

PROGRAMS/PROJECTS DESCRIPTION

Design projects:

1) EWH Vaccine Storage & Delivery Device Team (September, 2014–Present)

As part of our mandate to foster the development of innovative solutions to world health problems, we developed a partnership with the Engineering Science Department at our university. Through this partnership, we were selected to serve as clients in a year-long senior level engineering design course (BME479) and put forth a request for proposal. A team of four 4th year engineering students responded to our request for the design of a vaccine carrier system. Over the course of the last 7 months the group has worked, under our supervision and feedback through regular meetings, to develop an innovative design and prototype. The details of their proposed design can be found in the attached proposal. The team has been entered in the annual EWH design competition and they continue to work on benchmarking their design against vaccine carriers currently in use in Nigeria, their region of interest. The student team presented at the EWH Symposium held at University of Toronto and got very positive feedback as well.

2) STEM Kit Design in collaboration with Let's Talk Science (January, 2015–Present)

Getting students excited about science is essential in increasing participation in STEM fields. In particular, global health education is the key to inspiring and empowering students to improve health care around the world. In order to achieve these goals, we designed an educational kit for Let's Talk Science that teaches students about the science behind malnutrition, a prevalent global health issue. The kit will be used in grade nine and ten science classrooms across the Greater Toronto Area. The primary objectives for the kit are (i) engaging for target audience (ii) simple to use (iii) durable and (iv) easy to transport and store. The kit is structured as a one-hour long hands-on classroom activity. We used structured brainstorming and multi-voting to develop five valid alternative designs. A weighted decision matrix based on the relative importance of each objective was then used to choose the best design. The two designs that received the highest scores were "Food Calorimetry" and "Iron Deficiency and Malnutrition". We recommend the "Food Calorimetry" design, in which calorimetry is used to measure the energy content in food, because it is most engaging and most suitable for a classroom activity. The alternative design calculates the amount of iron in cereal using magnetism, and is a viable second option. The selected design will be constructed and implemented in classrooms to assess its ability to convey the scientific aspects of malnutrition to students.

Kit builds:

Upon recruitment, we quickly realized many of the students had little to no experience with electrical circuits and soldering. Since familiarity and experience with handling electric circuits is an integral aspect of equipment repair, we decided to teach our membership how to construct and solder basic circuits through a series of introductory workshops with a focus on a hands-on learning approach to circuit building.

1) Engineering Workshop I (December 2, 2014)

We prepared a small lecture to introduce the concepts and uses of some basic circuit board components. The students then constructed 3 circuits on a breadboard based on the provided circuit diagram. We then, introduced the concept of soldering and the students practiced soldering wires onto a prototyping board.

2) Engineering Workshop II (March 5, 2015)

A continuation of the previous workshops, students moved straight into soldering, and many of the students were able to assemble a completely soldered circuit board.

Equipment repaired:

In order to repair medical equipment, our chapter attempted to form a partnership with a non-profit organization and provide student volunteers. These volunteers would help in repairing equipment brought in by the organization. We approached many organizations in Toronto, but unfortunately, were not able to find one that fit our requirements. Many organizations either only dealt with fully functioning equipment or did not have locations that were accessible to students in Toronto.

STEM activities: Please see the "Future activities" section for two upcoming STEM events.

Future activities:

1) Engineering Workshop III (to be held from 4:00-6:00pm on April 28, 2015)

Workshop III will have students bring in their circuit boards created in the previous workshop and have them test their circuits. We will introduce basic troubleshooting techniques and teach them how to remove and replace components on the circuit board.

2) Collaboration with Let's Talk Science (LTS): We intend to use the STEM calorimetry kit that our student team has designed along with the optical heart rate monitor and ECG signal generator kits we have built from EWH in STEM outreach events in Toronto schools. We are collaborating with LTS who have an extensive network with local high school science teachers.

3) Science Rendezvous (May 9 2015): The event is an annual, national science festival dedicated to promoting science and research in the community. It is primarily attended by school children. We are collaborating with the Biomedical Engineering Students Association (BESA) and showcasing interactive EWH kit builds at our booth.

4) Fundraising events for EWH UofT members accepted into the Summer Institute program: Three EWH UofT members were accepted into the Summer Institute program. First, we will raise funds from engineering departments. In addition, we will set up a donation portal on our website to get external funds. Finally, we will apply for on-campus funds for the three members.

