

## Fall 2015

### Velkommen Tilbage! Denmark and Sweden with Will Lescas



This winter, I was given the chance to go to Denmark and Sweden to conduct research for my senior thesis on the European Migration Crisis and its potential effects of the Scandinavian welfare model. It was an incredible opportunity that galvanized my interest in my topic, and my love for the Scandinavian Region. I spent three weeks in Copenhagen, Aarhus, and Stockholm meeting with professors, politicians, and locals to build a better

understanding of the how both countries were coping with the stresses of the increased migration.



I began my trip in Copenhagen, although in some ways it was not so much an adventure, as it was a homecoming. I stayed with my Danish family from my semester abroad the year before, and was welcomed back as a true member of the family. My conversational Danish skills improved immeasurably, and I was able to rediscover my love for the Danish culture- even if it entailed biking in a few inches of snow!

My original plan was to meet with faculty from Copenhagen University, but my Danish family suggested that I try to get in contact with members of the Danish Parliament as well. After sending a few emails, I was welcomed into Christiansborg Palace to meet with Ulla Sandbæk, a leading member of the Danish Green Party, and Niels Rohleder, the head advisor to the leader of the far left party, Enhedslisten. It was a true testament to how open the Danish democracy is.

The next stop on my journey was Aarhus, the second largest city in Denmark. I had never been to Aarhus before, but its world-renowned university was enough incentive to go and explore. My time in Aarhus was capped by a panel meeting with three experts in the field of migration. During this meeting, we not only discussed their research, but they also



took great time to help me refine my research question, and help in collecting my thoughts. It was a blessing now that I am in the process of writing.



I then flew from Aarhus airport (quite possibly the smallest airport I have ever seen) to Stockholm. Sweden's immigration policy has been the diametric opposite of Denmark, and the contrast was very surprising. Sweden's open policy is contentious, and I got the chance to see that first hand. First, I met with two members of the increasingly popular, right wing party, the Sweden Democrats, for lunch in the parliament commissary. The next day I met with two ministers from the ruling Social Democratic party. The apparent disdain that the two shared for each other was shocking, but it was

exceptionally useful in understanding the reality of the immigration policy debate in Sweden.

I also got the chance to meet with Tomas Hammar, "the grandfather of Nordic Migration studies." Although Professor Hammar has been retired for over 20 years, he invited me to his home for lunch, and it was one of the most insightful experiences I have ever had. Over Jansson's Temptation and a pot of coffee, we talked about the developments in migration since World War II. Many of the theories we discussed have directly influenced my own research.

As I flew home, I was dumbfounded at how willing people in both countries had been to meet with me, and also how much better I understood the current situation. It was the experience of a lifetime, and I am so grateful to the Honors Program for helping to make it possible.

## Where Rainbows Meet: Cape Town, South Africa. by Jessi Lafferty



Thanks to the generous alumni of the Honors Program, I was fortunate enough to spend the month of January in Cape Town, South Africa working as an International Business Development Volunteer at Where Rainbows Meet (WRM). Where Rainbows Meet is a training and development center located in Vrygrond Township where their programs “provide the different groups in the community with information, education, support, and skills to take responsibility for themselves.” Vrygrond is an

informal settlement situated in the outskirts of Cape Town, South Africa where a large percentage of residents have HIV/AIDS and a majority of the population is unemployed. High rates of unemployment are strongly correlated with extremely high levels of alcohol and drug abuse, crime, and domestic violence. WRM aims to be the safe haven that members of the community can turn to when faced with sever social challenges.

When I arrived at the project in the beginning of January I felt entirely overwhelmed by what the month had in store. I had just traveled across the globe for over 30 hours, my internal clock was already suffering from jet lag, the dry heat and altitude were already working against me, and culture shock was unfolding. On top of my initial feelings of insecurity, my orientation at WRM was taxing. The Project Manager and Director of the foundation walked me and another volunteer through what plans they had for the upcoming year, what tasks they wanted to see accomplished, and the challenges inherent in each. Given that WRM caters to the needs of many different demographics of the community, the ideas they had in mind seemed unrealistic for such a short amount of time with minimal resources – the ongoing dilemma for many NGOs worldwide.

