

M-HEAL Winter 2015 Newsletter

University of Michigan * College of Engineering * April 2015



Letter From the Presidents

Amanda Ejups * Ryan Thomas



Dear M-HEAL Community and Friends,

The 2014-2015 school year has been another busy and successful year for M-HEAL! Over the fall and winter semesters, M-HEAL has expanded to eight project teams and over 130 members from across campus. We have strengthened our partnerships with other organizations, such as World Medical Relief, with whom we have begun a domestic project working on facility planning for their new location. M-HEAL hosted a

successful third annual Global Health Symposium in partnership with Timmy Global Health with the theme, Unpacking a Professional's Kit: Actions and Solutions in Global Health.

Another success this year was the first annual Service Abroad and Needs Assessment (SANA) trip to Antigua, Guatemala. This trip was comprised of sixteen members, representing various project teams, who performed needs assessment in order to prompt the development of new project teams for M-HEAL. They discovered the major challenges were related to upper respiratory infections, anemia, poor hygiene, and scarcity of diagnostic tools. The team that developed after the trip, the Guatemala Team, is currently filtering their need statements as they navigate the front-end of the design process. M-HEAL is excited to continue the annual SANA Program and will soon decide on next year's destination!

To provide more structure for our project teams and enhance the M-HEAL experience for every member, we have developed the M-HEAL Design Framework. This Framework is a comprehensive, living document that details the design process of M-HEAL, which is centered around a three-phase process: Define, Design, and Deliver. With the aim to develop members' skills in leadership, communication, engineering, diversity, and research and best prepare them for their future careers, the Framework targets the unique M-HEAL process, including design ethnography, regulatory pathways, humanitarian design, and entrance and exit strategies.

M-HEAL has grown significantly over the past year and augmented its presence on campus, and we've gained four new project teams: the Guatemala Team, The Initiative, Life Lamp, and the World Medical Relief Team. With a unique history, a dynamic present, and a promising future, we are excited for what the next year will bring for M-HEAL and for every one of its members.

Be sure to check out our website at www.mheal.engin.umich.edu, like us on [Facebook](#), follow us on [Twitter](#), and join our [LinkedIn](#) page. Feel free to reach out to the M-HEAL Executive Board by emailing mheal-contact@umich.edu with any questions or comments.

Sincerely,

Amanda Ejups and Ryan Thomas
Outgoing and Incoming President

Project Teams

Medical Device Repair Collaborative

By Madeline North

This semester has been great for MDRC, as we have made considerable progress towards our goal of improving the ability of hospitals in low-resource areas to treat their patients. We have partnered with the World Medical Relief to assist in their endeavor to send repaired medical devices to countries that need them most. The members had a fantastic time interacting with the staff, and gained valuable hands-on experience working with various medical devices, such as patient monitoring devices and blood pressure cuffs. Additionally, members attended a shadow session at the local Veterans Affairs Hospital, where they observed and interacted with practicing biomedical technicians during their workday. Moving forward, MDRC aims to help its members develop their technical and professional skills through device repair workshops, increase community outreach and philanthropic service, as well as continue to educate its members on global health and policy. We are also looking forward to a partnership with Project CURE and a possible trip to Chicago to volunteer with the organization during the fall semester. After such a successful semester, we look forward to expanding our opportunities and working towards our team goals.



Members of the Medical Device Repair Collaborative work on repairing and preparing EKG machines for shipment to the Philippines at the World Medical Relief (WMR) facility in Detroit.

WMR is an organization that takes donated surplus supplies from hospitals and sends them to developing nations to be used.

Life Lamp

By Chris Hughes

We have been brainstorming possible design ideas and just recently have narrowed down the rough characteristics of our proposed solution. The design will feature a rechargeable lead acid battery, will have a four foot rigid frame, at the end of the frame will be a foot of flexible metal tubing with the lamp head, and finally the light source of our design will be from LED light bulbs. Using this criteria we will break up into sub-teams. Each sub-team will be responsible for designing and fabricating their assigned component. There will be three sub-teams: frame, wiring, and lamp head. During our weekly meetings our sub-teams will touch base with the whole team as far as how they are progressing and any issues they are facing. It is our hope that by using sub-teams we will operate more efficiently and have a working prototype by the end of winter 2016 semester.

Project Teams

Maternal Health

By Steven Houtschilt

As the end of the semester nears, MHEAL's Maternal Health Team, also known as Team Nica, is working diligently to finalize our summer trip details and deliverables. This year, we have successfully designed the gamma prototype to our portable gynecological exam table. The previous prototype was under twenty pounds and folded neatly so it could be carried in a large backpack. The gamma prototype improves on this design, adding a reclining back for comfort and for more visibility by health care practitioners, a smaller seat in order to save weight, and more stable legs. We will have the gamma prototype completely built, painted, and evaluated for safety with stress test software and physical weight testing. We are incredibly excited to send eight of our members, along with a translator, to several maternal health clinics in Nicaragua this May, to deliver this table to one of our partner clinics, bring donated medical supplies, get feedback about our beta prototype, and conduct another needs assessment to inspire future designs by our team. We are so grateful for the opportunity to travel this summer to meet with our stakeholders, improve our global perspective, and initiate a new direction for our team.



