

MIT D-Lab

D-Brief 2022-2023
Academics-Research-Practice

"D-Lab inspires people everywhere to make things and feel good about it. You can't get much closer to the MIT spirit than that. From its pioneering development efforts in Haiti to new evaporative cooling devices for safer food storage, D-Lab has tapped into the power of design to make a more equitable world."

- MIT President Rafael Reif
on the occasion of D-Lab's
20th anniversary



Front top: D-Lab students and workshop participants in Turkana, Kenya. Photo: Courtesy MIT D-Lab

Celebrating 20 years at MIT and around the world

This past year, D-Lab celebrated its 20th anniversary! We are grateful to all the students, researchers, communities, and supporters – at MIT and around the world – who have believed in and contributed to D-Lab's mission to develop and advance collaborative approaches and practical solutions to global poverty challenges.

To celebrate, we welcomed hundreds of people to MIT for a day-long program in October.. Students, alumni, international partners, faculty, and staff joined us for panel discussions, hands-on activities, student presentations, and lively conversations about biomass fuels, gender and development, climate change and development, evaporative cooling, lean research, humanitarian innovation, participatory design, and so much more.

Founded with the vision that MIT could play an effective, collaborative, and respectful role in improving the lives of people in resource-constrained communities, D-Lab has come a long way. This D-Brief reviews D-Lab academic, research, and practice programs for the 2022-2023 academic and fiscal year.



Bolivian university student, Mihael, working with D-Lab students and local waste pickers on a drill press. Photo: Courtesy MIT D-Lab

Student and alumni voices

"I heard about D-Lab while I was looking into applying to MIT. It was one of the places I was most excited to get involved in. And to this day is still one of my favorite places at MIT."

- Sally Beiruti '20



"D-Lab was a place where I learned the value of my education and the opportunities it affords me."

- Elliot Avila '14, Co-Founder Imaratech



"Finding out about D-Lab got me super excited. People often underestimate how much knowledge is to be found just from talking to people ... I'm just eager to bring that knowledge and expertise back home."

- Carene Umubyeyi '22



"D-Lab delivered ... I immediately was involved in projects that were changing people's lives right now."

- Joshua Maldonado '22



Subjects Offered 2022-2023

D-Lab offers 12-15 full-semester classes each year. Below are the classes offered 2022-2023 and one January Independent Activities (IAP) class!

D-Lab: Development

11.025/11.472(G)/EC.701/EC.781(G)

Humanitarian Innovation

EC.750/EC.785(G)

Entrepreneurship for the Idealist

EC.703/EC.783(G)

Introduction to Energy in Global Development

2.651/EC.711/EC.791(G)

Applications of Energy in Global Development

2.652/EC.712/EC.782(G)

D-Lab: Schools - Building Technology Laboratory

4.411/EC.713J

D-Lab: Water, Sanitation, and Hygiene

11.474(G)/EC.715

D-Lab: Gender and Development

EC.718/EC.798(G)/WGS.277

Water, Climate Change, and Health

EC.719/EC.789(G)

D-Lab: Design

2.722J/EC.720

D-Lab: Leadership in Design

EC.725

Design for Scale

EC.729/2.729/EC.797(G)/2.78(G)

Global Ventures

MAS.665/15.375/EC.731J

Terrascope: Design for Complex Environmental Issues

2.00C/1.016J/EC.746J

Build Your Own Bicycle

EC.S02 (IAP)

MIT D-LAB ACADEMICS

Under the leadership of Professor Maria Yang, D-Lab Faculty Academic Director, and D-Lab Associate Director of Academics Libby Hsu, D-Lab offered 14 subjects this past year with 181 students enrolled. Fourteen students worked closely with staff on research projects in Cambridge and abroad through MIT's Undergraduate Research Opportunities Program.