Despite such adversities, January was an overly rewarding yet challenging month. I was forced to take the theories and concepts taught in a classroom setting and apply them to real world scenarios. Among many other responsibilities, I developed a complete business model for Siyazenzela, a local micro-social enterprise including marketing schemes, promotional material, and financial practices. My team and I organized two large-scale awareness events designed for 700-800 people of Vrygrond Township. Furthermore, I facilitated Life Skills classes taught to adult students in the Work Readiness Program focused on preparing individuals for the job market.



It was the life skills classes and the time spent with the students of the Early Childhood Development program that taught me the most. I have been extremely fortunate through my upbringing and education to immerse myself in different cultures through opportunities such as this. The stories of the women overcoming their own personal challenges and taking steps to better their lives and the lives of their families were inspiring to say the least. The looks on the children's faces of pure joy despite their upbringings in violent and substance abusive homes were infectious. Over the course of four weeks I was able to apply knowledge that I learned in my business classes to help create feasible plans for the training foundation. Moreover, I learned a lot from other

volunteers about the consulting and advisory career path that I will be pursuing after graduation.

## **A trip to Visvesvaraya National Institute of Technology (VNIT) in Nagpur, India, by Dakota Hanemann-Rawlings and Michael Karavolias**



During the winter session of 2016, I had the opportunity to travel to the Visvesvaraya National Institute of Technology (VNIT) in Nagpur, India with two of my peers for three weeks. As a group of senior chemical engineers, my peers and I were traveling to the esteemed Indian university to exchange research ideas with students and professors, share experiences regarding our student clubs and activities, discover the class structure and learning styles

presented by the professors, and experience the culture and academic life of the local students. My group began the trip with a fairly determinate idea of the experiences that we would seek on the trip, but throughout the trip we found ourselves in a host of unexpected and new situations that enriched the experience and resulted in deep spiritual and moral refinement.



The learning experience for our team began with our 1000 km journey from Mumbai airport to Nagpur. The trip spanned several days and involved a host of different transportation methods including trains, busses, trucks, rickshaws, and foot. Our journey brought us from the most affluent areas of India to some of the poorest and most polluted environments in the world. We received a firsthand view of the sharp divide between the upper and lower class in the country. The growth in population and the exponential industrial development coupled with a lack of investment in proper infrastructure, waste management, and social care has resulted in a convoluted and deeply rooted network of issues with poverty, pollution, corruption, and healthcare. Experiencing these issues in our travel brought our team to redefine why we were on the trip, and allowed us to refine our goals for our time at VNIT. My peers and I concentrated our undergraduate research on the development of sustainable, bio based materials and chemicals that have a low environmental impact. Being that VNIT is a leader for engineering development in India, one of our main goals for the trip was to convey this research to the students and professors so that we could spark sustainable development in the country.



Upon arriving at the university, our team's first goal was to immerse ourselves in the culture and day-to-day life of a VNIT student. We spent our first few days with a group of four friendly VNIT chemical engineering students. My peers and I found many similarities to the VNIT students and we immediately felt a close bond. With the local students, we attended class, hung out with friend groups, and experienced the student clubs and activities. We also had the chance to visit the local temples and areas of worship that the students frequented, along with

the hangout spots, restaurants, and entertainment venues. The experiences allowed our team to bond with the local students and discover the rich local culture.

