use in artisanal and small-scale gold mining*



Date: Wednesday, October 24 4:00-5:00 pm

Where: BBW125

Abstract: Around 1400 tonnes of mercury are used per year by approximately 16 million artisanal gold miners in more than 70 countries. This talk will describe the environmental and health effects of mercury pollution, and it will suggest methods to reduce and eliminate mercury use in artisanal gold mining. The lack of enforcement, practical regulations, and educational initiatives are some of the main reasons why mercury use continues to prevail in artisanal gold mining. Education is highlighted as the main method to encourage miners to change their methods.

Past Guest Lectures

Abel Chávez- *Integrating Sustainability and Resilience One Community at a Time*



On September 13th, Dr. Abel Chavez of Western State Colorado University spoke on campus about best practices and techniques for achieving community sustainability and resilience. He shared some of the work he and his students did in the CS2I Lab to help smaller rural communities achieve sustainability goals specific to their community and circumstance.

Leslie Collins- *Social and Environmental Responsibility Management is Key when Manufacturing a Product*



On August 31st, Leslie Collins gave a presentation on highlights of her experiences practicing social responsibility in her careers both at Hewlett Packard and Facebook. As a leader in supply chain responsibility she manages supply chain labor and health and safety practices as well as company-wide conflict minerals program. Collins' presentation gave a valuable insight on what it is like to apply humanitarian ideas and practices in an industry setting.

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In The News

[Plastic Pollution Crowds Out Life, Says Environmental Engineer Jenna Jambeck](#)

The threat of plastic pollution on land and by sea continues to grow and Environmental Engineer Jenna Jambeck decided it was time to do something about it. Learn more about how Jenna advocates domestically and abroad for more attention on plastic recycling and reducing the waste we generate daily.

[7 Reasons the Tanga Region is every California Girl's Dream](#)

Hannah Jewess, a recent HE grad, is blogging about her experience in the Peace Corps in Tanzania. Read her blog to learn about her experiences and laugh at some of her funny observations!

Stay tuned, more to come!

Humanitarian Engineering Newsletter

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