

About Bridget LaSala



My name is Bridget LaSala and I am a senior at Villanova University. I am majoring in Civil and Environmental Engineering with a minor in Aerospace Engineering.

I decided to participate in the Grand Challenge Scholars Program to further my understanding of how engineering is incorporated into other fields and topics. I have an interest in the society and environment in which we live and how engineering plays a role into that relationship. This program has allowed me to experience courses and activities outside of the engineering field, while working towards a common theme.

The Grand Challenge I chose to pursue is restoring and improving urban infrastructure. As a civil engineer, I have learned a great deal about the status of our society's infrastructure. From bridges and roads, to water systems, and structural buildings, the world's infrastructure is starting to deteriorate. I have gained a passion and understanding for the need to restore and improve this infrastructure, investigating new techniques and methods to ensure it is done so safely and sustainably. These new advances must be made to ensure the health and safety of society, while communicating the importance of how advances will improve the overall quality of living for individuals. As I am looking to pursue a career in structural engineering and eventually international development, I hope to bring unique ideas to the continuously developing world. Through my many experiences at Villanova centered around my GCSP theme, I have learned how vast the dependence on sufficient infrastructure is and the importance of it within people's lives. It is my goal to work directly with communities, especially those who are underrepresented, to develop advanced infrastructure and treated water systems by reducing fossil fuels and solid waste while using sustainable materials and construction techniques. With these initiatives, I am committed to providing a better and safe infrastructure for future generations to prosper.

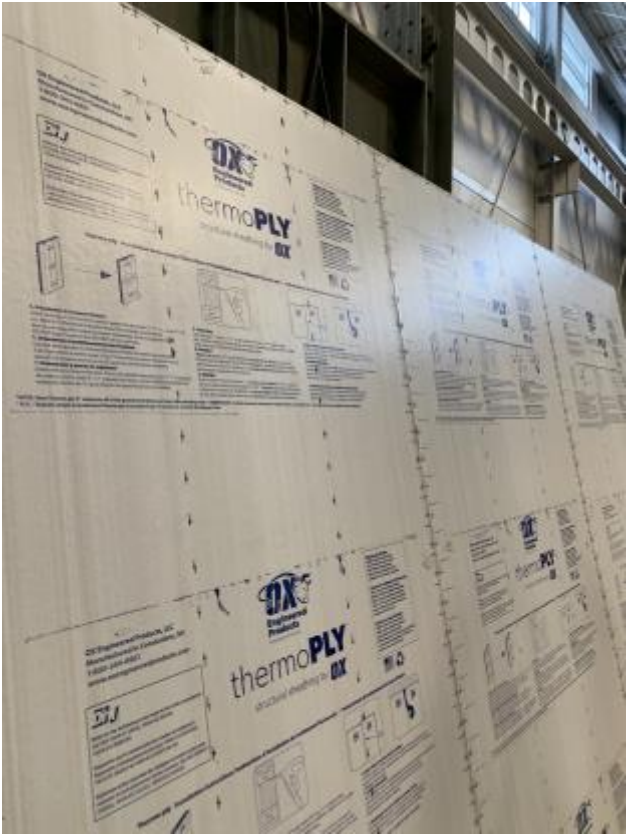
## Research/Creativity



Throughout an entire semester I conducted research for a professional Civil and Environmental Engineering Company, Mulhern and Kulp, investigating Thermo Ply Wall Sheathing. Dr. Dinehart, a Villanova professor, is the advisor and contact for this project and the research is being done in the Structural Engineering Teaching and Research Laboratory (SETRL) at Villanova. This research evaluates wood shear walls and connections, specifically looking at the new Thermo Ply Wall material. Traditional plywood has become very costly to obtain as it is in high demand throughout the construction industry. The Thermo Ply sheathing was developed as a cheaper, more lightweight material. Thermo Ply is not only more cost effective than plywood, it has more pliability which allows it to get a tighter seal connection to the studs, making it less susceptible to weather damage and leakage. It is also more customizable than plywood so it can be used for a variety of different projects. After manufacturing and testing the walls, a report and a presentation is given to company representatives explaining the results and possible effectiveness of the new sheathing material.