ORGANIZATIONAL ACTIVITIES

Chapter Structure and Statistics:

The EWH UofT Chapter has three main organizational areas: **Engineering** - teach basic engineering skills to be able to evaluate and repair medical equipment; **Innovation** - design new technologies for global health applications; **Education** - raise awareness and educate students about healthcare problems in low and middle income countries. We also have two administrative focus areas: **Fundraising** (raise funds for Chapter activities) and **Communications** (event marketing via email list-serve, Facebook, Twitter and Chapter website). The EWH UofT Chapter is led by two co-Presidents and each of the five focus area teams is led by a Director. Overall, the executive board has 16 members. The EWH UofT Chapter currently has 182 undergraduate, graduate and post-doctoral members. We have had 19 executive board meetings so far (10/19/2013, 1/17/2014, 2/24/2014, 3/10/2014, 3/17/2014, 3/24/2014, 5/5/2014, 5/7/2014, 6/4/2014, 6/23/2014, 7/25/2014, 9/11/2014, 11/6/2014, 11/26/2014, 1/21/2015, 2/25/2015, 3/23/2015, 3/25/2015). The average attendance of these meetings has been 10-12 board members. All board meeting notes and focus area documents are organized in a shared digital OneNote Notebook and available for download from OneDrive that is accessible by all board members online.

Fundraising approaches:

We have raised funds from departments and on-campus competitions for student clubs. For departments, we tailor our fundraising activity to each of the following pillars – Engineering, Innovation and Education. We developed a fundraising package for each pillar at the beginning of the each term, and sent the fundraising packages to various departments and University of Toronto affiliated research institutes. We raised CAN\$1497.82 by this method. In addition, we have won five on-campus funding competitions, and raised \$2400 from those in total.

Other chapter activities (please refer to the ‘past events’ section on our website ewhuoft.sa.utoronto.ca for more information on each event):

1) **Documentary screening (August 22, 2014):** We screened ‘The Right to Heal’ — a documentary about the need for essential surgeries in developing countries and the devastating handicaps that result from what could have been fixed with a trivial surgical procedure. The group discussion afterward was engaging and insightful. Our first event of the year had a great turnout of ~30 attendees.

2) **Launch Party (October 17, 2014):** Our Launch Party was a great way for us to showcase our three pillars: Education, Engineering and Innovation to the U of T community. We had information booths for each pillar, attendees were able to take part in a mini-hackathon, play with circuits at our engineering booth and take part in a global health quiz to win prizes. This was also a great opportunity to meet the current members of the organization and sign up for available spots on the executive board. The event was successful, and we had ~50 attendees.

3) **EWH Summer Institute Info Session (November 12, 2014):** We had an info session given by Inka Johnson from EWH for those interested in applying to spend two months in Nicaragua, Tanzania or Rwanda. The event attracted ~12 attendees. Three of our members were accepted into the program.

4) **World AIDS Day (December 1, 2014):** We interacted with attendees at our EWH – U of T chapter booth and helped spread awareness about HIV and AIDS. All EWH – U of T executives attended the event.

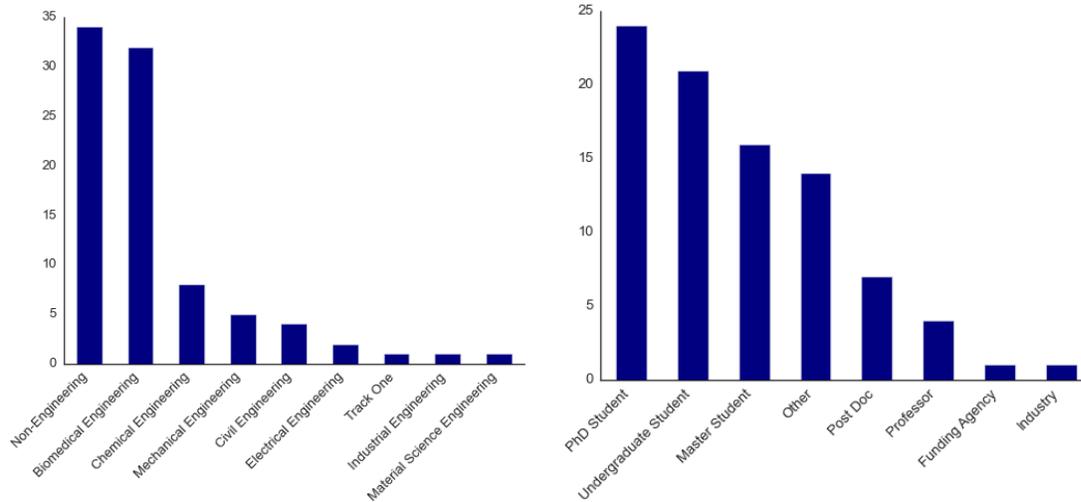
5) **EWH Annual Symposium (March 30, 2015):** The symposium spanned a full day of lectures, panel discussions, networking opportunities and a poster session. Participants had the chance to learn about exciting global health topics and network closely with leaders in the field. The conference brings together a diverse group of passionate scientists, government and industry representatives to promote world health to the next generation. The event was a huge success and saw ~100 attendees.