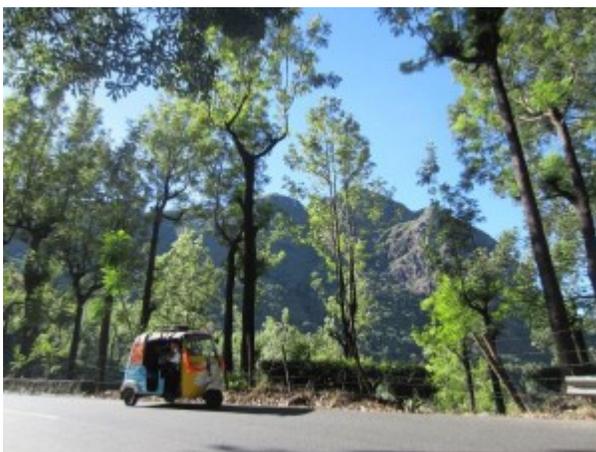
During the next couple of days at the university, my peers and I hosted a range of presentations to convey the experiences and academic pursuits that we are interested in. For our first presentation, we gave a detailed overview of the undergraduate research that we are involved in at UD. We placed an emphasis on our bio-based chemical and material research, explaining the different ways that harmful industrial processes and commercial materials can be replaced by greener processes and bio-based feedstocks. We hoped to convey this information to the professors to spawn a development in the utilization of renewable resources in India to attenuate the apparent environmental issues that the country faces. I also had the chance to convey my experiences with Engineers Without Borders, and I spoke with several students about the prospect of starting an EWB chapter at VNIT.



The three weeks that my peers and I spent at VNIT involved some of the most amazing and eye opening experiences of my life. The trip helped to enrich both my team and the people of VNIT, and will hopefully lead to a range of new programs and initiatives at both universities. Without the Honors Enrichment Award, this culturally and academically enriching experience would not have been possible.  
~Dakota

To take away the most from a traveling experience it is important to enter it with no prefabricated notions. This axiom proved essential during my two weeks at the Visvesvaraya National Institute of Technology (VNIT) in Nagpur, India. Before going to India I had touched base with the director of the Chemical Engineering program at VNIT; however, for much of the stay the director was ill so a new plan was formulated with three chemical engineering students at the university that comprised of attending lectures, interacting with professors, touring the lab facilities, presenting our experiences at UD to the student body, and local excursions.

The chemical engineering program at VNIT is very new at only five years old; the chemical engineering program at Delaware recently celebrated its 100 year anniversary. Being able to see the contrast between the programs and observe the progress VNIT has made in only five years was amazing. The program already has over fifty students in each class and a functioning unit operations lab. This success is in part due to the students. I was inspired by their desire to learn and grow as students. India is considered a developing country in many respects, but the established educational system is vast and powerful. Through my travels in the country I noticed that even in extremely rural areas where people were of very low socioeconomic status there were still students attending school. The emphasis on educating the seventh of the world's population that live in India is admirable.



Besides observing the substantial growth of the chemical engineering department at VNIT I was also taken aback by the beauty of the country. We were able to see everything from chaotic cities to deserts to beautiful beaches to scenic mountains. In each of these places it was guaranteed that we'd also see at least one cow which are considered sacred in India. Unfortunately, we also saw a lot of pollution. Seeing this resource-rich country plagued with poor sanitation and infrastructure reignited my passion for development work. It reminded me that a Ph.D in Chemical Engineering will give

me the tools to help provide clean energy and water in communities like the ones I had the

privilege of going to. India is an amazing country, with a powerful education system, and a warm, welcoming community that made my experience there unforgettable. ~Michael

## A Glimpse of Ghana: NGOs and Children's Nutrition, by Kelly Daniels



Figure 1: Cape Coast, Ghana

As an aspiring medical student, I saw Honors Enrichment Funds as an opportunity to observe and learn about medicine in a new context, and approach it from a perspective that neither my college education nor East Coast shadowing and clinical experiences could afford me. Various experiences during my first three years at UD, including study abroad and domestic-based service trips, had fostered a growing curiosity to learn about and understand cultures different from my own. With my entrance into the medical world quickly approaching, I felt that I

needed to submerge myself in an experience that would further broaden my knowledge and challenge my current perceptions of medical systems outside of the United States. Thus, I set off



Figure 2: A view from Cape Coast Castle, the primary space used to export slaves during the transatlantic slave trade. A majority of slaves that ended up in the US were originally captured in Ghana via intertribal warfare.

on a four-week trip to Ghana, where I was thrown from my comfort zone and immersed in a new culture where I was welcomed, challenged, saddened, and inspired.