The past Maternal Health team that traveled to Nicaragua with an initial prototype of the examination table and backpack. They plan to go back this summer with a new prototype to leave at clinics as well as complete more needs assessment tasks.

Project Teams

The Initiative

By Brittany Gadigian

In November 2014, we founded our project team, The Initiative. Our goal since the beginning has been to create a purely organic project team—begin with a target community, determine a serious health problem, and implement a culturally acceptable solution. Initially, we partnered with Reimagine Haiti and focused on water purification in a village outside of Anse-a-Bef, Haiti. After weeks of acquiring funds and conducting preliminary research for our initial needs assessment trip intended for Summer 2015, the University's restricted travel list was brought to our attention. As a brand new team, we were unaware of the University's restriction on travel to Haiti (can't blame the newbies, right?) and our project quickly dismantled. Luckily, with a team as eager as ours, we decided to take another approach. Rather than focusing on an area initially, with the help of University faculty, we shifted our focus onto a new project idea. Although we side-stepped our initial task, we believe this slightly different tactic will be more effective due to the problem's universality. What's the problem? Infant mortality. What's the solution? A hybrid infant warmer. By combining kangaroo care (skin-to-skin warming) and a stand-alone infant warmer, we hope to significantly lower the infant mortality rate in our target area. We plan on adhering to our organic philosophy, however, and we will not move forward with the design process until we have a target area we know has a dire need for our solution and will also accept it culturally.

BluCircle

By Jaclyn Kawwas

Our team is composed of nine undergraduate and graduate students from different engineering disciplines and biological sciences working to accomplish the goal of unmet medical needs in hospitals and clinics in the developing world. The three project leads are seniors Hope Tambala, Kristina Kim, and Ryan Schrader. Other outstanding members include Gauri Sadalgekar, Jaclyn Kawwas, Brennan Garrett, Brianna Wolin and Steven Peterson.

Due to limited access to hospitals and clinics, many people in the third world go undiagnosed with diabetes and may suffer a shorter life as a result. Though diabetes can be easily managed through medication and careful diet, if the patient is not aware of the disease, they could experience a dramatically decreased quality of life. BluCircle's mission is to develop an innovative design for a non-invasive blood glucose detector targeted towards people in third world countries with a high potential risk for type-2 diabetes, as well as to bring forth overall awareness of diabetes.

In order to accomplish this, we developed a design approach, switching from near infrared spectroscopy to a non-invasive glucose biosensor using saliva analysis. With this approach we can plan on a more technically feasible solution that can reach suffering undiagnosed diabetics worldwide. We are currently determining which countries would be most feasible to travel to.

In the future, BluCircle seeks to expand its team from nine members to fifteen or sixteen members with the new project leads Brennan and Gauri. We plan to work on this innovative detector this summer in order to be prepared for the upcoming semester. We are excited for the future of BluCircle and all of its upcoming successes.

SANA

Michelle Bakker * Trish Dine * Emma Kellenberg Callewaert

Over spring break M-HEAL's Service Abroad and Needs Assessment (SANA) program sent its first group of students to Antigua, Guatemala. The team of sixteen students was divided into two groups, one working in the morning and the other in the afternoon. Both groups volunteered daily in community centers where they performed health awareness skits and distributed anti-parasitic medication, vitamins, and dental supplies.

While in these health outreach programs, members shadowed a local doctor who provided basic health care examinations for community members. During this time, members conducted needs assessment through observations of clinical practices as well as interviews with the doctor and local medical specialist, Jorge.

The team identified four key health care challenges in these communities: upper respiratory infections, anemia, and a lack of diagnostic equipment and hygiene education. As eloquently put by one of the SANA members, "Even with such limited supplies and support, the individuals and organizations we worked with were still able to help hundreds of patients in just one week." In the future, this team plans to return to these communities – hopefully next time with a viable engineering solution that could address the needs of these communities and continue our work with Máximo Nivel. With the success of this first SANA spring break trip, M-HEAL now plans on making this an annual event available to all its members.



The Guatemala Project Team is a new project team that formed this semester as a result of the Service Abroad and Needs Assessment (SANA) trip to Guatemala over spring break. The team is comprised of eight members—six undergraduate and two graduate students—who were all part of the SANA team. In the short time that the team has been together, we have developed our needs statements, established our preliminary goals, and created contractual agreements for team members and general practices moving forward. We are currently in the process of improving and filtering our needs statements into several categories and ranking them based on team interest, data availability, and other components of our selection rubric. Given that our team conducted a very extensive needs assessment while in Guatemala, we have information about many facets of the Guatemalan healthcare system and are working to narrow our focus to one needs statement concerning a specific aspect of healthcare such as diagnostic tools, maternal health, anemia, etc. To narrow our focus, we will be conducting a literature review over the summer to gain a better understanding of our prospective focus beyond the information we gathered through observation and interviews. By the beginning of fall semester we will begin to develop design concepts and complete design workshops on topics such as SolidWorks.