Wood frame structures are traditionally constructed using nails to connect the sheathing, usually plywood, to the wooden frame. This research presents a potential substitute for the nails and plywood in these structures by utilizing Thermo Ply sheathing stapled to the frame. Eight tests were conducted, with four traditional (plywood) walls and four Thermo Ply walls of dimensions eight feet by twelve feet. The tests are run to the maximum displacement possible past three inches before the wall starts to completely break. The walls were constructed by Mulhern and Kulp and delivered to the SETRL lab to be tested. Traditional hold downs are used to hold the wall in the testing mechanism, and 950 lb of force loaded onto the load cells before testing. Based on these tests, it will be determined if the Thermo Ply has the same strength as plywood to withstand the necessary loads without deformation above the

design values. The Thermo Ply walls stapled to the wood frame will be further investigated to better understand the consistency of its performance and possible implementation in future construction to reduce construction costs and improve structural resiliency.



1 - Thermo Ply Wall Sheathing on Wooden Frame



2 - Setup of wall to drill holes for testing connection



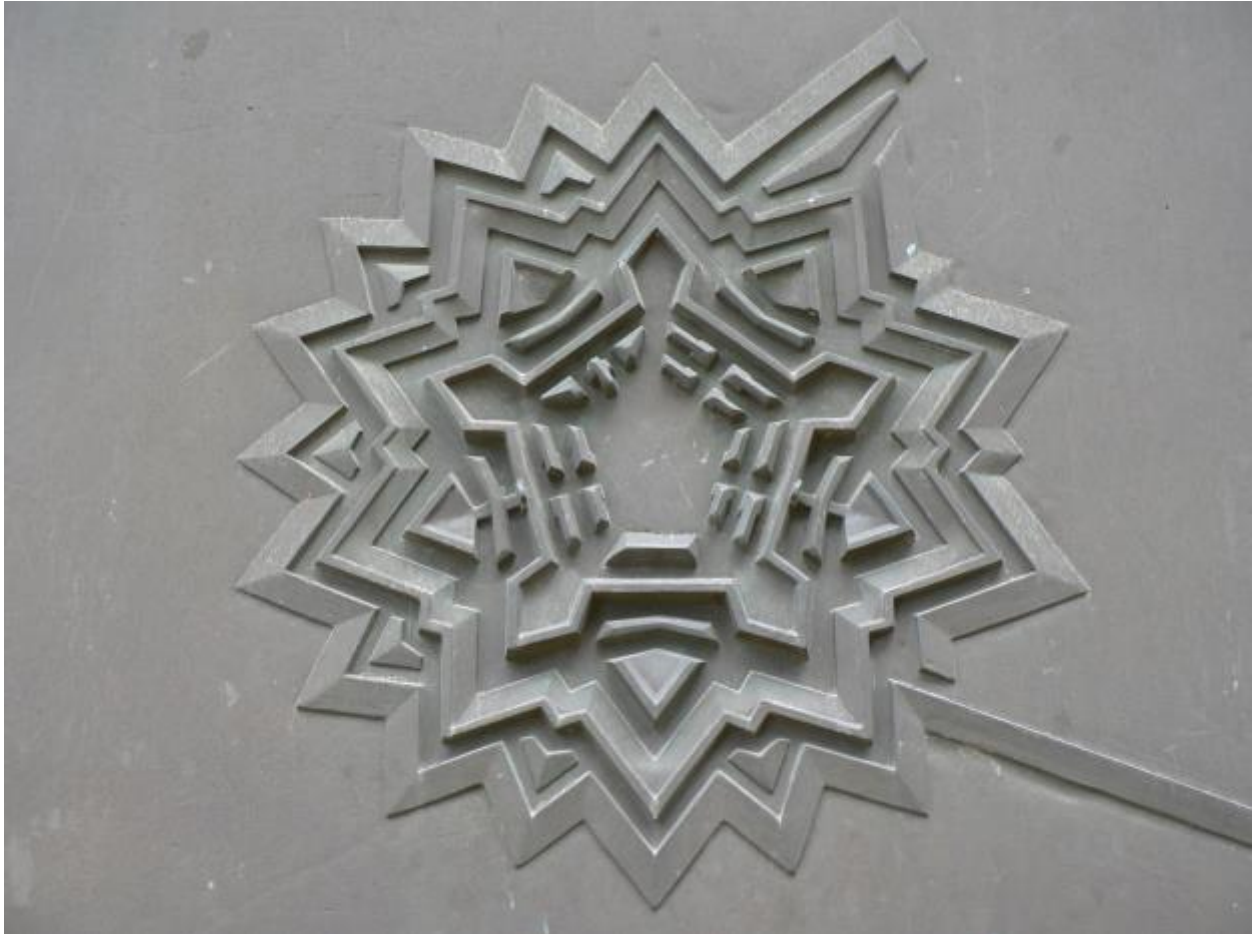


*3 - Traditional wall in testing apparatus*



*4 - Backside of traditional wall in testing apparatus*

## Multidisciplinary Solutions



I spent time learning about the important topics of peace and justice through the Service and Justice Experience (SJE) Program. This multidisciplinary program plays an important role in educating and forming the Villanova community on a deeper level. I was a participant and student leader on three trips, and I also participated in Service and Justice Event Discussions on various peace and justice related topics. The SJE trips enable students to serve with people and partner organizations who work every day to improve the lives of others who are in poverty and marginalized by society. While building a community within their groups and with those whom Villanova partners, students obtain firsthand experience of life at the margins of society and exposure to the knowledge and insights of the people they encounter. Issues of injustice are examined, and a life-long commitment to working for the Common Good is developed. The trips also include discussions regarding faith and spirituality to develop a deeper relationship with the world while living out Augustinian values.

I was a part of three SJE trips, two to North Carolina and one to Arkansas, serving with Habitat for Humanity, a global nonprofit housing organization. Their mission is to improve housing and urban infrastructure by creating life changing solutions to provide homeownership for families in need of decent, affordable housing. They advocate to change policies and systems to improve access to adequate affordable housing. These ideas were taught and brought to life in the work I did on my trips. Each day we worked on building a house, doing maintenance work to bring other buildings up to

code to be used again (such as a food bank and elderly care center), and worked with the communities to bring awareness to the work Habitat does and how those in need can gain support. We also had important discussions about the meaning behind the work we were doing and how important access to fair housing is in impoverished areas. Understanding affordable housing and the need to provide more throughout the country is something that needs to be improved upon. These discussions have resulted in a continued advocacy and pursuit of these topics through media presentations and making involved choices related to purchasing and sustainability to develop a sense of solidarity. The Service and Justice Experiences and my work with Habitat for Humanity focused on a commitment to service through a peace and justice lens to inspire further infrastructure development and the need for affordable housing.



