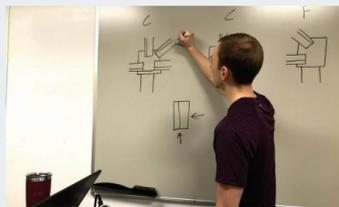


ANNUAL REPORT PROJECT HIGHLIGHTS

The school year of 2019-20 was suddenly altered in mid-March. Several projects that were scheduled to close at the end of the school year were able to continue their work and complete their project. (Note that all photos were taken in spring 2019 before masks and social distancing were required.)



Student Project Manager Justin Blest draws design



Location of Covenant Christian's future recreational area and covered walkway

One example of pressing on and finishing well during hardship was the **Covenant Christian Academy Civil Design Project**. The Collaboratory partnered with the academy in Harrisburg to develop plans for converting a parking lot into a recreational area, as well as an addition of a covered walkway. Consultant H. Edward Black & Associates provided invaluable guidance to the design plans.

Perfect timing! After several years of work the **Block Press Project** team successfully delivered two working block presses to partner Tim Johnston and Friends in Action in spring 2020. The presses will be used by the Rama people on the east coast of Nicaragua.



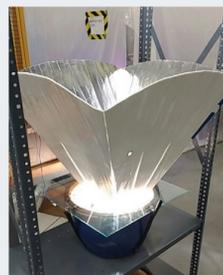
Project Manager Dr. Phillip Tan inspects block made with the press



Team prepares mud to use in block press



Solar oven prototype and sun simulator testing solar oven



Cone reflector on top of solar oven

Another project that completed its work during this fiscal year was the **Solar Oven**. The Collaboratory partnered with Go ED Africa and Dr. Michael Pucci to design a solar oven using locally sourced materials for use in Kiziba Refugee Camp, Rwanda. This will allow the community there to process tallow, providing them with a viable and sustainable livelihood.

COLLABORATORY PARTNERS - CURRENT AND FISCAL YEAR '20

Ability Prosthetics and Orthotics
AlignedWorks
Brethren in Christ Zambia
Burkina's Promise
Jerald Cunningham
Cary Cupka
Center of Hope
Centre for the Advancement of the Handicapped
Covenant Christian Academy
CURE International
Disability Services, Messiah University
Engineering Ministries International

Forward Edge International
Friends in Action International
Full Gospel Assemblies
David Germeyer
GO Ed
HALO Trust
Harrisburg School District
Hope Walks
IEEE Smart Village
In Peace and Love
International Nepal Fellowship
ITEC
Living Love Ministries

Macha Research Center
Medical Mission International
Mennonite Central Committee
Open Door Development, Burkina Faso
Rio Missions
Sheltering Wings
SIM: Open Door Development
Theological College of Zimbabwe
Trans World Radio
Tree4Hope
Wheels for the World/Joni and Friends
World Vision



THE COLLABORATORY FOR STRATEGIC PARTNERSHIPS AND APPLIED RESEARCH

One University Ave. Suite 3034
Mechanicsburg, PA 17055

Address Service Requested

DOKIMOI ERGATAI



WELCOME DR. DARREN HERCYK

By Sharlee Nye '21



Dr. Darren Hercyk, Collaboratory Director



Darren's wife, Lori, and children in Kenya



Darren with former colleagues in China

Dr. Darren Hercyk joined the Collaboratory as its new director during the summer of 2020. Prior to joining the Messiah family, Darren's career has spanned manufacturing, missions and global development, and higher education.

Integration of faith and work is a struggle for many believers, and Darren shared this changed dramatically for him when his employer relocated his family to China. In addition to Darren leading the engineering and maintenance departments at a manufacturing facility in China, his family was able to start a children's ministry at a local church. As Darren shares, "God gave us favor allowing us to serve. I learned in China that when you want to make lasting change, work through the local church. The ministry we started in China continues over 20 years later."