I was paired with an NGO, Point Hope, which operated out of Ofaakor, a community located about two hours from the nation's capital, Accra. Point Hope, which was actually founded just outside of Seattle, focuses primarily on children's nutrition and education, with a special interest on refugee populations. As a democratic country with relatively low corruption and increasing levels of development and urbanization, Ghana has become home to many refugees from Liberia, Nigeria, and Togo. Point Hope had recently identified a village, Apra, where there was concern for community food security. It was my task, alongside two peer volunteers, to conduct household surveys collecting demographic information, and data on housing, water, sanitation, economic livelihoods, education, food security, and children's nutrition, in order to construct a community profile to determine whether a nutritional intervention was necessary. With the help of primary school teachers as translators, we completed the interviews and analyzed our data. More than

one third of the community's children were malnourished, with another quarter of them at-risk, and more than 90% of households were food insecure.

The NGO immediately extended a pre-existing supplemental feeding program to include this community, however, the most difficult part of the experience was noticing just how few resources the community had and being confronted with the seemingly endless barriers that stood in the way of addressing those challenges. I observed the careful balance that must be observed in these communities between assistance and empowerment and learned about the detrimental effects of interventions that were implemented carelessly in the past. Participating in the process from preliminary research to data collection,



Figure 4: Kelly Daniels and Point Hope volunteers, with a translator



Figure 3: Distributing Tom Brown nutritional supplements at the first day of the new program in Apra

analysis, and implementation allowed me to see the importance in thorough and thoughtful data collection for the purposes of humanitarian work and human development. The experience was a valuable glimpse into the world of public health. Meanwhile, my interactions with community members and villagers taught me about a culture with strong social supports, family values, and very spicy food.

this is evidence to the quality of the educational experience. I can now ask intelligent questions about an area of study that I hardly knew existed, and while I now can truly appreciate exactly how much I do not know, I would say that this new thirst for knowledge is favored over the naïve feeling of mastery that comes with the culmination of an undergraduate degree. As a senior with an apparent “end of education” in sight, the friendly but firm reminder that there is still much to learn was the most valuable aspect of this experience.

After spending a month in Ghana, I definitely had more questions than answers, but I believe

## Tessria Women's Running and Leadership Camp: created by Elizabeth Clinton and Nora Reynolds



Nora and I were both members of UD's Club Cross-Country and Track teams. In our junior years, we both had the opportunity to study abroad (separately) in Morocco and were determined to keep up our running training. While we were there, we discussed how uncommon it was to see women running or exercising outside and even more uncommon to see Moroccan women in leadership roles in the community. When we returned home, we talked about how much running has taught us: from

goal-setting to team-networking to just building enough confidence to run outside in public. We decided to explore the idea of creating a running and leadership camp for Moroccan women; *Tessria* was born.

*Tessria* in Arabic means "to accelerate," which conveys forward motion in both running and development. After consulting with Moroccan friends and an amazing Peace Corps volunteer in Morocco named Simone, we set an overall objective for the camp: to use running as a tool to educate female participants and develop their skills in specific areas such as leadership, discipline, responsibility, and self-confidence to empower them to engage in public political, social, and economic spheres. The participants would leave the camp ready to become active vehicles for change and development within their country.