*5 - My group putting up the fourth wall for the house we were building in Hickory, North Carolina*



*6 - Tables we designed and built using wood from pallets to sell at the local Habitat for Humanity ReStore*



*7 - Working together to put up Styrofoam insulation on a house in Hickory*





8 - The house my group constructed throughout the week in Fort Smith, Arkansas

## Business/Entrepreneurship



During my study abroad in Dublin, Ireland I had an internship with a company Theatre Forum. Theatre Forum works with those involved in the Arts Sector in Ireland, including performers, directors, writers, set producers, and venues, to strengthen Ireland's performing arts community and to advance its interests to ensure a sustainable future. There are trainings, organized events, and other opportunities for members to collaborate and set the community's agenda. Interning for Theatre Forum allowed me to further my interest in the arts as I have been involved in theatre throughout my life. I have seen many professional shows and musicals, and built sets in stage crew for my high school theatre productions.

Theatre is a major sector in Ireland, so I was able to participate in and learn what makes the arts and theatre so special there.

During my time working at Theatre Forum, I assisted in organizing a Conference entitled Inter-Sections. With this title, the conference was focused on the relationship between the arts in Ireland and other different sectors. It aimed to allow groups to communicate with one another, share information, and formulate solutions to various problems. At this event, art venues, artists, performers, and organizations came together for a weekend of speeches and discussions regarding important current issues relating to the Arts Sector in Ireland. The key idea of the conference was “How to face up to Climate Change.” My work for the conference was to develop a business model intended to make the conference as zero-waste as possible, reducing dependence on our solid waste infrastructure such as landfills and incinerators, and limiting fossil fuels.



*9 - Reusable Keep Cup Souvenir*

In order to do this, I investigated what they did at previous conferences, specifically the schedules, gifts, food, transportation, and basic day to day events. I made a plan with local artists to design an electronic copy of the schedule and a website that could be used during the conference to access information regarding the different talks throughout the day instead of providing paper booklets with this information. I scheduled with attendees' various pickup locations and public transportation methods they could take together from different locations to increase the amount of carpooling that occurred. Attendees were also provided a glass Keep Cup upon arrival which were used throughout the conference for coffee and drinks. This was done in lieu of a conference bag or plastic memento and disposable cups. The catered food was served on washable utensils and plates as opposed to single use throw away materials. Name tags were provided to each guest, but they were made from recyclable card stock and were printed without a plastic pocket or coating.



