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

HE @ Mines

NEW CLUB: Socially Responsible Scientists and Engineers (SRSE)

When: Wednesdays from 4:00-5:00

Where: CoorsTek 150

Are you looking for professional and individual development outside of the classroom in understanding what it means to be a socially responsible scientist and/or engineer? SRSE is focused on just that. With plans to host student and faculty presentations, professional speakers, an annual symposium, and opportunities for networking and attending conferences we can further discuss what social responsibility in engineering is and how we can encourage it in others. If you would like the chance take part in developing this club or just want to learn more, stop by one of our meetings!

Society for Mining and Metallurgy & Exploration (SME) Conference, Denver, CO

During the week of February 24-27, the SME conference was held in Denver. This event attracted students and industry professionals from around the globe, including Colombian collaborators working with Mines faculty, graduate students, and undergraduate students on artisanal and small-scale gold mining (ASGM) through the National Science Foundation (NSF) Partnerships for International Research and Education (PIRE) grant. The conference had presentations on new, cutting-edge technology; networking opportunities; and discussions and research presentations on the increasingly important consideration of sustainability in mining. Being the number one cause of anthropogenic mercury contamination in the world,



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ASGM was a large part of the discussion at the conference as well. Mines had multiple graduate students from the PIRE project present on their research on ASGM in both poster presentations and formal presentations. From panels on community outreach, financial planning, and sustainable development to technical presentations on metallurgy, mining, and exploration, attendees shared extensive knowledge and learning at this year's conference.

Mines' Legacy in Corporate Social Responsibility panel and networking event

On Monday, February 25, Mines held an event at the Denver Catalyst RiNo on Corporate and Social Responsibility (CSR). Gerald Grandey, a '68 Geophysical Engineering graduate of Mines and Joey Tucker, a '77 Mining Engineering graduate of Mines spoke about their careers and the impact of CSR on their work. The event was moderated by Dr. Jessica Smith, co-director of HE who is currently writing a book on engineers and social responsibility. The speakers discussed their own backgrounds and work in relation to CSR and its importance when working in the extractive industry.

Colombian Student Visit

On Friday, February 22, a group of 15 Colombian students from Universidad Nacional de Colombia in Medellin who are working on ASGM projects and research with Mines students came to Golden to explore the mining and metallurgical labs, work with the three Mines Global Social Innovation Challenge (GSIC) teams, and collaborate with PIRE graduate and undergraduate students. Cadets and faculty from the US Air Force Academy, also working with Mines on the NSF PIRE grant, were also able to come and collaborate with the Mines and Colombian students. With this large, dynamic group finally together in one place, interesting discussions of ASGM took place that spurred new ideas, shifted project directions, and connected PIRE students with in-country contacts. This Colombian team will be supporting the PIRE project in Colombia where six HE graduate students will be working in community-centered projects in collaboration with HE undergraduate students.



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Global Social Innovation Challenge (GSIC)

GSIC is an international social venture pitch competition hosted by the University of San Diego that recognizes student-led social ventures focused on sustainable change. The competition has three stages focused on developing a nuanced understanding of a social or environmental issue, and identifying gaps in the approaches currently deployed to solve this issue. Following, the students are to create a viable business plan based on a new potential solution that can address these gaps. Mines is currently a part of three teams all with projects focused on ASGM currently competing, of which two will be selected for the final competition. Of these teams, there are students from CSM as well as Colombian universities UNIMINUTO and UNAL. EDS Professor Robin Bullock has been essential in helping the teams develop their problem definitions and proposed solutions through making connections with Mines faculty, industry professionals (large and small scale), and other resources. This challenge has given students the opportunity to extend the life of their in-class projects to hopefully become actual implementable solutions.



Senior Design Spotlight: Engaging Communities in Nepal

As detailed in a previous newsletter, one Mines HE capstone design team has been working on designing a public restroom facility to be installed along the Everest Base Camp Trail in rural Nepal. With 40,000 tourists per year, this region also experiences a high volume of human waste that is threatening the local environment and is a risk to public health. There are significant technical challenges associated with the project, but one of the largest hurdles for the team has been engaging with these local communities halfway across the world. Over winter break, two members of the team had the opportunity to visit Nepal for three weeks and work directly with



A group of local government officials and community leaders discuss the location of a new toilet with Hike for Help leaders

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Pour flush latrines are extremely common along the Everest Base Camp trail. These facilities often discharge out the back of the buildings without treatment.

local community members to develop the best design for the restroom facilities. During their time in Nepal, the team had a chance to meet with local government leaders, speak with an engineer from the region, learn about local sanitation practices, and observe existing waste management systems. These experiences provided valuable insights for the project and allowed the team to connect with the individuals who will actually work on the project in Nepal. **If you are interested in learning more about this experience, Evelyn**

Lundeen will be presenting about her trip on March 20th at the meeting of the new Socially Responsible Scientists and

Engineers club (SRSE). The club meets in CK 150 at 4 pm every Wednesday. Food will be provided. We hope to see you there!

