



# ENGINEERS WITHOUT BORDERS

EWB | Winter 2019 | Missouri S&T

## OUR MISSION

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Engineers Without Borders (EWB) partners with developing communities to improve their quality of life through the implementation of sustainable, equitable, and economical engineering projects. In the process of helping these remote communities, EWB promotes the development of globally aware and internationally responsible engineers, students, and professionals.

# MONTANA-CAHILL CHALLENGE GRANT

Get Involved

To donate go to: [ewb.mst.edu/donate](http://ewb.mst.edu/donate)

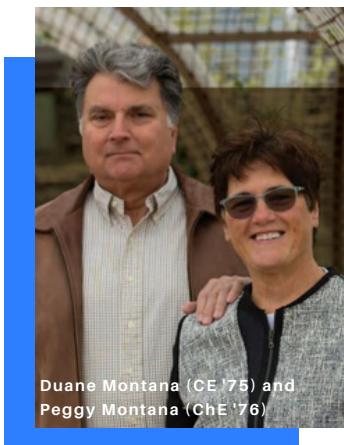
The S&T chapter is fortunate to be surrounded by a community which supports us selflessly in many ways. The largest expression of this support has been the Montana-Cahill Challenge Grant. Established by Margaret (Peggy) (ChE'76) and Duane Montana (CE'75), a fund was established matching donations up to \$500,000 for 20 years. Rolla native David (ME'93) and Dr. Ann Rueff-Heikkinen added to this grant through a generous donation of \$250,000 . Lastly, EWB-S&T founder Dr. Rick Stephenson created a matching challenge donation of \$50,000, moving us closer to our goal. We are excited to complete our challenge grant with the help of passionate individuals such as with the help of other passionate individuals like Peggy, Duane, Rick, Ann, and David. We welcome your support in our efforts to improve the lives of others by providing access to bridges, latrines, schools, and especially clean water.



Peggy Montana (ChE '76)



David Heikkinen and Dr. Ann Rueff-Heikkinen



Duane Montana (CE '75) and Peggy Montana (ChE '76)



Dr. Rick Stephenson



EWB is always looking for creative ways to reach out to our community. Contact Chad Barton at [crb56c@mst.edu](mailto:crb56c@mst.edu) to purchase tickets, ask questions, or give outreach ideas.

## 2019 FUNDRAISERS

### Winter Recap

This past winter we fundraised over \$2000 through selling tickets for a Cancun trip, raffle baskets filled with goodies from our partnering communities, running coat check and Trash the Cake event at Metropolitan Bride Show in Springfield, Mo and finally our Rolla Showcase (previously Talent Show). This made for a busy few months, but was successful and rewarding. A detail recap will be in the Spring 2020 newsletter.

### Looking into 2020

3rd Annual Golf Tournament - TBA, will be held in St. Louis, Mo in Fall, 2020. More information in Spring 2020 Newsletter.

# CLOSING COMMUNITIES

## Puerto Pando, Bolivia and Santiago, Honduras

### Puerto Pando, Bolivia

It was bittersweet to say good bye to our friends in Puerto Pando. We completed a system which supplies water to the community through collection basin, a sedimentation tank, slow sand filters, water storage tank, supply pipeline, pipeline suspension bridge, and a buried distribution system. EWB-S&T Puerto Pando team is now Atahuallani, Bolivia, located near Mount Illimani. We are excited for the new opportunities Atahuallani will bring, summarized on page three.



### Santiago, Honduras

Due to political unrest, we were forced to use remote-implementation to construct a pipeline to a 100,000-gallon tank for the town of Santiago. The community was sent construction documents and drawings while we were available to answer questions. Now that the project has been completed, we are confident in the local water board to maintain and expand the system. In every project we do, we strive to leave the community capable of providing for themselves as the community of Santiago Honduras is. Since the closing of this project, this team recently opened a new project in Agua Fria, Ecuador summarized on page three.



"One child who grew up around the Nahualate water distribution project - our team's most recently completed project - become a civil engineer after being inspired by the project he grew up helping complete."



### Why did you join EWB?

I joined EWB for the same reason I wanted to become an engineer; I wish to improve the quality of life for people around the world. Engineers Without Borders allows students to use the knowledge they are learning in their classes to work in the real world on real projects that will be implemented and change people's lives around the world. How many college organizations can say that?

### How has EWB affected your day-to-day life?

Little did I know what joining EWB would mean for my day-to-day schedule. I spend more time on campus than I would otherwise and know some professors I would otherwise have never known. I take on design problems that I have never seen in classes with a team of driven student team members. EWB allows me to gather some experience in engineering disciplines outside my own. I would say that my career has benefited in that I got my first Co-op/Internship due to my work with EWB. I gained valuable leadership, communication, and technical skills I use almost every day.