## How do we face up to climate change?

These sustainable changes we implemented at the conference and the plans are documented for future use throughout the theatre community in Ireland. The changes at the conference were highlighted to the attendees, who had great appreciation for the effort to eliminate as much plastic and waste as possible. Discussing these ideas, we developed plans for the majority of the attendees with how they can implement sustainable practices similar to the ones I developed for the conference into their company or work environments. The world's infrastructure is continuously becoming more sustainable in its materials and practice. Even at the small scale of the conference, this model of implementing sustainable changes to the Theatre Forum company makes a big impact. At the conference, an organization Julie's Bicycle presented the Creative Green Certification that they developed. Julie's Bicycle is a charity bridging the gap between environment sustainability and the creative sector. The Creative Green Certification offers organizations a method for achieving environmental best in practice and was showcased throughout the weekend. Being an environmentally friendly business, Julie's Bicycle and Theatre Forum recognizes and cares about its impact on society and the environment. These best practices reduce the load on our existing infrastructure, allowing us to extend their life-cycle. We were able to contribute to the health of the structure and environment within which it operates, a necessary step in the nature of today's world.

## Global/Multicultural Experience



In the summer of 2018, the summer after my freshman year at Villanova, I had the amazing opportunity to study abroad in Dublin, Ireland through the Learning Communities Abroad Summer Internship program. This program gives first-year students a unique international experience over the course of an 8-week study abroad program. Throughout this program, I took a 3-credit Villanova-taught course entitled Contemporary Ireland: Identity, Literature, and Culture; a 1-credit University College Dublin taught course; and a full-time internship along with various cultural immersions and excursions.



The Contemporary Ireland course I took focused on the culture and literature of Ireland, and the authors and history we learned introduced me to various aspects of the country's development. The natural landscape and attractions found throughout have lasted the trials of nature. I experienced driving on the opposite side of the road through the many roundabouts at each intersection. The roundabouts were developed as safer and more efficient options than stop signs or stop lights, systems that can be improved on various roadways and incorporated in developing new infrastructure.

My travels also took me to Amsterdam for a weekend. Being in this city, I witnessed the mass volume of bicycles used to travel throughout the city. Understanding the roadways and transportation systems that have created room and allowed for bikes to be ridden and parked is an infrastructural success. Cities throughout the United States are increasing their effort to implement bike lanes on roadways, supporting efforts to diminish the carbon gas emissions of vehicles.

Through this program, I broadened and strengthened my academic interest in civil engineering and what that pertains to. I built professional experiences as a freshman that prepared me for future employment and opportunities. I also gained an increase in intercultural competencies and international infrastructure that allowed me to understand how academia and employers differ in another country, challenging my pre-conceived notions of the world through an immersion in Ireland's foreign culture.



*10 - The 'Irish Oreo' at an art exhibit in Dublin*



*11 - A trip to Lough Tay, or the Guinness Lake, in Wicklow*



*12 - Colorful row houses in Limerick*

## Social Consciousness

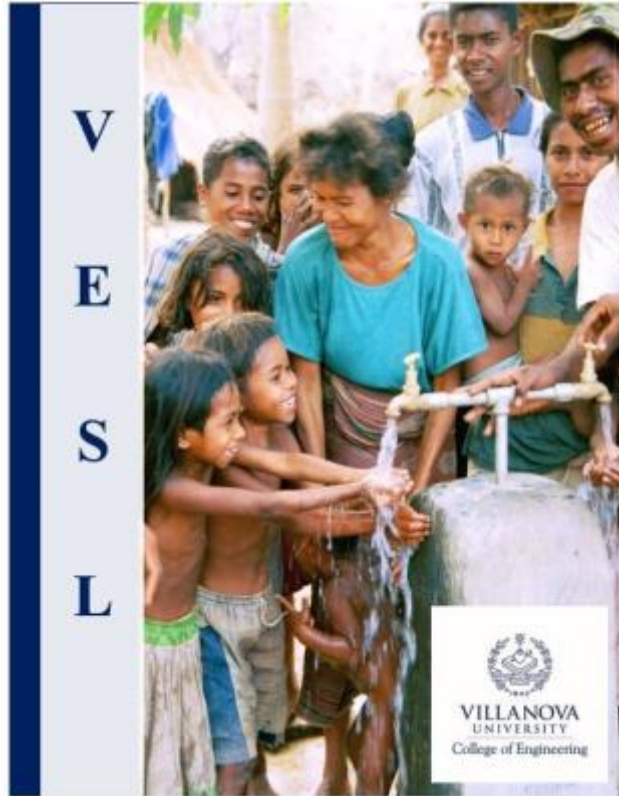


Villanova Engineering Service Learning (VESL) experiences are committed to projects that are rooted in ethical engagement with partners and communities. Fundamental to this belief is that empowering local communities is essential to creating sustainable solutions. Over the course of an entire semester, my team and I prepared for every aspect of the trip. During our weekly class periods, team leaders who have valuable experience in international development taught us about what it truly means to serve others in an international environment. We were taught the project management cycle and how to