In addition to the many popular D-Lab classes, this year we piloted a new class, Entrepreneurship for the Idealist, taught by Manish Bhardwaj, co-founder of Innovators In Health, a healthcare non-profit for the rural poor in India and a fellow of the Dalai Lama Center for Ethics and Transformative Values at MIT. Prior to the start of his class, Manish wrote, *"Fighting injustice holds a particular urgency for our students. I hope this course will empower these idealists to affect real change in the world. My journey working for the rural poor started with MIT IDEAS and D-Lab, so I'm excited to teach the course here!"*

Student projects and fieldwork 2022-2023

Coursework that's grounded in real challenges is core to the experiential learning process, and this past year, our students worked in 54 teams with international community partners in the following countries: Bangladesh, Bolivia, Botswana, Brazil, Cameroon, Colombia, Ghana, Hong Kong, India, Kenya, Mali, Mexico, Morocco, Navajo Nation, Nepal, Nicaragua, Sierra Leone, South Africa, Turkey, Uganda, Ukraine, and the United States. You can find about more about these projects and their outcomes on the D-Lab website under Academics at d-lab.mit.edu/academics.

Travel and fieldwork are core to the student experience. With the easing of COVID-19 restrictions and additional funding from the MIT Social Impact ELO Fund, we were able to significantly increase student travel this year. Forty-three students – nearly one-quarter of students enrolled in our classes – traveled on 11 trips to Bolivia, Brazil, Cameroon, Colombia, Ghana, Kenya, Mexico, and Morocco, to work with international community partners on projects initiated in their classes during the semester. Traveling students were mentored by D-Lab staff and community members who ensured the safety and the success of these trips and the project outcomes.

See below for just one example, in this case, D-Lab: Development students working with the Perkins School for the blind adaptive design center in Yucatan, Mexico. The January trip was the first step in a new partnership between D-Lab and Perkins.

Students collaborate with adaptive design center in Mexico

MIT News, April 2023, excerpt



Participating in an intensive three-week lab in Yucatán, Mexico, changed how MIT junior Penelope Herrero-Marques views her role as an engineer.

As an undergraduate studying mechanical engineering at MIT, Herrero-Marques deeply connected with her

studies, yet always felt that something was missing until she got involved with D-Lab. "I needed the ability to think about social impact more," she says. "What I'll remember the most from this trip was recognizing the value and beauty of simple technology."

MIT D-LAB RESEARCH & PRACTICE

Research and Practice programs at D-Lab continue to give form and substance to our international impact and the D-Lab student experience. Research is led by Professor Kim Vandiver who serves as D-Lab Faculty Director of Research, and Associate Director of Research Kendra Leith. Lecturer and Inclusive Economies Specialist Libby McDonald heads the practice team. These teams work on multiple longterm projects, while advancing approaches to research developed at D-Lab such as Lean Research and methodologies for community engagement such as participatory design and creative capacity building.

Research and practice programs 2022-2023

ASPIRE: A five-year program creating a replicable model for how Latin American universities and their collaborators can respond to local and regional development needs. Funded by USAID with MIT D-Lab, MIT MechE, Universidad del Valle de Guatemala, and AGEXPORT.

Biomass Fuels & Cookstoves: D-Lab's oldest research group working with biochar producers around the world and testing briquettes at D-Lab's Burn Lab.

Evaporative Cooling for Vegetable Preservation: Eight-year old program that recently launched the open-source design for a large capacity forced-air evaporative cooler.

Humanitarian Innovation: With ongoing programs in Rhino Refugee Camp in Northern Uganda, communities in South Sudan, and in Athens, Greece. (See box below.)

Inclusive Economies: Working with artisanal and small-scale miners in Colombia to address gender-based violence and environmental degradation through a formalization process.

Local Innovation: Social science research on processes of local innovation and local systems change in communities facing development challenges.

MIT D-Lab | CITE: USAID-funded evaluation projects since 2012, this year focusing on bicycle use and access in Africa.

Off-Grid Brooder for Cameroonian Poultry Farmers: Two-year-old program working with community partners to develop a simple chick brooder using thermal batteries made from local beeswax.

