



engineeringworldhealth



Annual Report
October 2017—September 2018

Letter from the Board Chair and the CEO

Dear Friends of Engineering World Health,

Do engineers build bridges?

It seems like there's an obvious answer.

But Engineering World Health takes a different approach: we build bridges among people.

Our engineering student volunteers and our instructors connect with the communities in which they work. In teaching and learning how to fix hospital equipment, they save lives. And their own horizons – as engineers, and as citizens – are forever expanded.

As a friend of Engineering World Health, you know EWH fixes vital hospital equipment. **In 2018, our 175 engineering student volunteers fixed 2,036 machines worth approximately 4.1 million dollars.**

That's a major contribution to public health in the countries in which they served: Rwanda, Tanzania, Uganda, the Dominican Republic, Guatemala, Cambodia, Nepal, and Mongolia. But they did so much more.

Equipment donated to low-resource hospitals often arrives without instructions for use or manuals for set-up, maintenance, or repair. EWH Institute participants reach out to manufacturers and scour the internet (including our own BMET library) to find them. Often, they translate them into the local language to make them accessible to the technicians and nurses in their hospital. In 2017, one team in Nicaragua went above and beyond: one participant translated a manual from Mandarin to English, and her partner then translated it into Spanish.

Participants teach local technicians and medical staff. In 2018, a team in Tanzania found that their hospital had almost no working oxygen concentrators. They traced the problem to the filters that were never changed. So, in partnership with their hospital's administrators, they held a class for over 30 nurses and doctors to demonstrate how to clean the filters, and the importance of doing so.

And they leave behind knowledge in the form of quick start guides – “how to” instructions, in English and the local language, attached to the machine, on how to start it, use it, and do basic maintenance.

The exchange of knowledge goes both ways: in Uganda in 2017, engineer Yosiah taught Institute participants how to recycle and reuse plaster of paris, which is used in making molds for prosthetics. After testing to validate and build on Yosiah's technique, participants were able to share this information with another clinic with which they worked.

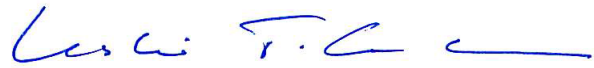
Engineering World Health is also proud of our record of world-class, formal instruction of local technicians, who are responsible for repairing and maintaining equipment, but who have little-to-no formal training. Over the past four years, EWH built a training program at Lagos University Teaching Hospital that graduated more than 80 biomedical engineering technicians to international standards. Continuing EWH's major contribution to public health and educational opportunity, the University now offers accredited 2-year and 4-year degrees in biomedical engineering.

Of course, we couldn't do it without you. Whether you're a volunteer, parent, educator, or supporter, it's you who keeps us going and growing from year to year.

To your good health,



*Michael R. Tracey, Ph.D.
Chair of the Board of Directors*



*Leslie J. Calman, Ph.D.
President and CEO*



Our Mission

To inspire, educate, and empower the biomedical community to improve healthcare delivery in the developing world.

Engineering World Health:

- Provides students from around the world with the life-changing educational experience of repairing vital medical equipment in the world's most resource-poor communities.
- In collaboration with local partners in Asia, Africa, and Central America, creates locally-sustainable training programs for biomedical engineering technicians (BMETs).
- Engages the next generation through K-12 STEM (science, technology, engineering and math) curricula, university chapters, and design activities to improve global health.

EWH believes we have a responsibility to stay true to these values:

- Ensuring a scientifically-based and creative educational experience.
- Leaving the communities in which we work with greater capacity than we found them.
- Finding workable solutions through innovation and creativity.
- Serving while partnering with local educators, hospitals, and clinics.
- Promoting self-reliance and capacity building.
- Providing challenge without compromising safety.