prepare our projects. We learned how to use GPS devices and how to test the pH and acidity of a water sample. These skills were used throughout the various projects in their respective locations.

During my time at Villanova, I participated in two VESL trips. In Spring 2019, I traveled to Ghana to work on water supply infrastructure. The organization my team worked with was LifeTime Wells. LifeTime Wells drills and installs water hand pumps to small villages in regions around Ghana. While in Ghana, my team and I surveyed and maintained the water hand pumps. We traveled to 20 different villages, talking with members of the community about their usage, maintenance, and upkeep of the hand pumps. In each community, we talked to the leaders and asked them various questions about functionality, management, and water quality including who uses the handpump, who maintains it, if payment from the villagers is required, and if they treat the water. Much of their water infrastructure, which consisted of these pumps, was in disarray or out of service, so we repaired what we could. While at each pump, we took a GPS coordinate point which, upon our return, mapped out in ArcGIS to have an exact location map for each numbered hand pump. On this trip I saw firsthand the necessity of clean water infrastructure and what providing adequate safe water can bring to a community. Instead of walking miles to the nearest water source, the villagers were able to walk a few feet to pump it themselves. After the trip, we developed a report including the GPS locations of the pumps as well as detailed graphs and tables using the data from surveys collected at the communities. This information was given to Lifetime Wells for use and reference to better understand and communicate with the communities how to properly maintain the water pumps and the importance of having a proper formal system in place to do so.

The second project I worked on was in January 2020. Over the course of 11 days in Ecuador, my team and I worked with students and professors from the Escuela Superior Politécnica del Litoral (ESPOL) to bring electricity to a small island community. The community has two generators on the island that only provide electricity for five hours each day. Being a crabbing community, they are up before the sun and did not have light to see. In order to provide them with more electricity, we installed battery and solar panel systems to over 20 homes, in the school, and in the community building. In each home, we also wired lightbulbs to different rooms, providing additional electrical infrastructure and light. Throughout the week we also held workshops with community members to teach them the basics about electricity as well as how to use the systems we installed in their homes. We developed the presentation in Spanish and demonstrated through simple activities and demonstrations how everything works. This was an important part of the week because we gave the community the tools and knowledge they need to understand the systems so they can properly maintain them when we left.



## Ghana Final Deliverable



**VILLANOVA**  
**UNIVERSITY**  
College of Engineering

*13 - Ghana Handpump Community Surveys 2017-2019*

*Allison Beauclair, Cameron Bryan, Shannon Kearney, and Bridget LaSala*

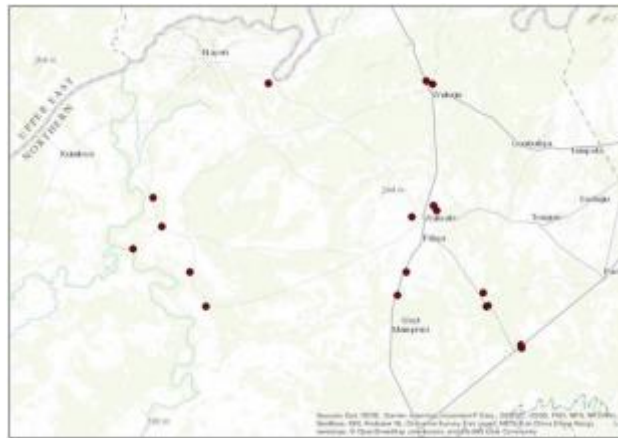


*14 - Villanova is partnered with Lifetime Wells International to travel to Ghana and perform community surveys where Lifetime Wells has installed handpumps. Data is collected regarding topics such as functionality, management, and water quality.*