Ouarzazate, a small city in the south-central region of Morocco, became our camp location, due to the need and desire for sports education for women in the area. Ouarzazate and its surrounding villages are low-income areas, and we wanted to make sure our participants could attend no matter what their socioeconomic status. With crowdfunding opportunities from the University

of Delaware, we were able to fundraise enough so that there was no cost to *Tessria* participants. We put together a 5-day program that included three essential parts: an opening icebreaker/networking activity, a workshop that connects both running and a life skill, and an exercise portion. Our workshops included discussions on goal-setting, sexual harassment,



women's health, and a panel of women who held leadership roles in the community. These workshops brought up many societal issues, but the women's stories and statements were inspiring. In our goal-setting workshop, one of our participants named Sumiha, who could be said to be our most conservative participants, told us that her hijab (hair and neck covering) does not hold her back from anything. In fact, her goal was to design a line of sport hijabs for

women! Our exercise periods involved basic stretches, ab routines, and relay races, and culminated in a 15-minute distance run! We were so impressed by the athletic ability and determination of some of these women, many of whom had never attempted any kind of intensive exercise! Sumiha, the same woman who wanted to design sport hijabs, kicked our butts in the 15-minute run, pushing the pace the entire time.

In addition to the concrete impact we were trying to have on the area, we were able to use this project as a research opportunity. We used our time in Morocco to gather research for our undergraduate theses: Nora is looking into the effects of the camp over the week; Elizabeth is looking into the cultural factors that affect women's participation in sports in Morocco.



Though neither of us spoke the local dialect



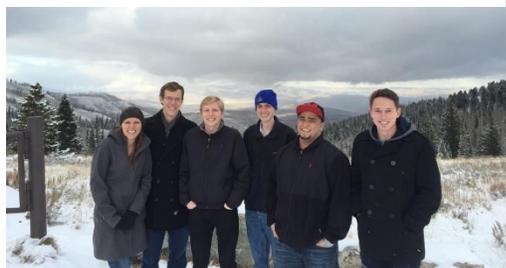
of Arabic spoken in Morocco, we formed such a close bond with these 20 women over the course of the camp. During many of the workshops, the women stated that they had not known a lot of information that we had discussed, but we learned so much from them, too. For a day-to-day recap of Tessria and periodic updates, check out our blog at

[www.tessriarunning.wordpress.com](http://www.tessriarunning.wordpress.com).

## Ben Carberry and Michael Palmer presents research at the AIChE conference in Salt Lake City, UT

My research experiences over the last 3 years have shown me how research is driven forward by our ability to come up with creative solutions to complex problems. Conferences like the fall national meeting of American Institute of Chemical Engineers help to reach these goals by encouraging the exchange of ideas and professional networking. The national AIChE conference is the largest meeting of chemical engineering professionals in the nation; this year thousands of engineers traveled from all over the world to Salt Lake City Utah to give talks and attend lectures at this meeting. As someone applying to graduate school and interested in pursuing a career in research, my experience at the AIChE conference was rewarding not only because I had the opportunity to network with high caliber students and faculty from all over, but I also got the chance to present my research and gain new creative insight to my senior thesis.

Figure 5: Our group excursion into the Rocky Mountains near Park City



My trip to Utah with 11 other students from UD was a wonderful experience from the moment I stepped off the plane and was greeted by the beautiful rocky mountain landscape. The student portion of the conference kicked off with a keynote address from Roger Boisjoly, an aeronautical engineer who worked on the Challenger space shuttle. Mr. Boisjoly spoke on his experiences working as one of the head engineers, and on his attempts to raise safety concerns and halt the launch in 1986 before the shuttle exploded. I really connected to this story because in my mind Mr. Boisjoly did everything right. He was a skilled engineer

who stuck to his recommendations despite all urging from his superiors, and still his work resulted in disaster. His testimony showed me that as engineers sometimes being able to solve problems is not enough; we have the ability to create, and the responsibility to ensure that our creations don't bring harm to others.