Senior Design Spotlight: Learning and Engaging with the Maya Itza



Community meeting in San Jose with the Senior Design Team and the Bio Itza Association.

On February 14th, six members from the Bio-Itza Eco Cottages Senior Design team departed for a community engagement and technical scoping trip to Northern Guatemala. Since August 2018, the team has been working with the indigenous Maya group the Bio-Itza Association, who preserves and protects a jungle reserve west of Tikal, the traditional knowledge of herbal

medicine and remedies from the rainforest, and the language and culture of the Maya

Itza. The team is working to design three new sustainable, off-grid eco-cottages to accommodate more tourists in more private and comfortable rooms on the reserve.

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Before the trip, the team had been speaking directly with a few community leaders and stakeholders once every two weeks. However, the team struggled to understand the history, purpose, and current use of the reserve as well as the many needs and desires of community members in the area. When the opportunity to travel to Guatemala presented itself, HE team members Dorothy Walch, Maggie Guinta, and Noah Au-Yeung as well as the other students on the team jumped at the opportunity to learn from the community members and foster strong collaborative relationships through a community meeting and design workshop. The team members consulted with HE faculty Dr. Juan Lucena, Dr. Beth Reddy, and Ethan Faber to get advice and guidance for organizing and leading a community meeting. The team's main Guatemalan contact, Aderito, is a community leader in the association that invited and encouraged participation from the Maya Itza community.



Focus groups in community meeting with community leader and shaman, Don Reginaldo, discussing cottage design and construction materials.

Thanks to the help of the local organizers and the genuine engagement and concern of the Bio-Itza, the community meeting went very well. Community leaders, reserve rangers, Spanish teachers, and other Association members participated and engaged in conversations about the



Don Reginaldo leading the senior design team through the jungle, teaching about medicinal properties of plants, and showing site of the existing septic tank.

reserve, the community, eco-tourism, the cottage and subsystem designs, and other project opportunities. Through the community meeting, the Mines Senior Design team gained important insights into critical components of the project and Bio-Itza Association members were happy to have a community gathering and discuss new ways to promote and preserve their reserve and culture.

After the community meeting, the team went to the reserve where they conducted topographical, geotechnical, solar, and water surveys. On the reserve, rangers and community leaders taught the team about

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traditional medicine, the history of the reserve and Association, the existing structures and traditional building materials, and the challenges and opportunities of building in the jungle.

Overall, the trip was a great success. The Senior Design team gained critical insights for the project and local community members made important design decisions about the eco-cottages and other aspects of the project. The team also learned more about the next steps for this project and the important non-technical components to ensure this project contributes to a sustainable stream of funding for the protection of the reserve and the continued efforts of the Association.

HE Team Updates

Julia Roos- HE Associate Director

HE welcomes Julia Roos as the new HE Associate Director. Ms. Roos will be responsible for supporting the administration and strategic growth of the HE program and for supporting its students including the Shultz Scholars as well as managing the PIRE project and its associated research efforts. Prior to this position, she was a Consultant with Spark Policy Institute, a systems change strategy and evaluation consulting firm, where she supported strategic planning efforts, facilitated community and stakeholder engagement, and managed multi-disciplinary systems-level evaluation projects.

Ms. Roos graduated from the University of Pennsylvania with a bachelor's degree in Systems Engineering and from Harvard T.H. Chan School of Public Health with a master's degree in Environmental Health. Her past experience also includes examining and understanding human health effects of environmental exposures and identifying and evaluating community and population health impacts and disparities.

In her free time, Ms. Roos enjoys running, exploring Colorado, doing home improvement projects, and spending time with her family. She is a volunteer at the Maxfund Animal Shelter in Denver and is on the leadership group for a community organization in her neighborhood. She is passionate about female representation in STEM and leadership roles, responsible environmental stewardship, and support for underserved populations in Colorado and abroad.



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HE Spring Courses

Responsible Engineering and Resilient Communities

The newest special topic course in Engineering, Design, & Society (EDS), *Responsible Engineering, Socio-technical Systems, and Resilient Communities*, is aimed at theorizing ASGM through a focus on important concepts in engineering ethics, Science and Technology Studies (STS), and international development to offer new perspectives to undergraduate and graduate students working with ASGM communities in Colombia. The course is centered around the



NSF-funded PIRE project, Responsible Mining, Resilient Communities, to provide students new tools to view and consider engineering for communities. The course aims to combine the idea of socio-technical engineering, community resilience, and ASGM into one engineering framework that can be applied to the PIRE project and many others. Through challenging readings, discussions, and video-conferences with Colombian engineers and miners, students are exploring the relationship between the socio-technical system of ASGM and resilience in communities to then apply in their own work and projects. For the undergraduate students, many of

their projects are focused on the work they began in last semester's HE course *Projects for People* that explored geologic risk mitigation in ASGM. The graduate students are looking to apply the knowledge gained in this course to their own dissertations and projects related to ASGM. Looking forward, the students will integrate the knowledge gained in this course in their GSIC projects in June and in their fieldwork over the summer in Colombia.