EWH CHAPTER FEEDBACK.

We are grateful for the support EWH has provided us so far in initiating our new student chapter. In particular, we really appreciated Inka Johnson’s visit to UofT to give an info session about the Summer Institute program. We could use more support in setting up and finding a non-profit partner for kit builds. Even if EWH does not have any partners in Canada, perhaps they could contact their US partners and see if they have branches or contacts in Toronto that would like to work with us.

APPENDIX - PHOTOS, TABLES, SCHEMATICS AND ADDITIONAL MATERIAL

- Slides from **Engineering** presentations (separate three files)
- Symposium Programme (separate docx)
- EWH UofT Chapter Constitution (separate docx from OneNote)
- Symposium registration breakdown statistics



- Storify link for Symposium (<https://storify.com/shukshre/engineering-world-health-2015-annual-symposium>)
- Website link (ewhuoft.sa.utoronto.ca), Facebook page link (www.facebook.com/groups/EWHUofT), Twitter handle (@EWHUofT)
- Vaccine team – poster, report (**separate files**)
- LTS team – poster, report (**separate files**)

1) Documentary screening (August 22, 2014)

Our first documentary screening showcased 'The Right to Heal', a documentary about the need for essential surgeries in low and middle income countries and the devastating handicaps that result from what could have been fixed with a trivial surgical procedure.



 **Documentary Screening + Ice Cream** 
Friday August 22nd at 5:30pm
Cumberland Room, Center for International Experience
33 St. George St., Toronto, ON M5S 1A4

We have just launched Engineering World Health at the University of Toronto—a student organization devoted to inspiring and mobilizing the U of T community to improve the quality of health care in hospitals and clinics in the developing world.

Join us for our first documentary screening this Friday, August 22nd. We will be screening *The Right to Heal*—a documentary about the need for essential surgeries in developing countries and the devastating handicaps that result from what could have been fixed with a trivial surgical procedure. Afterward, we will be holding a group discussion session for those interested, with ice cream! All are welcome!

Our first documentary screening is kindly sponsored by the Biomedical Engineering Student Association (BESA).

 www.facebook.com/groups/EWHUofT  [@EWHUofT](https://twitter.com/EWHUofT) ewh-uoft.strikingly.com



2) Launch Party (October 17, 2014)

Our launch party featured mini-hackathon challenges (biological waste translocation system and open source blueprint speed build), a basic electrical engineering station, and a “test your global health knowledge” questionnaire.

Engineering Innovation Education

Engineering World Health
University of Toronto

LAUNCH PARTY!

Friday October 17th 5:00–8:00pm Wallberg Building, Room WB215
184–200 College Street Toronto
ON M5S 3E5

We have just launched Engineering World Health at the University of Toronto—a student organization devoted to inspiring and mobilizing the UofT community to improve the quality of health care in hospitals in low and middle income countries.

Join us for our Launch Party on Friday, October 17th! We will have information booths for the three different pillars of our group: Education, Engineering and Innovation. We will also have a Mini-Hackathon (with prizes for the best ideas) and food and drinks. Come meet the current members of the group and sign up for available spots on the executive board.

This event is kindly sponsored by the Institute of Biomaterials and Biomedical Engineering (IBBME) and the Centre for Global Engineering (CGEN).

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3) EWH Summer Institute Info Session (November 12, 2014)

Inka Johnson, the coordinator of the EWH Summer Institute, came to UofT to tell us more about the exciting program where students can spend two months in Nicaragua, Tanzania, or Rwanda repair medical equipment in a hospital! This event led to the acceptance of three UofT students: Jiaqi Huang, Sandra Fiset, and Jessica Tomasi. Congratulations!



Want to spend 2 months in Nicaragua, Rwanda, or Tanzania?
Want to work in local hospitals repairing vital health technology?
Come join us and find out how!
Refreshments will be served!



4) World AIDS Day (December 1, 2014)

We took part in the annual University of Toronto World AIDS Day, interacted with attendees at our EWH-UofT chapter booth, and helped spread awareness about HIV and AIDS.