As the conference continued there were several networking events where I got the opportunity to meet faculty from universities from all over the nation. One of the toughest things about choosing a graduate program is finding faculty advisors to work with. Much like finding a good supervisor in industry, it's important to evaluate potential graduate advisors. They all have different work styles and expectations, and if they create an environment that is not conducive to the learning and success of the grad student, then grad school can be a long and sometimes failure-ridden five years. At the AIChE conference there was a grad school career fair where I got to talk to professors from most of the graduate schools I was interested in to see if these people were really people that I could work with. Beyond questions about programs, I found many faculty also very receptive to questions about directions after graduate school and some of the experiences they had that made them choose to go into academia. It was through several of these types of conversations that I think my mind became more open to the possibility of becoming a professor. I think I still have a ways to go before I know what my directions post-graduate school will be, but the access I had at this conference to the many different viewpoints

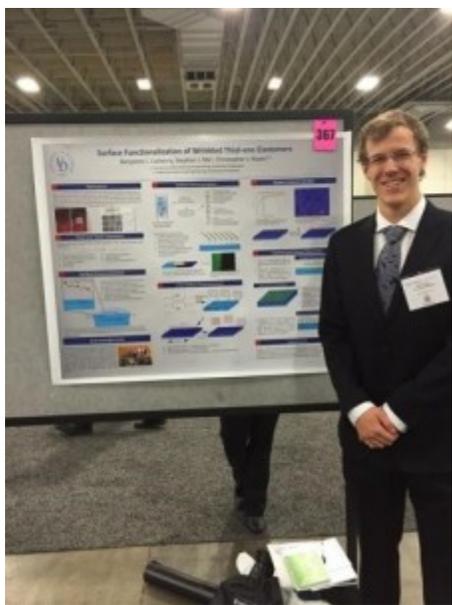


Figure 6: Presenting my research alongside nearly 400 student researchers

of both respected faculty and industry professionals helped to make me more receptive to career directions I might not have otherwise considered.

I think perhaps my favorite experience from the conference was the poster competition where I had the opportunity to present work from my senior thesis to a conglomerate of interested professionals. Each time I presented, people asked new questions I hadn't thought of or sometimes even pointed out other experimental methods that would have perhaps worked better. This experience may seem very simple, and perhaps it is, but to me it really embodies what these types of meeting are all about because at the very same moment I was presenting my senior thesis there were other seminars occurring where experts in the field of drug delivery, or catalysis were gathered to hear and provide critiques that will hopefully inspire new directions of research. It is this promotion of the open sharing of information that makes conferences like AIChE a power

house of innovation, and the best part of all is I got to be a part of it. I may not have won any prizes for my poster, but I came back with new ideas and directions to take my research and I think that is pretty cool.

As engineers, it is easy for us to work individually with our own resources, and mistake our ability to understand the world from a particular perspective as a strength. The perspectives of others not only helped me to become more open to other ideas and viewpoints, but also to be better prepared for my future career and come up with better solutions to the particular problems I was working on. With a mindset more open to collaboration and the ideas of others, I came back from AIChE a better engineer. ~Ben

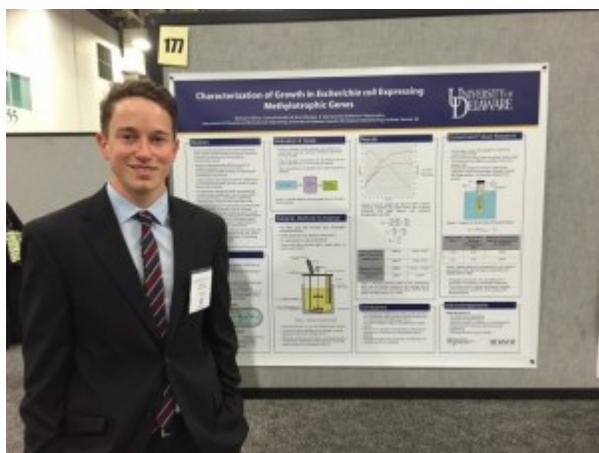
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The student conference, whose last days overlap with the regular conference, is an opportunity for chemical engineering undergraduates from across the country and from around the globe to gather in one place and enjoy an engaging weekend centered on chemical engineering. The event is not only an excellent networking opportunity, with representatives from top graduate schools and companies actively recruiting, but a chance for students to engage in some friendly competition.