After their experience in China, Darren and his family transitioned to full-time global service in the areas of evangelism, emergency response, and long-term development. Over an 18 year period, they lived in China, Kenya,

Ethiopia, Zambia, Zimbabwe, Pakistan, Sudan, East Timor, Haiti, and Liberia. The work in these counties spanned from responding to emergencies like earthquakes and Ebola, to development programs in agriculture, education, water and sanitation, microfinance, shelter, and global health, to advocacy programs in justice and peace. Through all these experiences, Darren partnered with the local church.

As the new director, Darren clearly resonates with the values that the Collaboratory upholds and affirms in their commitment to Christian service. He shares, "Students in the Collaboratory learn how to integrate their faith and the gifts God has given them during their time at Messiah. These are important lessons that I only wish I had learned earlier in my professional career. The Collaboratory students will be ready to work and serve wherever God leads them."

A native of Upstate New York, Darren earned a B.S. in Mechanical Engineering from Rochester Institute of Technology and M.A.s in Christian Ministry and Global Studies from Liberty University. Darren

also completed a Doctor of Ministry (D.Min.) with his research focused on experiential learning to prepare students and the church for global engagement. Darren and his wife Lori have five children and two grandchildren. Darren and Lori are now happy to be residents of Central Pennsylvania and part of the Messiah family.

STUDENT VOICES Interviewed by Lindsay Coward '22

How does the Collaboratory strengthen your spiritual life?



Jordan Barner, '22
Panama Bridge

"The Collaboratory helped me strengthen my relationship with God by providing me with close friends and mentors who encourage me in strengthening my faith. It also gives me the opportunity to help others and see what a relationship with Christ can do to help build others up and grow."



Zach Holsinger, '21
Energy Monitoring and Management Systems (EMMS)

"Joining the Collaboratory has strengthened my relationship with God by equipping me with tools and resources to show his love to others through my role as a student. The clients and the work we have done on our team have deepened my understanding of the ability we have to experience God's love."



Gabi Griffith, '21
ROCK Team

"The Collaboratory allows me to grow closer to God by showing me how my engineering skills can serve his kingdom. Throughout my time on the ROCK team, I made valuable friendships that continuously point me to Christ."



Katie Rose, Dec. '20
Energy Monitoring and Management Systems (EMMS)

"Colossians 3:23 says, 'Whatever you do, work as for the Lord.' The Collaboratory helped me find a connection between engineering and my faith. I am more motivated to do my work because I am working for God's kingdom."

STAY CONNECTED: For regular updates and inside stories, follow us on these social media sites! We would love to hear your Collaboratory story.

facebook.com/MUCollaboratory mu_collaboratory
The Collaboratory for Strategic Partnerships and Applied Research

Our newsletter is printed on recycled paper, containing post-consumer fiber. It is 100% Green-e certified, Green Seal™ certified and made Carbon Neutral Plus. Please recycle when finished reading.

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STAY CONNECTED

GET INVOLVED

I am interested in volunteering on a weekly basis as a project manager.

I am interested in being a reviewer for project effectiveness and management. (1.5 hour, one-time commitment)

Contact me for other service opportunities. (Please fill out your contact information below.)

NEWSLETTER FEEDBACK

My contact information has changed:

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I'd like to receive this newsletter by email. My email address is:

Please remove me from your mailing list.

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Collaboratory
 Messiah University
 One University Ave. Suite 3034
 Mechanicsburg, PA 17055

You may also email your responses to collaboratory@messiah.edu.

YEAR IN REVIEW: A WORD FROM DERECK PLANTE



I keep hearing people say, "I can't wait for 2020 to be over so we can get beyond all of this." I admit that I have had similar thoughts, but I sense God may be disappointed with this thinking. God gives us daily opportunities to participate in his kingdom work and Collaboratory members continue to follow God's direction.

Our 30 teams worked with a renewed sense of excitement at the beginning of the previous academic year. In January 2020, our dedicated Mobility team, led by Dr. David Vader, traveled to Benin to work with fabricators from SIM Burkina Faso. Dr. Tim Van Dyke and I led an enthusiastic team to Nepal to continue our work on a new project designing a wheelchair,

and Doug Flemmens led the Economic Empowerment team to Algeria. In early February, the Collaboratory staff strategized how to support eight teams that were preparing to travel in May. These plans came screeching to a halt in March. Messiah sent all students home and transitioned to online instruction. All travel plans were canceled, and we contacted our many partners to give them the news.