Publications 2022-2023

D-Lab staff publications from the past year, all of which are available for download from the D-Lab website, include:

The MIT D-Lab Participation Toolkit - Apr 25, 2023 | Amy Smith, Martha Thompson

Participation for Humanitarian Innovation Toolkit - Apr 05, 2023 | ERHLA and MIT D-Lab

Access to Affordable Bicycles in Africa: Final Report - Mar 31, 2023 | Dan Frey, Megha Hegde, Maggie Hsu, Gwyn Jones, Kendra Leith, Robyn Richmond, Jonars Spielberg, and Dan Sweeney

Clay Pot Cooler Training in Mali: Outcomes & Impacts - Oct 17, 2022 | Laura Mogannam, Fatimata Cissé, Kola Sidiki Cissé, Kukom Edoh Ognakossan, and Eric Verploegen

Research Uptake Brief - Oct 09, 2022 | Elizabeth Hoffecker

Building Resilience and Social Cohesion through Local Innovation Ecosystems in South Sudan - Sep 30, 2022 | Linda Ahimbisibwe, Laura Baracaldo, Gemma Pearson and Lydia Tanner

Rehabilitating Goldenberry Production in the Ecuadorian Andes with Regenerative Agriculture - Aug 08, 2022 | Elizabeth Hoffecker and Eunhae Lee

CSIS Panel Proceedings: Transformation Through Humanitarian Innovation and Private Sector Engagement - Jul 19, 2022 | Amy Smith

Handbook of Innovation and Appropriate Technologies for International Development - 2002 | Multiple D-Lab contributing chapter authors | Edward Elgar Publishing

Giving refugees design education – and newfound hope

MIT News, March 2023, excerpt



A 16-year-old Afghan boy said he had always dreamed of becoming a mechanic or engineer, but after being on the move for so long he had let go of his dream. He said the workshop gave him hope.

That first workshop has blossomed into a years-long collaboration between D-Lab

and Faros that has seen the creation of a permanent school in Athens and the development of a curriculum that has given refugees of all genders and backgrounds a crash course on D-Lab's design process.



D-LAB FEATURED AT MIT MUSEUM

In October, the new MIT Museum opened in Cambridge's Kendall Square. The first exhibit as you enter the main galleries on the second floor is titled "Essential MIT" and the first display, "Designing Involvement," features four MIT D-Lab projects along with texts and videos. The projects included are evaporative cooling, Saathi Pads, agricultural waste charcoal, and SurgiBox.

D-Lab student reports and reflections

An element of every D-Lab student field experience is reporting and reflecting on the specific project as well as the full intercultural experience. Many students find that their fieldwork transforms how they think of themselves, their studies, and their world. See below for a few examples and visit d-lab.mit.edu/blog for more!



Gaining insight into public health in rural Turkana County, Kenya March 02, 2023 | Shulammite Lim



Creative Capacity Building for Circular Economy Design in Cochabamba, Bolivia February 16, 2023 | 2023 IAP D-Lab: Development & D-Lab: Gender and Development Teams



A Creative Capacity Building model for sexual and reproductive health workshops in Kenya August 08, 2022 | Sarah Ladhani



Evaporative Cooling for Fruit and Vegetable Preservation in Turkana July 15, 2022 | Ava Distelbloem and Christine Tang



My journey through MIT D-Lab to Moving Health July 11, 2022 | Aditya Mehrotra

Alumni, students, and ventures in the news

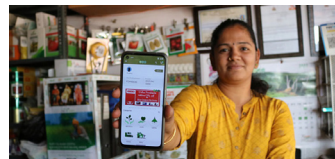
Many of our students continue the work they started in a D-Lab class for years to come. Some pursue academic research, others develop products and services and start businesses. See below for just a few news articles about our alumni and visit d-lab.mit.edu/news for more!



Kwami Williams, True Moringa Alum aims to prove that money does grow on trees April 25, 2023 | MIT Technology Review



Emily Young, Moving Health Moving Health unveils new ambulance design March 28, 2023 | 3News (Ghana)



Essmart Getting innovative products to rural communities September 20, 2022 | MIT News



Jana Saadi Leveraging computational tools to enhance product design August 10, 2022 | MIT News



Kristin Kagetsu Meet the Activist Behind India's First Biodegradable Menstrual Pad August 04, 2022 | Global Citizen

Looking ahead

As we look ahead, D-Lab will continue to serve as a hub for equitable design at MIT, harnessing the strengths of the MIT community and our partners around the world to address global poverty challenges. We plan to increase our collaborations with MIT faculty and labs and embed a systems lens into our research and practice programs to achieve significant and sustained impact on development outcomes abroad. And, we intend to provide even more opportunities for students to bring their whole selves – their expertise, empathy, and curiosity – to the important work they do with D-Lab as effective global change-makers.



MIT D-Lab designing for a more equitable world

MIT Massachusetts Institute of Technology