### What are you excited about moving forward with Paraje Xecaxjoj?

As with any EWB project, my favorite part will be when our team will turn over the project to the community. The point of the EWB design team is to change lives and sometimes inspire generations both in EWB and in our communities. One child who grew up around the Nahualate water distribution project - our team's most recently completed project - become a civil engineer after being inspired by the project he grew up helping complete. I am most excited about meeting community members because, at the end of the project, that is the most memorable and important aspect to me.

## STUDENT SPOTLIGHT

### Chad Barton; Paraje Xecaxjoj, Guatemala

# AGUA FRIA, ECUADOR

Program Lead: Nathan Erickson

Engineers Without Borders-S&T met a new community, Agua Fria, Ecuador in January 2019. Agua Fria, is situated a few miles from the Pacific Ocean and is home to roughly 250 people who are in need of a reliable source of clean water. During our first visit, we spoke with each family to listen to their ideas, concerns, and to ensure our plan would satisfy as many needs as possible. Community leaders guided students to potential sources of water where we collected water samples. That semester, we analysed collected data while considering the community's needs and wants. We developed a decision matrix determining the best method is rain water catchment system to provide water to the central part of the community. In August, five S&T undergraduate students, two Mizzou graduate students, and two professional mentors traveled to Agua Fria to install the first system on the centrally located school. This was a critical first step towards providing potable water to residents in Agua Fria. During construction, we conducted in-depth interviews with each home to ensure further

steps in our project would continue to meet the community's need. We also collected more samples from other potential sources to provide water to every home in the community. We ended with a friendly soccer game sendoff (where we got our butts kicked!), the team reluctantly offered their goodbyes. We evaluated potential sources of water deciding on designing a chlorinated gravity-fed pipeline distribution system from a local river with rainwater catchment systems on homes too distant or situated above the gravity-fed system. EWB-S&T is excited to continue working with the community of Agua Fria, and also the opportunity to re-match the kids in soccer!



The rain water storage tanks are shown behind community and team members

EWB-S&T began a second new partnership this year in Atahuallani, Bolivia. This community lies below Mount Illimani, about five hours away from the capital city of La Paz. The goal of our project is to provide clean water from a nearby source. The people of Atahuallani current water supply is contaminated by animals waste and runoff from a local mine. The first step is a preliminary assessment trip which was



completed in July to identify and survey potential water sources. We have used this survey data to map where water flows from nearby glaciers down into Atahuallani. The community has requested not use an existing canal to supply water to residents as the water flow is barely sufficient to maintain irrigation during the dry season. Therefore, we are considering using a natural canal located above Atahuallani. This plan is beyond anything we have done before, as this natural canal includes more than a thousand foot drop in elevation in a short distance of a few thousand feet. We will return to the community in early August 2020 to implement the first part of our water treatment and distribution design. We are very excited to establish our relationship with Atahuallani and continue meeting the challenges head on.

## ATAHUALLANI, BOLIVIA

Program Lead: Abby Cain

# PARAJE XECAXJOJ, GUATEMALA

Program Lead: Emma York

In Paraje Xecaxjoj (pronounced Par-ah-hey Check-ah-hoe) we are designing a two-story school building to accommodate approximately 400 children. Many civil and architectural students have joined for the hands on experience of designing a building from the ground up. In doing so, our team is learning that no project is "cut and paste". The land set aside for the school has slope stability issues above and below the plot. We have spent the past months consulting with faculty and professionals, learning as much as we can about different slope stability method. Priorities for this are materials found in-country and sustained by local community for the coming years. The upper shorter slope will be stabilized through the use of gabion walls. Our team has spent many hours learning the best method of constructing and maintaining gabion walls, so that we can communicate and build this option with the community. The second lower slope, is still under consideration on the best method of stabilization.



This is the plot of land which the school will be built on

Our plan is to visit the community either in late March of 2020 or Summer of 2020. We plan to give the completed structural plans for the school to the community, help oversee the purchase of equipment and building materials, and meet with contractors. The Guatemala team is excited to continue working with Paraje Xecaxjoj. As a fun fact, we learned that the community's name translated means "the eagle sees the spicy vegetable under the mountain."



Our mission in Diez de Abril, Bolivia is to provide clean water to its community. Most work in country has ceased due to political unrest, but looks to start soon with the upcoming elections. The original well has decreased yield and formed a crack in the well casing. A new well location has been chosen, and a design for a well proposed. Now, since this is real life and not a textbook scenario, we ran into a few problems. First, the area has erosion issues, which create deep ditches across roads and around homes. Second, the rainy season (January through March) can cause complication to any construction and transportation as well as leads to major erosion. As of right now we are planning on traveling during late March of 2020 or Summer 2020. We are excited to continue to work with Diez de Abril as we put classroom skills to real world problems.

## DIEZ DE ABRIL, BOLVIA

Program Lead: Casey Hines