COVID-19 continues to significantly impact all of us. In the face of great challenges and constant change, we remember that God is always working and is worthy of our praise. Many of us see these changes and challenges as bad things, but God can bring good out of anything. Our job is to continue the work that God has given us to do as much as we are able. Anecdotal reports indicate that families around the world are spending more quality time together, people are getting to know their neighbors, the vulnerable are being cared for, and people are realizing that life is fragile and precious.

At the Collaboratory this fall, 26 engineering projects move forward, and communication with our partners and volunteers encourages us. We are uncertain about when we can travel again, but we are certain that we have good engineering work to do right now. We are grateful for this work and the many dedicated students, faculty, partners, panelists, and volunteers that make up the Collaboratory family. Thank you for being part of our family and helping us to continue our work.

PROJECT HIGHLIGHT: LANDMINE NEUTRALIZATION AND HYBRID THERMAL LANCE

By Jane Mylin '21



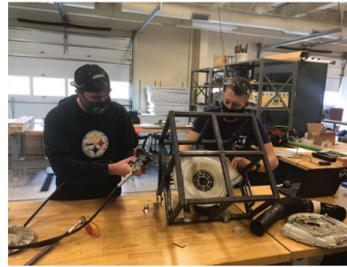
HTL team conducting a burn test

Each year, an estimated 15,000 to 20,000 people are killed or injured by landmines. A landmine is an explosive device concealed underground that is designed to kill or severely injure combatants in an armed conflict. Unfortunately, a large percentage of landmines remain underground for years after conflicts end, posing a significant hazard to residents of former war zones. Current estimates suggest that nearly 110 million active landmines remain in the earth, some dating back to World War II. (continued on next page)



Landmine Neutralization team testing hydraulic blower

Article continued from previous page



Working on placement to mount the blower and motor assembly within the protective cage

in the underground mine. HALO workers uncover the side of the mine, set up the HTL, and start a countdown sequence.

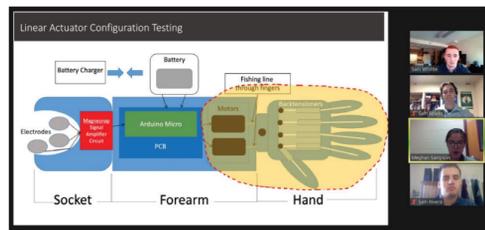
The HTL is a small, inexpensive way to destroy landmines that doesn't use any volatile materials, making it very easy to transport to other countries. "We want this to be completely open-sourced," says HTL student Project Manager Josiah Stitt. Once they achieve a reliable design, the team plans to publish the design so HALO can source its own local manufacturers.

The Landmine Neutralization team is designing a remotely controlled air excavator that will help to remove dust and debris from destroyed buildings. These environments are very dangerous for deminers, as the accumulated dust and debris make it difficult to locate explosives throughout the infrastructure. The air excavator consists of a cage containing the components of the power source, which is then mounted to the rake of an excavator. Looking ahead, the team plans to attach an arm to the cage for increased mobility, and attach a camera to the arm to make it easier to locate the landmines.

Landmines are a threat to the safety of millions of people today, and children account for a significant percentage of landmine casualties. Refugee children, in particular, fall victim to landmines – upon returning home, they are often unaware of new hazardous areas. The Collaboratory, the HALO Trust, and other organizations work around the globe to make the world a safer place to live. We are glad that even during this time of COVID-19 the project teams can continue their work on campus to help solve this world problem.

THE COLLABORATORY MOVES FORWARD DURING THE PANDEMIC

By Sharlee Nye '21



Fall 2020 the Muscle-Activated Prosthetic team leads their Project Review Meeting by Zoom.