Summer & January Institutes

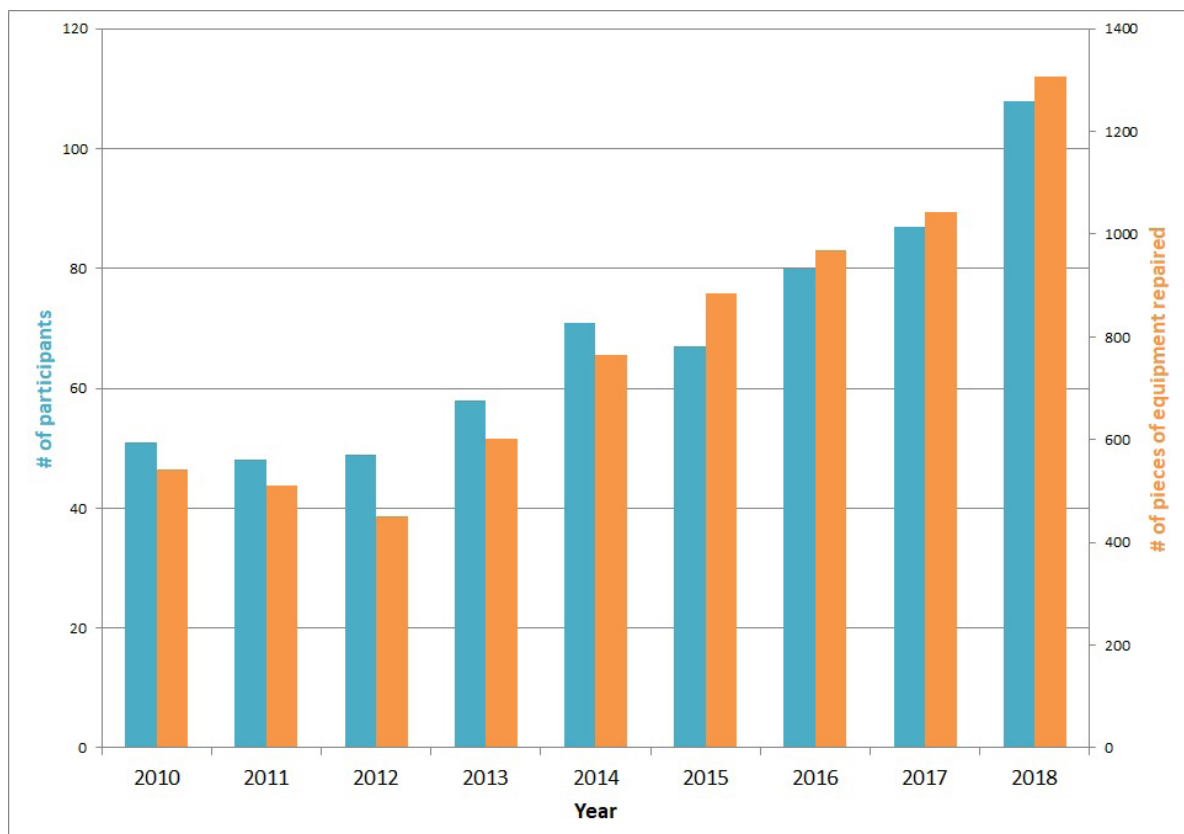
The EWH Summer & January Institutes recruit exceptional students to live and work in developing countries, fixing equipment, training and learning from staff, and experiencing first-hand what low-resource hospitals need so that as they go forward in their engineering careers, they can creatively meet those needs.

175 volunteers joined the Summer & January programs in eight countries this year. The participants, 50% of whom were women, carried passports from 18 countries and represented over 30 universities. Together, they repaired 2,036 pieces of equipment, worth an estimated \$4.1 million.

In 2018, EWH ran three January Institutes and seven Summer Institutes. To reach more communities, we have expanded our university partnerships to include Duke University, Texas A&M University, the University of New South Wales, the Technical University of Denmark, the Nordic Five Tech Alliance, Rochester Institute of Technology, George Mason University, the University of Portland, the Catholic University of America, and Makerere University.

EWH thanks Maddy Bishop-Van Horn, who has done incredible work as our Institute Manager over the last two years. As 2018 comes to an end, we wish Maddy the best in her future adventures, and we welcome Megan Lavery as our new Institute Manager in 2019.