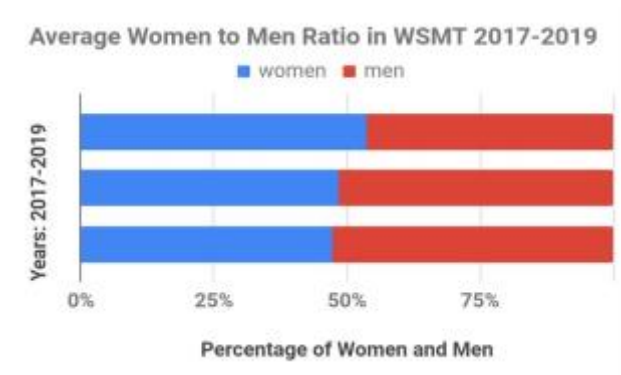
15 - Location Map of surveyed area



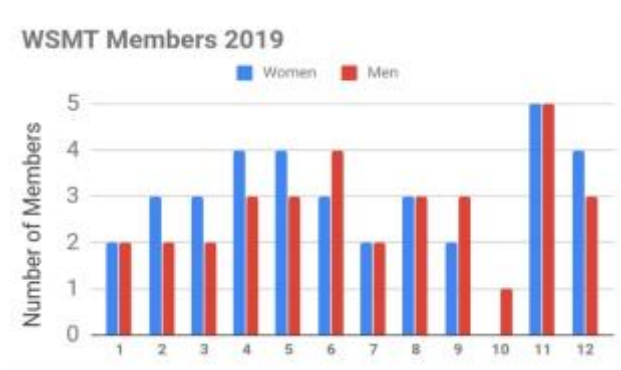
16 - Shown is a map of the individual communities which were surveyed during March 2019 in and around Walewale. An ArcGIS tablet program was used to mark the location of each handpump. These coordinates were then uploaded into ArcGIS with a base map of the area to give accurate locations of each community's handpump.



17 - Communities that have received formal management and operations training have about 25% more wells functioning than in communities that have not received training. Training ensures that community members know how to properly maintain and manage their well so that they can benefit from it for years to come. Lifetime Wells hopes to continue to train communities to increase handpump functionality.



18 - It is recommended by our partner, Lifetime Wells, that the percentage of women be much higher than then men. In communities in Ghana, it is the women who utilize the handpumps, therefore they should have the power and responsibility to take care it in the most appropriate way. Formal training could allow these communities to reassess their management teams to create the most effective group.



**19 - Communities Surveyed in 2019 with WSMT**

- |                  |               |                |
|------------------|---------------|----------------|
| 1- Bugiya Palaa  | 5- Bukudoaw B | 9- Binbini     |
| 2- Bugiya Kura A | 6- Mishio     | 10- Wulugu     |
| 3- Bugiya Kura B | 7- Zua        | 11- Sariba     |
| 4- Bukudoaw A    | 8- Bulbia     | 12- Tampilungu |



20 - Talking with the community members about our survey questions



*21 - Our leader Matt using the hand pump*



*22 - My group taking GPS points at one of the villages*



*23 - Smiling with the friendly children we met*

## **Ecuador Project Report**



*24 - Villanova University*

*EGR 5001: Engineering Service Learning*

*Stone Keener, Bridget LaSala, Jordan Pauls*

*January 3-10, 2020*





25 - The Villanova and ESPOL students in Cerrito de Los Morreños

## Introduction

This past winter a group of three Villanova undergraduate students traveled to Ecuador for an Engineering Service Learning Project. They were accompanied by Viviana Villavicencio Vallejo, a graduate student at Villanova and a native to Ecuador. The purpose of this trip was to install solar home systems and electrical wiring in the homes of those living on a small island, Cerrito de Los Morreños.

The island of Cerrito de Los Morreños contains thirty homes, with 700 people living within them. This community lives without running water and has very limited access to electricity. There are two generators on the island that powers the electricity for the people. However, this only runs from 5:00 PM - 12:00 AM. This means that throughout the day there is no electricity available for use. This is an issue especially in the morning hours when the community members are working. The main profession on the island is crabbing. There are Mangrove trees that surround the island, and the mud they are rooted in provide a sufficient home for the crabs. These crabs are caught, sold, and eaten on a daily basis. This profession requires the workers to be up in the early hours of the morning, which is difficult when there is no light to see by. A few years ago another university installed solar panels on the roof of every home, as well as a battery system to allow the solar energy to be used in the homes. These systems lasted only for a short period of time because the community members were not using them properly and did not understand the purpose or maintenance of them. This led to their deterioration and they became unusable after time. In order to improve upon this issue, this project was developed to remove and replace the photovoltaic systems that are currently on the island. The photovoltaic system, PV system, consisted of three parts: the battery, the charge controller, and the inverter. These three components were connected to each other using wires, terminals, and bridge connections, and were connected to the solar panel and electric wiring of each household. The electrical wiring to the lights and electrical systems within the households were also replaced. Throughout the week long trip, ten systems were replaced and eight houses were re-wired to provide the necessary electricity throughout each house.