The annual School of Science, Engineering and Health Symposium was conducted in a very different manner necessitated by the Coronavirus. The symposium allows junior and senior engineering students to present the progress of work on a Collaboratory project. Instead of occurring in Frey Hall with live presentations and many parents and local professionals attending, the 2020 symposium was conducted virtually. Each student made a video to present their project and a live question and (continued on next page)

Project Manager, Dr. Don Pratt recalls witnessing children in Cambodia traipsing through a landmine-affected area. "Seeing the kids run around in these areas made me sick, angry, and motivated to do something," he says. Pratt's experiences inspired him to develop two projects, Hybrid Thermal Lance (HTL) and Landmine Neutralization, to create devices to aid in the safe destruction of landmines.

Most landmines are destroyed using other explosives, which can be expensive and dangerous to transport. Both teams are designing mechanisms that travel safely and cost much less than the dangerous explosives. They work with a global non-profit organization called The HALO Trust, which travels to war-torn communities and helps remove landmines. HALO has been involved in demining for over thirty years, and currently operates in thirty-five countries.

The HTL is designed to safely burn through landmines from the side in order to avoid setting them off. The device works by igniting an acrylic burn tube, which acts as a fuel source. Attached to the tube is a ceramic nozzle, which focuses the flame on a specific spot



HTL team testing a new circuit (photo taken pre COVID-19)

Article continued from previous page

answer session was hosted on Zoom afterwards. Participants gave positive feedback on the new format. Looking ahead to spring 2021, the annual symposium may be held online again due to the pandemic.

Lori Zimmerman, Collaboratory Program Manager, says, "I have been very impressed with students as they had to make sudden adjustments in how they worked on their projects and interacted with their team members, project manager, consultants and their partners. Mask-wearing, social distancing and low room capacities have created new challenges for project teams and for all students, staff and faculty this fall. The ingenuity shown by all has been amazing. Even during these challenges, great work has continued."

University staff spent the summer making changes to the engineering department's classroom setup to allow for social distancing and an enhanced experience for remote students. Laboratory spaces are used as lecture halls and the engineering project space in the basement of Frey Hall serves as a classroom throughout the academic week. Collaboratory student leaders even found creative ways to hold weekly Discipleship Community meetings this fall utilizing the outdoors and planning more small group events.



Discipleship Community meets at Shoemaker Field

DEMOGRAPHICS OF COLLABORATORY STUDENT PARTICIPANTS (FY20, ENDING JUNE 30, 2020)

Total number of students actively involved - 218

Engineering	165
Business department	17
Education	5
Science	6
Computer and Math	7
Social Work	3
Sustainability Studies	2
Other majors	13
Seniors	80
Juniors	73
Sophomores	50
First Years	15

CONTACT INFO

If you would like to be added to our mailing list or have questions or comments, please contact:
 The Collaboratory, Messiah University, Suite 3034,
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Collaboratory@messiah.edu
 717-796-1800, ext. 7226

For more information, please visit our website: messiah.edu/collaboratory

MISSION

The Collaboratory is a center at Messiah University for applied research and project-based learning, in partnership with client nonprofit organizations, businesses, governments and communities in our region and around the world. Areas of engagement include engineering, science, health, and information technology. Our two-fold mission is:

- To foster justice, empower the poor, promote peace and care for the earth through applications of our academic and professional disciplines.
- To increase the academic and professional abilities of participants, their vocational vision for lifelong servant-leadership and their courage to act on convictions.

VISION

Increasing hope and transforming lives through education, collaboration, innovation and service.

IDENTITY

The Collaboratory is an organization of students, educators and professionals affiliated with Messiah University. We are Christians who aspire to obey the instructions of our Lord and Savior Jesus Christ, to love neighbors as ourselves and to share his Gospel. As God enables us to serve others today, we seek to grow as disciples of our Lord and Savior Jesus Christ, to serve as God's stewards over the resources of our academic disciplines and to bear witness to the good news of the Kingdom of God.

STUDENT STAFF

Student Director: Mikayla Eyster
 Assistant Student Director: Katie Bunch
 Student Program Manager: Matt Collman
 Student Administrative Assistant: Mik Fenn

PROFESSIONAL STAFF:

Director: Darren Hercyk
 Program Manager: Lori Zimmerman
 Sector Leaders: Darren Hercyk, Derek Plante, Andy Erikson, Tim Howell
 Marketing Team Advisor: Alyssa Heberling



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