Institute Growth by Number of Participants and Equipment Repaired, 2010-2018





“One of my favourite accomplishments was presenting an educational seminar on the proper cleaning of medical equipment to over 100 hospital staff. Another was when we fixed two infant warmers in the Maternity Ward that were not in use. The ward previously had no functional infant warmers and they were being used only as cradles.”
 — Laurence Boss, Cambodia

January Institute Country	University Partner	Number of Participants	Pieces of Equipment Returned to Service	Estimated Value
Cambodia	UNSW	34	306	\$580,000
Uganda	UNSW	21	334	\$668,000
Guatemala	RIT & GMU	12	90	\$172,000

Summer Institute Country	University Partner	Number of Participants	Pieces of Equipment Returned to Service	Estimated Value
Guatemala	-	10	67	\$134,000
Dominican Republic	UP & Catholic U	11	76	\$152,000
Rwanda	TAMU	18	235	\$470,000
Uganda	Duke	16	205	\$410,000
Tanzania	Duke	22	433	\$866,000
Nepal	Nordic 5 Tech	21	216	\$432,000
Mongolia	Nordic 5 Tech	10	74	\$148,000

“The Summer Institute program taught me a lot about being a better human in general. I thought a lot about the ripple effects of what we were doing – what it means to keep that equipment working.”

— Chris Largaespada, Guatemala



“I enjoyed all the medical equipment fixes, but mostly importantly I got to learn a lot and take home lessons that can help in my home country, Bhutan.” — Prabha Katel, Rwanda



“EWH is really special because of the cultural assimilation part. I’ve met a lot of other volunteers who are here for 2 or 3 weeks, but they can’t communicate with the staff so they can’t figure out what’s needed. We learned enough during the first month to be able to greet people, and that makes folks willing to talk with us – and that’s made us really effective in our work.”

— Grace Shen, Tanzania

“My biggest accomplishment during the program was to instruct the technicians so that they can do the fixes without us in future.” — Roshan Pokharel, Nepal

“I gained a lot of confidence in my engineering abilities and it made me feel that I could actually make an impact on the world.

— Julia Estrin, Rwanda



“The dental ward had been neglected for some time, so when we came in to fix the dental chairs, the staff was very receptive. We didn’t fix anything on our first visit - and they were left disappointed. But we came back subsequent days with a mission to get the chairs working, as they only had one fully functioning chair. After getting spare parts and help from the On-the-Ground Coordinator, we managed to bring 3 chairs into operation. The smiles on their faces was enough to know how helpful we were to the ward. It was very satisfying to have contributed something positive to that ward.” — Sandy Muchtarudin, Uganda



“The most valuable part for me has been all that I have learned during this program. Not just technically, but also about what it takes to run a professional hospital, the importance of hospital management, and donation policies.” — Bo Hansen, Mongolia



Chapters

University Chapters raise awareness among students regarding healthcare challenges that beset the developing world and the medical technology issues unique to resource-poor settings. Participation in EWH Chapters helps students connect to a global network of biomedical engineers committed to solving health challenges and introduces them to ways they, too, can make a difference.

In 2018, 50 student chapters from universities all over the world affiliated with EWH.

US Chapters

Arizona State University
 Boston University
 California Polytechnic Institute-San Luis Obispo
 Clemson University
 Cornell University
 Duke University
 Elon University
 Georgia Tech
 Johns Hopkins University
 McMaster University
 Michigan Tech University
 North Carolina State University
 Northeastern University
 Northwestern University
 Purdue University
 Rose Hulman Institute
 St. Philip's College
 SUNY at Buffalo

Syracuse University
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 University of Bridgeport
 University of Illinois-Chicago
 University of Kentucky
 University of Maryland
 University of Minnesota
 University of Missouri-Columbia
 University of North Carolina
 University of Portland
 University of Texas-Austin
 University of Texas-Dallas
 University of Vermont
 Vanderbilt University
 Virginia Commonwealth University
 Washington & Lee University
 Washington University in St. Louis
 Western New England University

International Chapters

Autonomous University of Mexico State
 Chung Yuan Christian University, Taiwan
 Makerere University, Uganda
 Technical University of Denmark

University of Aalborg, Denmark
 University of Ghana
 University of New South Wales, Australia