On the first day of the conference we had the great pleasure of listening to a talk given by Alan J. McDonald, former director of the solid motor rocket project for the Space Shuttle *Challenger*. He gave incredible insight into the value of safety in all types of engineering, something which is becoming more and more of a focus in modern techniques. The rest of the day was filled with various "tech sessions" which consisted of talks given by experts in a variety of chemical engineering subject areas.

The second day was when the recruitment fair took place. Representatives from graduate schools and top companies had booths which students could visit and discuss their future goals. This was an incredibly valuable experience as someone who is planning to begin graduate school in the fall because it gave me an opportunity to learn about the schools in a way that I simply could not from a website. I was also extremely fortunate in that a few of the specific professors that I want to work with were at this event, and I was able to speak with them about their research.

Following this recruitment fair was the “chem-e car” competition, the premise of which is that each university participating designs a small 4-wheeled car, which must be propelled and stopped by a chemical reaction. Before arriving at the event the participants are not told what distance their cars must travel or how much weight will be loaded onto it. While the University of Delaware did not participate in this event, it was still extremely exciting to watch and I was very impressed with how well many of these cars worked.



The undergraduate poster competition took place on the third day. This competition is a chance for students to present their research to chemical engineering professionals and gain experience talking about their work. Not only was this great experience for future presentations but I also placed second in my division.

While in Salt Lake City we also had

the opportunity to do some sight-seeing. I had never been to Utah before and was amazed at the beauty of the landscape. Even from the center of the city you could see the snow-covered mountains in the distance. We drove up into the mountains to explore and were rewarded with spectacular vistas and wildlife. Salt Lake City itself is also beautiful, with an astounding number of parks throughout the city as well as the Mormon temple, which is truly an architectural spectacle.



Overall this trip was fantastic. I made a lot of new friends from all over the country and was able to participate in an event which will certainly benefit me in my graduate school career and beyond. ~Michael

## Krystina Callahan in Moshi, Tanzania



This past winter session, I was given the wonderful opportunity to travel to Moshi, Tanzania for almost four weeks. Moshi is a small town located in Tanzania, Africa at the foot of Mount Kilimanjaro, the tallest freestanding mountain in the world. About 40 other University of Delaware students and I traveled to Moshi through the organization MedLife. This is a worldwide organization whose goal it is to help those in third world countries with medical care, education, and development projects.

Each day we were in Moshi was different. We ventured into a new village about an hour from where we were staying to set up our mobile clinic. We were all organized into different stations to help the patients

with different things. When a patient arrived, (there were typically about 50 patients already waiting when we got there) they went through education. Many of the problems in Tanzania rise from a lack of education. Many people get sick because they do not know that taking a shower or washing their hands are necessary for good health. In this station the patients learned about everything from personal hygiene to feminine care to the importance of going to school. Once given basic health lessons, they were checked in and sent to get their vitals taken. We took their blood pressure, height, weight, and temperature. The patients could then see a local doctor, who we got to shadow. The doctors would explain to us what was wrong with the patient and then ask us to suggest a diagnosis. The most common problems in Tanzania are high blood pressure, fungal infections, and malaria. After diagnosis, the doctor would prescribe medicine free of charge. It was humbling to see how thankful a person could be when you hand them a prescription for ibuprofen. We also taught children how to brush their teeth and gave them each a toothbrush to take home.





In total, we gave medical care to 2288 patients, 85 of whom MedLife will follow up with because of more serious issues. At the beginning of the trip, I knew about people in Africa and how they were poor. But I was still surprised to learn that most of the patients we saw had never been to a doctor before. Their closest hospital was at least five miles away, which makes a long journey on foot. Even at this hospital, there are only one or two doctors working at a time, and there are typically not enough beds for everyone. It is also very expensive and those in need cannot afford to go. Knowing that this is reality for so many people in the world was

saddening. I now realize how fortunate I really am.

After this experience in Africa, I want to explore the world and help others while doing it. There is so much that we don't know about, and so much that can be done to help those in need. I really hope I can head back to Africa in the future and continue to help those who need it the most.