Engineers Engaging Communities

Another HE course dedicated to providing students with real-world examples of the relationship between engineering and social responsibility is Dr. Beth Reddy's course *Engineers Engaging Communities*. Dr. Reddy utilizes her cultural anthropology background to guide students' understanding of how to be effective communicators and researchers embedded in a community. The first half of the course introduces students to the conceptual and methodological tools to engage communities in respectful and productive ways. This begins with students learning to understand their own assumptions about a community and how those might affect their opinions of the community. Students learn ethnographic field methods and participatory research strategies to better understand how to effectively engage with a community and conduct research. The second half of the class is then focused on applying these concepts to a real world situation of

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each student's choosing. This semester, students are tasked with engaging local communities about the environmental hazards they may be exposed to and practice empathizing and engaging with these communities. At the end of the course, the students begin to understand how to effectively engage with communities and use these experiences to develop more socially responsible and community focused engineering projects.

Upcoming Events

SEECer's Symposium on Housing Insecurity - Saturday, April 20th 10 am-2 pm

Please join us for the first of many HE symposiums! The mission of the HE Sustainable Engineering Education Coalition's (SEECer) Symposium is to encourage students and professionals to incorporate the human-centered design approach into their engineering projects and explore the socio-technical nature of real-world problems. Through the topic of housing insecurity, we will explore how engineers and professionals of other disciplines can collaborate with communities to have a broad and positive impact on this current societal challenge. This symposium will take place on April 20th, 2019 at the Colorado School of Mines in Golden, CO. It will include multiple guest speakers well-versed in housing insecurity as well as round-table discussions with local housing and homelessness organizations to continue the conversation about housing-related social responsibility. Interested in being involved? Email Addy Bateman, abateman@mymail.mines.edu for more information. If you would like to attend the conference, please follow this link: <https://goo.gl/forms/ewv1JkrumQPepcnD3>.

Peace Corps Prep Upcoming Events

Peace Corps Prep has a few events coming up to give a wider view of Peace Corps jobs, sites, and experiences. The RHA has generously donated funds to PC Prep, so all events will have free food!

Serving in the Peace Corps is a great way to immerse yourself in a new culture, learn a new language, and have the experience of a lifetime while using your skills to support communities with their needs!

March 20th from 12pm-1pm	Peace Corps Film Festival	Library 121
April 4th from 12pm-1pm	Alex/Armenia	MZ 231

Past Guest Lectures

Alex Mejia

On January 14th, Dr. Alex Mejia gave a presentation to Mines students and faculty. Dr. Mejia works at the University of San Diego as an assistant professor of Integrated Engineering where he researches how the integration of historically and culturally accumulated wealth of knowledge, skills, and practices, and engineering design can serve as a pathway to and through engineering. Specifically, Dr. Mejia focuses on the foundations of knowledge of Latinx adolescents which shape their distinct ways of approaching engineering and solving problems. In his talk, Dr. Mejia mentioned that the integration of other ways of knowing, doing, and being that aren't taught academically, into engineering education will show students that these approaches are viable and suited to engineering in both a real-world and an academic environment.



The incorporation of Chicax Cultural Studies structures and pedagogies into engineering education is of particular interest to Dr. Mejia, as well as the convergence of engineering education and social justice.

Mark Huerta

On February 13th, Mark Huerta, a PhD Candidate in Engineering Education Systems & Design at Arizona State University (ASU), presented to Mines faculty and staff on his perspective of developing the next generation of changemaking engineers. Huerta received his BS and MS in Biomedical Engineering from ASU and is the co-founder and Chairman of 33 Buckets, a non-profit focused on providing sustainable clean water access in the developing world. He presented primarily on his research, "Inner Engineering: A mixed methods study evaluating the use of a mindfulness-based intervention to cultivate 21st century skills among freshmen engineering students," including the development and implementation of a mindfulness leadership program and findings that suggest the potential value of introducing engineering students to practicing mindfulness. He identifies that 21st century



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competencies in skills such as creativity, innovation, problem-solving, resilience, teamwork, and leadership are necessary in leaders capable of enacting positive change within their communities.

Elizabeth Ferry

On February 26th, Dr. Elizabeth Ferry, an anthropologist, professor, and the interim department chair for the Department of Anthropology at Brandeis University, presented her book, *La Batea*. Ferry has a background and interests in value, materiality, mining, and finance, and with fieldwork emphases in Mexico, Colombia, and the United States. *La Batea*, referring to the wooden pan used in ancestral mining, is a collaborative project between herself and her brother, Stephen Ferry, a photographer. The combination of photos and ethnographic pieces seeks "to break apart this stigmatized category and explore the histories, practices, and struggles of a range of small-scale gold mining communities." Ferry discussed stories behind several of the pictures as well as the behind-the-scenes process in making decisions of how and what to include and the overall presentation of the book.



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