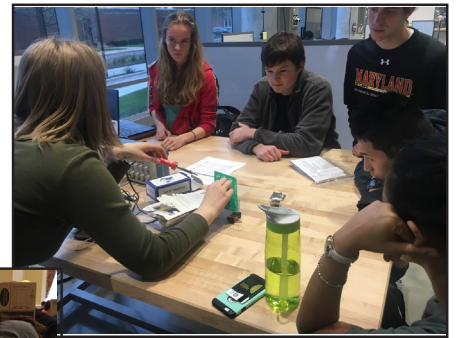
EWH University Chapters provide students with the unique opportunity to participate in a variety of student programs:



The Makerere University Chapter held its second annual Freshmen Challenge Design Competition. Here, Team BOE stands with the Organizing Committee. The team designed a Body Rehabilitation Bed to help patients with low limb function and partial paralysis.

The University of Maryland Chapter held a Kit Build with its Chapter members, assembling EWH's ECG Simulator Kit. They also worked with the Makerere Chapter to design improvements for wheelchairs donated to Uganda.

The UMD Chapter won 2017-2018 Chapter of the Year!



Design Competition — EWH Chapters are invited to participate in our annual Design Competition for cash prizes. Through extensive interviews with healthcare providers in developing countries, EWH identifies healthcare needs specific to the developing world and then challenges teams to design new technologies that might deliver the most positive impact for patients in these settings.

The 2018 winners are:

1st place: Purdue University Chapter, Dry Heat Sterilizer

2nd place: University of Illinois Chicago, Hearing Test Device

3rd place: Rose-Hulman Institute, Jaundice Detection app

Honorable Mention: Makerere University, Incubox Innovation

BMET Training & Support

While our Summer & January Institutes teach university students the impact of their engineering work and the value of good design in order to foster the next generation of engineers, EWH also works to build more sustainable healthcare systems right now.

In partnership with the GE Foundation, Duke University, in-country educational institutions, and local Ministries of Health, EWH has completed Biomedical Equipment Technician (BMET) Training Programs in 6 countries — Rwanda, Honduras, Ghana, Cambodia, Nigeria, and Ethiopia — teaching local hospital workers and students to become fully qualified BMETs. Each program is specifically designed to fit the needs of the local population. We also train future trainers to take over the program, with the ultimate result being that we leave the countries we work in with a sustainable source of well-trained BMETs.

Highlights of 2018:

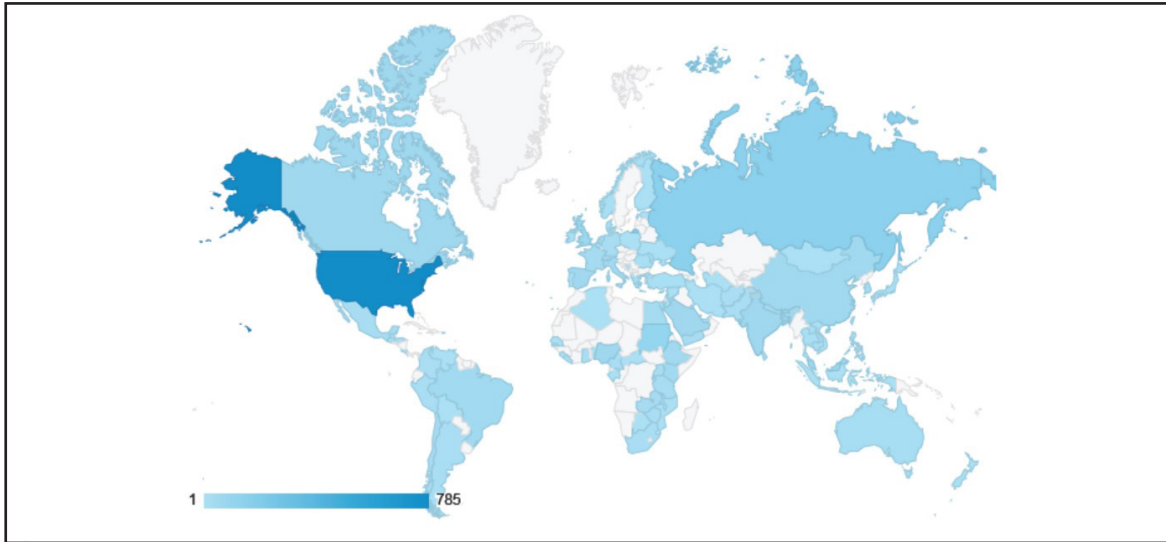
Nigeria — This year, we concluded our work in creating a sustainable BMET program at the Lagos University Teaching Hospital.