*26 - Stripping wires to prepare for installation*



*27 - The battery system installed and wired to the solar panel to power a house*

## **Project Involvement**

Villanova University partnered with the Institute of Electrical and Electronics Engineers (IEEE), as well as La Escuela Superior Politecnica del Litoral (ESPOL) for this project. IEEE is a professional organization of electrical and electronic engineers who are working towards advancing technology of the future. ESPOL is a public university located in the city of Guayaquil, Ecuador. These three organizations worked together to develop the project that was implemented during the week long service trip.

A great deal of preparation went into making this project possible. Much of this was done by ESPOL students and professors, who coordinated the purchase of many of the materials (batteries, conduit, lighting supplies) that we would use in the project. On the Villanova end, our responsibility was to pack inverters, charge controllers, and Arduino kits in our suitcases. We brought supplies to install photovoltaic systems and lighting circuits in ten houses, and we ended up finishing all ten. The final phase of preparation took place in Guayaquil, the day before we departed to Cerrito de Los Morreños. We met with the students and professors from ESPOL and were reintroduced to the project. Later that day, we made 20 wire connecting bridges, two for each of the ten systems to be installed.

The first day on the island we ate lunch and held our first community meeting. The meeting was with about twenty community members, who had been selected to have the PV/lighting systems installed in their homes. We spoke about the project, in Spanish, and showed them the components we would be installing. We also covered some basics of electricity, for example how a battery is like a pool; it can be filled up and drained and it has a maximum capacity. Later that night some of the leaders, Ruben, Alexis, Vivi and Ricardo split the students and volunteers into three teams, two of which would install lighting circuits, while the other would install the PV systems. Stone and Bridget were on the PV systems team, and Jordan was on a lighting team.

The second day on the island was the first full day of work. Alexis's lighting team chose to start with the largest house, one that had 5 families living in it and needed 5 bulbs and several switches throughout. It took close to four hours to complete, and was tiring work. Whether you were on a ladder stripping wires or holding the ladder from below, it was draining, especially in the heat. Luckily, one of the families in the house gave us a bowl full of steamed crabs as a thank you, and we ate them while on a break. Another house we visited had an old lighting circuit already installed, so we replaced the light bulbs and the worn switches. Later Alexis's team worked on the lighting circuit in the community center. There was already a circuit installed with a PV system, but they were not working together properly. We ended the day by fixing this problem. On this first day, the other team installed the PV systems in three houses. The first house we did took us almost three hours to install the system. We had to remove all of the old equipment and figure out the best way to connect everything in a neat manner. We also had to prepare the wires for the connections. This required measuring the distance between each of the components and putting terminals on the ends of them. The entire system went together in an easy manner. The inverter was placed on the stand first and then the charge controller. The bridge, or common connection point for the wires, was attached, then the battery, and finally the solar panel was connected. We used lots of zip ties, wire cutters, and screwdrivers to get the systems in place. It took some time to get the process down and remember to connect the negative than positive wires in the correct order with the components. After the first house, the other two houses took the team less than an hour to complete. After each installation we checked the voltage and current running through the system, and turned on the lights in the house to make sure everything worked properly. It was such a great feeling to see the lights working when it wasn't during the regular generator hours. At the end of the day, the team prepared all of the wires and connection points for the next day to hopefully speed up the installation. There was also a workshop where we showed the community members each of the components to the system and had them interact with them so they would understand how everything worked.