Global Health

Global Health Symposium

By Maggie Covello

This past March M-HEAL, in collaboration with Timmy Global Health, presented the third annual Global Health Symposium under the theme of *Unpacking a Professional's Kit: Actions and Solutions in Global Health*. This year's event was a great success with about 100 students attending, both from within the two organizations and just as members of the Michigan community who were interested in global health. The symposium this year presented both medical and engineering perspectives on creating solutions in international settings, as both offer important perspectives to global health projects.

Dr. Ramadhani Abdallah Noor and Dr. Utibe Effiong are both alumni of the Aspen Institute for New Voices, which is an organization that brings together standout development professionals from the developing world, and they are also both doctors focused primarily on public health. Dr. Utibe Effiong, who is originally from Nigeria, focuses on prevention of chronic diseases in developing nations, specifically diabetes, one of the fastest growing health challenges in Africa. He introduced attendees to the intertwined relationship of government policies and medical conditions in developing conditions. Dr. Ramadhani Abdallah Noor, originally from Tanzania, co-founded the Malaria Control Forum, which brings together scientists, researchers, government officials, and the media for updates and discussion of malaria control tools. His extensive cultural and field experience provided attendees with a unique perspective on work in a low-resource setting. The third and final speaker was Dr. James Holloway of the University of Michigan who has experience working in communities in Africa and Asia, and was able to provide a unique engineering perspective at the symposium. He spoke about the multiple failures of attempted international projects and what can be learned from them, emphasizing the need to take into account the local culture, customs and needs when looking at solutions.

The symposium introduced more students to the growing field of global health and the interdisciplinary aspects it encompasses and hopefully further motivated members to get more involved with M-HEAL project work, as well as be inspired to take a more in-depth look at the world of global health.



Incoming External Vice President Jennifer Lee asks a question during the discussion period.



Dr. Utibe Effiong presents during the symposium. Dr. Effiong is a Master's student at the School of Public Health at the University of Michigan.

Global Health

Humanitarian Technology Institute Seminars

By Sanjana Murali

This year, M-HEAL had the opportunity to further understand the design process through our connections with the Humanitarian Technology Institute (HTI). We attended three seminars created by HTI that detailed design ethnography and its various components, like gathering data about what health inequities exist in underdeveloped communities and how to systematically use that data to create a viable engineering solution.

Our connections with HTI have allowed us to develop focuses for various project teams, both new and old, and have revolutionized the way M-HEAL approaches projects. Project teams have gone to consultation meetings with various directors in HTI and have gained their perspectives on how to make our design processes line up with the standards that companies use. Older teams have gone to these consultations to define testing procedures on their prototypes, whereas newer teams have narrowed down their design concepts through the advice provided by the directors of HTI. Additionally, SANA travelers experienced the needs assessment processes detailed in the seminar firsthand while they were in Guatemala. SANA travelers were able to create interview guides to meet with patients and doctors, and they learned how to consolidate observations and data into spreadsheets for later use – tasks that M-HEAL initially became familiar with through these seminars.

Our relationship with HTI has had tangible impacts on the way M-HEAL project teams are organized and what these teams can accomplish. HTI has provided us with numerous resources, helping us ensure the success of our engineering innovations.

Giving to M-HEAL

M-HEAL greatly appreciates all financial contributions of materials, supplies, and time.

Your contribution is invaluable to M-HEAL as it continues to advance healthcare in the communities it serves across the globe. Your donation will be directly used to fund our teams' trips abroad as well as trips to conferences and design competitions across the country.

If you or your organization would like to make a tax-deductible contribution to M-HEAL, you can do so at: <https://leadersandbest.umich.edu/find/#!/give/basket/fund/932001>. Feel free to indicate the direct purpose of your donation in the comments section of the form. If you have any questions, feel free to contact us at: mheal-contact@umich.edu.

M-HEAL is a student organization at the University of Michigan and is sponsored by the Department of Biomedical Engineering with 501(c)3 status as not-for-profit.

Thank you for your support!

Thank You

Thank you to everyone who contributed to M-HEAL this semester to make our vision possible. Special thanks to the Department of Biomedical Engineering, the College of Engineering, Engineering Student Government and Central Student Government for their contributions to our organization. M-HEAL would also like to thank the Humanitarian Technology Institute for their mentorship and dedication to the project teams.

The SANA trip would like to thank all those who made the trip possible and to all the external supporters that helped the team while abroad. Specifically they would like to thank the College of Engineering, Engineering Student Government and the Ginsberg Center. They would also like to thank World Medical Relief, the University of Michigan Hospital System and the Biomedical Engineering Department for their donations of medical supplies.

As the year comes to an end, M-HEAL wishes all of our graduating seniors good luck with their future endeavors.

Thank you to all members of M-HEAL, our advisors, and all contributors within the University of Michigan and beyond for your participation in M-HEAL's success this year.



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