Over 80 BMET students have graduated, and the university will continue the program.

A new class will begin in 2019.



BMET Library Use By Country



BMET Library — Now in its third year, EWH’s online, open-access BMET Library continues to be a resource for technicians and engineers around the globe.

Nearly 1500 users visited the library this year, with Nepal, Malaysia, India, Nigeria, and Uganda among our top 10 user-locations.

The Library — which can be found at <http://library.ewh.org/> — now hosts over 450 items, including 40 complete books, 35 powerpoints, and 375 articles focused on troubleshooting, healthcare technology maintenance, and device repair. We expanded our Spanish section to include 49 items, and added a dedicated section for Summer & January Institute participants. They in turn share the library with the technicians with whom they work.

EWH also worked with Sarah Patterson of Arizona State University to test and refine her SolarSPELL device, which uses solar power to create a digital hotspot. She ran clinical tests in Rwanda and Tanzania in which Summer Institute participants were trained to assemble and use the device to access the BMET Library, and then introduced the device to technicians in our partner hospitals. Devices like the SolarSPELL may help improve access to resources like the BMET Library for those who don’t have reliable internet.



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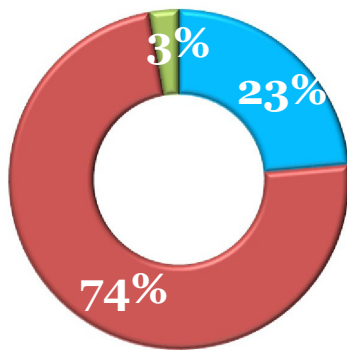
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Engineering World Health Statements of Financial Position

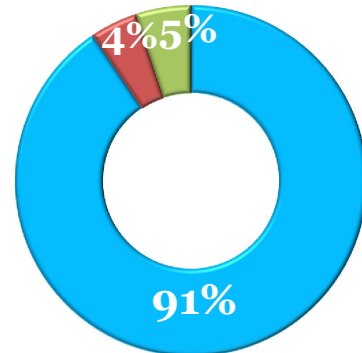
Statement of Activities	FYE 9/30/18	FYE 9/30/17
Revenue, Support, & Other Income		
Grants & Contributions	\$282,893	\$328,005
Program Fees	883,379	715,004
Investment & Other Income	33,433	51,725
Total Revenue, Support, & Other Income	\$1,199,705	\$1,094,734
Expenses		
Program Expenses	\$1,461,029	\$1,557,272
Management & General	70,187	86,871
Fundraising	81,862	74,042
Total Expenses	\$1,613,078	\$1,718,185
Net Assets		
Change in Net Assets	\$(413,373)	\$(623,451)
Net Assets at Beginning of Year	\$1,375,735	\$1,999,186
Net Assets at End of Year	\$962,362	\$1,375,735

Income



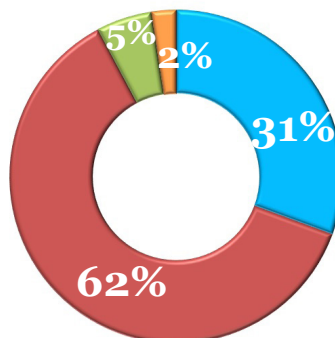
•Grants, Contributions •Program Fees •Investment & Other

Expenses



•Program Expenses •Management & General •Fundraising

Spending by Program



•BMET Training •Institute Programs •Student Programs •Other

2018 Funding Partners

Foundation and Corporate Donors:

Access Health Care Nepal	Henry E. Niles Foundation
Corning Foundation	Integra Foundation
Danaher	International Foundation
Derfner Foundation	MedShare
Ethicon, Inc.	National Instruments
FJC	Painter Family Endowment
Hamilton Roddis Foundation	Pinto Foundation Fund

Special thanks to the Wallace H. Coulter Foundation for the early and generous support that enabled us to grow.

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***Thank you to everyone who has supported
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Saving Equipment Is Saving Lives



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