5) Engineering Workshop I (December 2, 2014)

For the first of the learn-and-build series, we learned all about resistors, capacitors, and transistors and spent most of the time gaining experience on how to assemble components together on a breadboard based on a given circuit diagram.



Building global health one circuit at a time

Engineering World Health UofT aims to inspire and mobilize the student community to improve health care in low- and middle-income countries.

For the first of the learn-and-build series, we will be providing an introductory course on circuits. We will cover how to read circuit diagrams, identify and learn the function of basic electronic components, and get a taste of integrating components onto a circuit board. Non-engineering students are welcome as well!

Spots are limited, be sure to register at our website EWHUofT.sa.utoronto.ca to reserve your spot!



**Engineering
World Health**
University of Toronto

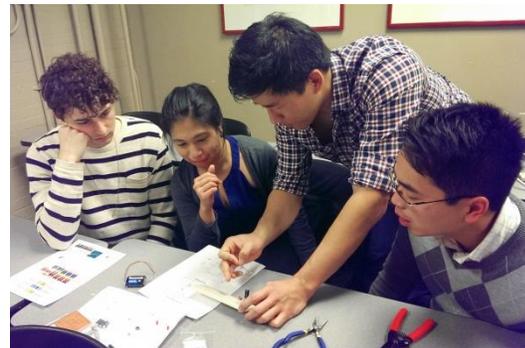


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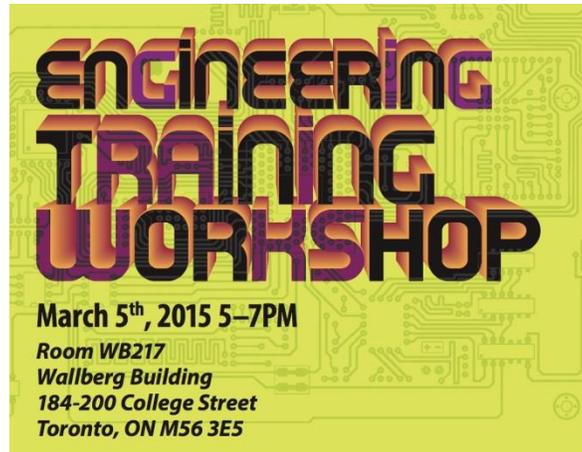
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6) Engineering Workshop II (March 5, 2015)

In the second installment of the engineering workshop series, we concentrated on more hands-on learning of circuit building. The focus this time was more on soldering and many participants were able to assemble a completely soldered circuit board which they took home.



**ENGINEERING
TRAINING
WORKSHOP**

March 5th, 2015 5–7PM
Room WB217
Wallberg Building
184-200 College Street
Toronto, ON M56 3E5

Building global health one circuit at a time

For the second instalment of the learn-and-build series, we will master the skills required to integrate components on a circuit board. Building upon what we learnt previously, we will be prototyping a basic circuit, while spending the majority of the time gaining some hands-on experience. We will provide a quick overview at the beginning, so don't worry if you missed our last workshop! Non-engineering students are welcome as well!

Spots are limited, so please be sure to register at our website EWHUofT.sa.utoronto.ca to reserve your spot!



**Engineering
World Health**
University of Toronto



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5) EWH Annual Symposium (March 30, 2015)

We organized the first annual Engineering World Health Symposium at the University of Toronto, highlighting our overall vision of our chapter—to inspire and mobilize the UofT community toward solving global health challenges. We invited a variety of speakers from academia, government, and not-for-profit organizations, to give guest lectures and participate in panel discussions, and held a poster session to showcase the fascinating global health research being developed at UofT. We also hosted a networking reception to connect students with global health experts, and create new opportunities for collaborations.



Registration and poster abstract submissions by March 26th at EWHUofT.sa.utoronto.ca

Engineering World Health Symposium

Meeting global challenges. Creating global opportunities.

MARCH 30TH, 2015 • 8:45AM-6:30PM
William Doo Auditorium
45 Willcocks St.
Toronto, ON M5S 1C7

FEATURED TALKS INCLUDE:

- "Global health: Technology if necessary, but not necessarily technology"
Dr. Yu-Ling Cheng
Director, Centre for Global Engineering
- "Creating a pandemic of health"
Dr. Alejandro Jadad
Founder, Centre for Global eHealth Innovation
- "Cells are cheap: Towards synthetic biology solutions to health problems"
Dr. David McMillen
Asso. Professor, Department of Chemical and Physical Sciences

Free Registration & Lunch • Networking Reception • Poster Prizes

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