On the third day on the island, the second day of work, the lighting team started with another large house, with four bulbs and three switches. The residents intently watched as we ran PVC conduit through walls and on the ceiling, offering assistance and the occasional snack. One issue we ran into the second day was a shortage of green wire. Since the wires we were using were not coaxial, we needed red wire to represent 'hot' and green wire to represent 'common'. We quickly ran out of green wire, and began to use red wire instead. To indicate that a red wire was 'common', we used bits of electrical tape at the ends of a piece of wire. In some cases, when we needed to tell three red wires apart, we would mark one wire with one piece of tape, another with two pieces of tape, and leave the other bare. The people of ESPOL were adept in improvising like this. The other team finished installing the rest of the PV systems today. After only getting through three the previous day, we were proud to have finished the

other seven. We split into two teams within our one team where two people would start at each house disconnecting the old system and attaching the inverter and the charge controller. The rest of us would then follow to attach the battery, solar panel, and remaining wires to get the system working. We ran into some problems during the last two installations. At one of the houses, the system was all connected but the inverter was not working. We replaced it with another one to make sure that was the problem, and then believed there was an internal problem within the component. However, after inspecting it very closely, we determined that there was a loose connection point on the outside that we just pushed back in and thankfully the inverter worked again. At the last house, the screws holding the old system in place were all stripped and needed to be cut off. This took some effort and lots of different tools, but after a while it came off and the new system was installed without any more issues. By the end of the day we had the installation down to a science and it was gratifying to see all the systems being installed.

The fourth day on the island was the final day of work. Alexis's lighting team worked on one more house, a smaller one with only two bulbs and two switches. After this was done, we revisited a house that needed new lightbulb sockets and replaced them. While we were there, we noticed that the shower area had no light above it and installed a new bulb there connected to the PV system. Finally, we revisited the community center and replaced many of the switches that were old and malfunctioning. The PV system team also visited the community center. We replaced some of the wires and connection points on the PV system that had worn away or were falling off. This team also went to eight different houses and installed connectors within the systems. These pieces attached to either side of a cut wire from the solar panel and clicked into one another. If the people ever needed to move the system or solar panel within their home, they could easily disconnect the pieces and reconnect them at the new location. This is much easier and does not require them to understand how the wires in the system connect or have to detach anything within it. At first this seemed like a simple task to do, but the team had to revisit the first four houses to double check the installation. In order for the connectors to be properly placed on the wires, a click sound had to be heard when they were pushed on. This was not realized until halfway through, which is why we had to backtrack in our work. It was a good thing we did because not all of the connections were placed properly which would have caused failure within the system if the wires were jostled to another position. Both groups finished all of the houses today. It was a few days of hard but rewarding work, both for the students and the members of the community.

Throughout the week, the biggest challenge the lighting team faced was using the ladder to install conduit and lightbulb sockets. The ladders we used were not stepladders, so they needed to be propped against a wall or a part of the ceiling. Often, this simply was not possible. For any time a socket or a piece of conduit needed to be installed away from a wall or support pillar, the ladder needed to be held up by a member of the team. This made the work much more painstaking - holding a ladder steady is not difficult, but supporting part of the weight of a person standing on a high rung of a ladder is. We told the team that for Christmas this year, we are getting them a stepladder.



*28 - Lightbulbs we installed in a home*



*29 - Electrical wiring system connected to the lightbulbs*

## **Conclusion**

The Cerrito de Los Morreños project seems to be well developed and successful. It is clear that since the project's beginnings, we, Villanova, IEEE, and ESPOL, have developed a presence in Cerrito and the community has responded with gratitude. From their attentiveness at community meetings, to their willingness to help during installations, it is clear that the community we entered appreciates the work that we have done and are continuing to do. One simple way to quantify the value of the work accomplished during this trip is to examine the ten homes that we worked on. Before we arrived, these ten houses had limited electricity for six hours in the evening. After we left, these ten houses now had sustainable energy to power lights in almost every room, for ideally twenty-four hours a day. While this was a only week-long trip for us, the work we did can provide light to those ten homes for years with adequate maintenance. Working with the ESPOL students in this small island community allowed the Villanova students to be fully immersed in Ecuadorian culture. The house we stayed at throughout the week provided us with delicious traditional home cooked meals that we enjoyed three times a day. We were on the island for a holiday on January 6th, Dia de los Reyes, or Three Kings Day. There was a big celebration on the island where they burned caricatures and had fireworks. This gave us a taste of how



holidays are celebrated in Ecuador and it was a great experience to have. The students from ESPOL were wonderful throughout the week in teaching us more about the systems we were working as well as about their culture, including how to dance! They were not discouraged that we were not fluent in Spanish, but rather enjoyed practicing their English with us and helped us improve our Spanish. We were totally immersed in the culture for the entire week and felt so impactful from the projects we did on the island. We in the Villanova team can easily say that we made a positive difference in the daily lives of these community members and fully enjoyed our experience.



*30 - The group taking a boat ride around the island*



*31 - A few students showed us the ESPOL campus*